CRITICAL HUMAN SUCCESS FACTORS FOR ERP PROJECTS

NÜKET İYİGÜN

BOGAZICI UNIVERSITY
2011

CRITICAL HUMAN SUCCESS FACTORS FOR ERP PROJECTS

Thesis submitted to the
Institute for Graduate Studies in the Social Sciences
in partial fulfillment of the requirements for the degree of

Master of Arts
in
Management Information Systems

by

Nüket İyigün

Bogazici University
2011

Thesis Abstract

Nüket İyigün, "Critical Human Success Factors for ERP Projects"

Many companies invest huge amount of money on Enterprise Resource Planning (ERP) solutions in order to build strong capabilities, improve their performance, improve operations and profitability, undertake better decision-making, and achieve a competitive advantage. But unfortunately every one of two companies is not satisfied with the results after implementation.

The multipurpose objectives of this study can be briefly summarized as to identify the critical human success factors (CHSFs) and the success measurement factors (SMFs) for ERP projects by compiling relevant scales from the related Information Systems (IS) literature and expert opinion, after that to analyze and evaluate the impacts of these CHSFs on ERP project success by combining different project stakeholder perspectives. On the other hand there exists a high correlation between the CHSFs which bring another main objective that is to examine the relations between critical human success factors and ERP project success on a 3-staged framework built according to the project phases.

Data collected online from 215 people, 28 different companies was analyzed by using descriptive, reliability and linear regression analyses to test the hypotheses and provide the findings. The findings are remodeled by using structural equation modeling (SEM) method to determine the impacts of the critical human factors on each other and on ERP project success by using partial least squares (PLS) technique.

The scales found meaningful according to the reliability analyses. The effects of the CHSFs on ERP project success are analyzed one by one, which resulted as Setting Clear Goals, Objectives and Success Criterias, Presence of a Project Champion, User Training, Project Team Composition and Quality, Communications Management Quality, Scope and Change Management Quality and Vendor Quality have a positive impact on ERP Project Success and there are some significant differences between the stakeholders about the perception of these factors.

Furthermore, the PLS analysis findings show that: as initial stage Presence of a Project Champion, Presence of Top Management Support and Vendor Quality have a positive impact on Setting Clear Goals, Objectives and Success Criteria's and Project Team Composition and Quality; at the second stage, Project Team Composition and Quality resulted as having a positive impact on Scope and Change Management Quality, Communications Management Quality and User Training while Setting Clear Goals, Objectives and Success Criteria's resulted as having a positive impact on Scope and Change Management Quality and User Training and a negative impact on Communications Management Quality; finally, Scope and Change Management Quality and User Training show positive impact on ERP project success while Communications Management Quality resulted negatively and there are again perceptional differences observed on project stakeholders views.

Tez Özeti

Nüket İyigün, “ERP Projelerinde İnsan Kaynaklı Kritik Başarı Faktörleri”

Günümüzde birçok şirket, yönetim efektifliğini arttırmak, performansı iyileştirmek, operasyon kabiliyetlerini ve karlılıklarını arttırmak, daha iyi karar verme altyapısı oluşturmak ve rekabet avantajı yaratmak için Kurumsal Kaynak Planlama çözümlerine (KKP) yüklü miktarda yatırım yapmaktadır. Ne yazıkki her iki şirketten biri uygulamanın sonuçlarından memnun olmamaktadır.

Bu çalışmanın ana amaçları, KKP sistemeleri entegrasyonu sırasında proje başarısına etki eden insan kaynaklı kritik başarı faktörelerinin (İKKBF) ve KKP proje başarısı ölçüm faktörlerinin, KKP uygulamaları konularındaki kaynakça ve uzman görüşleri de referans alınarak derlenen ölçeklerle belirlenmesi ve sonrasında İKKBF’nin KKP proje başarısı üzerindeki etkilerinin farklı proje paydaşlarının görüşleri bütününde incelenip değerlendirilmesidir. Ayrıca bu faktörler arasındaki korelasyonun yüksek olması nedeniyle, çalışmanın diğer bir hedefi de, KKP insan kaynaklı kritik başarı faktörlerinin birbirleri ve KKP projesi başarısı üzerindeki etkilerinin, proje aşamalarına gore sunulan üç katmanlı bir modelde incelenmesi olarak belirlenmiştir.

Çalısma kapsamında, uygun bir arastırma modeli kullanılarak toplam 28 farklı firmadaki 215 kişiden çevrimiçi olarak toplanan veriler tanımlayıcı istatistik ve hipotez testleri ile analiz edilmiştir. Elde edilen sonuçlar yapısal denklik modeli yöntemi kullanılarak modellenip ve insan kaynaklı kritik başarı faktörlerinin kendi aralarındaki ve KKP proje başarısı üzerindeki etkileri Kısmi En Küçük Kareler Yöntemini kullanılarak tespit edilmiştir.

Güvenilirlik analizleri sonucunda ölçekler anlamlı bulunmuş olup; proje amaç, hedef ve başarı kriterlerinin net bir şekilde belirlenmesi, proje takımı ve kompozisyonunun kalitesi, iletişim yönetiminin kalitesi, kapsam ve değişiklik yönetiminin kalitesi, kullanıcıların eğitimi, kullanılan dış kaynak hizmetinin kalitesi, üst yönetimin desteğinin ve proje sponsorunun varlığının proje başarısına üzerinde olumlu etkilerinin olduğu ispat edilmiş ve bu etkilerin proje paydaşlarının bu faktörlerle ilgili algıları bazında önemli olarak değerlendirlebilecek farklılıklar gösterdiği tespit edilmiştir.

Ayrıca en küçük kısmi kareler analizi sonuçlarına gore de kullanılan dış kaynak kalitesinin, üst yönetim desteğinin ve proje sponsorunun varlığının, proje amaç, hedef ve başarı kriterlerinin net bir şekilde belirlenmesi ve proje takımı ve kompozisyonunun kalitesi üzerinde pozitif yönde bir etkilerinin olduğu; proje amaç, hedef ve başarı kriterlerinin net bir şekilde belirlenmesi ve proje takımı ve kompozisyonunun kalitesinin de iletişim yönetiminin kalitesi, kapsam ve değişiklik yönetiminin kalitesi ile kullanıcıların eğitimi üzerinde pozitif etkilerinin olduğu tespit edilmiştir. Son olarak da kapsam ve değişiklik yönetiminin kalitesi ile kullanıcıları eğitiminin KKP proje başarısı üzerinde pozitif yönde, iletişim yönetiminin kalitesinin ise negatif yönde bir etkisi olduğu belirlenmiş yine bu etkilerin proje paydaşları bazında değişkenliği gözlemlenmiştir.

ACKNOWLEDGMENTS

I would like to express my special thanks to my advisor Prof. Dr. Meltem Özturan for her support and valuable remarks.

I'm also thankful to Assist. Prof. Dr. Özgür Döğerlioğlu and Assoc. Prof. Dr. Adem Karahoca, for participating in my thesis committee and their guidance during the study.

I owe very special thanks to my friends Arzu Tunçalp, Ali Rıza Dikici, Gonca Gülser, Tolga Yıldırım who never stopped supporting me by both socially and academically during my study.

I would especially like to thank TUBITAK (The Scientific and Technical Research Council of Turkey) for supporting me during my graduate study.

Finally, I dedicate my thesis to my parents Sema and Orhan İyigün who have shared all good and bad memories of educational life with me.

CONTENTS

FIGURES

TABLES

CHAPTER 1

INTRODUCTION

Nowadays many companies invest huge amount of money on ERP software with the expectation that it will help to build strong capabilities, improve their performance, improve operations and profitability, undertake better decision-making, and achieve a competitive advantage. But unfortunately every one of two companies is not satisfied with the results after the application of ERP.

ERP usually sounds like a good idea, but it's not suitable for every company. It can provide a huge value to small- to large-size organizations both in terms of technical and organizational issues, but it depends on what the company is looking for and how well the company is ready to implement and adopt it. What was keeping them away from having an ERP success story? The problem is usually not with the software itself, the way it is applied and the main failure points include things like insufficient business process definition, poor project management, and inadequate executive buy-in which contribute to a relatively low satisfaction level of ERP.

There are many possible issues leading the success of ERP projects, often captured by means of success factor groups (Al-Mashari et al., 2003). The most important factor in these projects is assumed to be the human factor, which includes the project stakeholders' angle from shareholders to end-users. This research seeks to identify these critical human success factors that affect ERP projects as a guide to ERP project management by compiling relevant scales from the related systems development life cycle (SDLC), ERP literature, developing a new scale for understanding (or

measuring) the success of an ERP project for different stakeholder types in the project environment.

The multipurpose objectives of the study can be briefly explained as follows:

- Defining critical success factors for ERP based on literature survey
- Selecting critical human success factors for the study
- Defining ERP project success measurement factors based on literature survey and expert opinion
- Associating critical human success factors with ERP project success by using ERP project success measurement factors
- Analyzing the relations between critical human success factors and ERP project success

In the literature there are many diverse studies about "ERP Critical Success Factors" but there are just few studies about "Human Success Factors" for ERP projects.

For these purposes a survey research is conducted (questionnaire based) to study the human critical success factors of ERP and to study the success of ERP systems. The questionnaires were being asked to three different stakeholder groups: The ERP project managers, ERP project team members and the end users. Data collected online from 215 people, 28 different companies were analyzed by using descriptive, reliability and linear regression analyses to test the hypotheses and provide findings.

This is the first study of this type ever conducted in Turkey. The originality of this work also lies on the qualitative aspects addressed in the questionnaire like the value added provided by ERP systems in terms of satisfaction, as well as intention to use while implementing and using ERP systems.

In this paper, the findings are provided under the form of summarized descriptive statistics and hypotheses testing. For the hypotheses testing section, the Partial Least Squares Path Modeling (PLSPM) is used as Structural Equation Modeling (SEM) technique.

CHAPTER 2

BACKGROUND

Enterprise Resource Planning (ERP)

ERP is an integrated approach, which combines all of the functions of an enterprise to create a single system that serves the requirements of each different department.

Muscatello et al. defined ERP as the technique and concepts employed for the integrated management of business as a whole, from the viewpoint of the effectiveness use of management resources, to improve the efficiency of an enterprise in 2003.

An ERP system is packaged business software that promotes seamless integration of business processes and functions and all the information flowing through a company and a unified enterprise view of the business that encompasses all functions and departments and an enterprise database where all business transactions are entered, recorded, processed, monitored, and reported.

ERP systems, which are broadly implemented as the backbone of many manufacturing service firms, demonstrate a holistic vision of a business by enabling the sharing of common data and practices in a real-time environment (Davenport, 1998a; Dillon, 1999; Klaus et al., 2000; Muscatello et al., 2003; Dawson & Owens, 2008).

Benefits of ERP

ERP systems are adopted by organizations for a variety of reasons but the first main advantage of ERP is to obtain information to organizations in a standardized, centralized, and cost efficient way consistently (Olson et al., 2005). This unified view increases the need for, and the extent of, interdepartmental collaboration and coordination, which also help companies by enabling increased communication and responsiveness to all stakeholders (Dillon, 1999).

A successful ERP system can decrease the operating costs, generate more accurate demand forecasts, speed production cycles, and enhance customer service.

Use of ERP also result in a reduction in manufacturing lead times, inventory, handling costs, working capital, improvement in efficiency, and increase in profitability because materials management planners had access to more accurate data and could perform a better job forecasting future demand (Goodpasture, 1995; Appleton, 1997; Brakely, 1999; Stein, 1999; Muscatello et al., 2003; Umble et al., 2003; Davenport & Brooks, 2004; Khosrow-Pour, 2007).

ERP systems have outcomes as improved cash management, reduction in personnel requirements and overall information technology (IT) costs by removing unnecessary information and computer systems (Loizos, 1998; Stein, 1999; Umble et al., 2003).

Other potential paybacks of ERP includes plentiful focused information about customer expectations and needs, and the capability to view and manage the extended

enterprise of vendors, alliances, and customers as an integrated whole (Muscatello et al., 2003).

In most of the companies ERP helps to track the logistics key performance indicators (KPIs) more closely, which provide more reliable delivery dates, lower total costs in the entire supply chain by a better Warehouse Management and Advanced Planned Optimizer modules. Through accurate timing of order replacement, the system creates orders to control work-in-processes and raw material inventories (Gupta & Kohli, 2006).

Facts about ERP

The popularity of ERP systems adoption started to increase in the early 1990s and has developed into one of the most well known software applications used in enterprise wide business processes management (Holland et al, 1999a). Since the last part of 1990s, firms got a hustle on implementing enterprise resource planning systems (Yingjie, 2005). A study by Stewart et al. (2000) states, "Enterprise Resource Planning Systems have been adopted by over 60% of Fortune 500 companies" (p.966). Another study by Deloitte Consulting LLC, 25% of the 64 Fortune 500 companies reviewed said they suffered a decrease in performance after go live with the ERP systems (Muscatello, Small, & Chen, 2003; Khosrow-Pour, 2007). As a major fact about ERP projects, with the failure notices of ERP adopting companies it has became an issue whether to implement an ERP software or not.

In 2001, Robbins-Gioia, a provider of management consulting services located in Alexandria - Virginia, made a study over the perception by enterprises of their

adoption of an ERP package, reported that 51% of ERP projects are considered failures and 30% over budgeted and over-scheduled by a wide margin (Caruso, 2007), 25% of organizations in Kumar et al.'s study (2003) faced significant resistance from staff and "about 10% of the organizations also faced resistance from managers" (p.799), Austin and Nolan of the Harvard Business School exposed that 65% of executives believe that ERP could be harmful to their organizations because of the problems that occurs during the application of ERP projects (Cliffe, 1999; Khosrow-Pour, 2007).

Application of ERP Projects

Application of ERP projects is a social change as well as a technical one. According to Al-Mudimigh et al. (2001) this is a challenge that requires a basically different viewpoint from technologically driven innovation. Additionally the challenge will be based on a balanced perspective where the organization as a total system is considered. ERP application is considered to be dependent on behavioral processes and actions, which includes two separate approaches, which are from macro and micro point of views at the strategic and operational levels respectively. Therefore this means that an on/off approach is not applicable for the context of ERP systems, if the system is expected to yield the desired and expected results. (Al-Mudimigh et al., 2001)

Understanding this balanced ERP application approach will prevent any unforeseen obstacles, and will guarantee and guide the change process to be experienced as a painless period. In addition, the balanced perspective advises to keep socio-technical considerations in mind. The resulting strategic, tactical and operational steps

and expected results must be defined, and evaluated in order to create flawless and robust integration. (Al-Mudimigh et al., 2001)

ERP solutions are not designed for a specific company; they are like a dress that everybody can fit in it in some ways. But if a company wants to use it efficiently should find a way to shape it like a tailor to fit its structure best, that's where the application of ERP takes role in ERP processes. As cited by Stewart et al. (2000), Davis & Olson, 1985 described application of an ERP as preparing an organization to obtain an information system for its effective use.

Another point that shouldn't be skipped is that one can put weight on or lose weight by time, which means only buying and fitting an ERP solution at the beginning doesn't guarantee a successful result. ERP solution should be kept fixed to company's size and controlling it if it still satisfies the enterprise needs. That's where the post audits and upgrades appear.

There are lots of factors affecting an ERP process success from decision-making to adoption and to post audits. Therefore for an efficient and successful ERP solution a company should be aware about all these factors to fit it as best as it can.

Systems Development Life Cycle (SDLC)

Like many projects, the information system development projects are often follows a life cycle. The SDLC is a methodology that the systems are best developed through use of a specific cycle of systems stakeholder activities, which is used in information system development projects (Kendall, 2005).

Marakas (2006) expresses that the SDLC is a methodology that has developed over the last few decades into a widely accepted structured approach to systems development. The specific stages and their sequence are meant to be adapted as required for a project, consistent with management approaches (Hoffer et al., 2002).

Dennis and Wixom (2003) identify the SDLC the stages as; system planning, system analysis, system design, and system implementation. Satzinger et al. (2004) defined SDLC in five separated phases: system planning, system analysis, system design, system implementation, and system support. According to Avison and Fitzgerald (2003a; 2003b), the SDLC the stages consists of seven separate phases: feasibility study, system investigation, system analysis, system design, system development, system implementation, and system maintenance. Stair and Reynolds (2006) define five SDLC phases: system investigation, system analysis, system design, system implementation, and system maintenance and review. Marakas (2006) stated that there are six separated SDLC phases: preliminary investigation, system analysis, logical design, physical design, system implementation, and system maintenance. According to Whitten et al. (2004), the SDLC methodology is a combination of five sequential phases: system initiation, system analysis, system design, system implementation and system support and continuous improvement.

There are a lot of slightly different SDLC models, from three to almost twenty particular stages required to develop a system in the literature (Whitten et al., 2004; Satzinger et al., 2000; Hoffer et al., 2002) but essentially a new information system development involves three major sets of activities which are analysis, design and implementation. There can be two major phases added to this structure, planning as the

first phase and support & maintenance as the last phase (Satzinger et al., 2000; Hoffer et al., 2002).

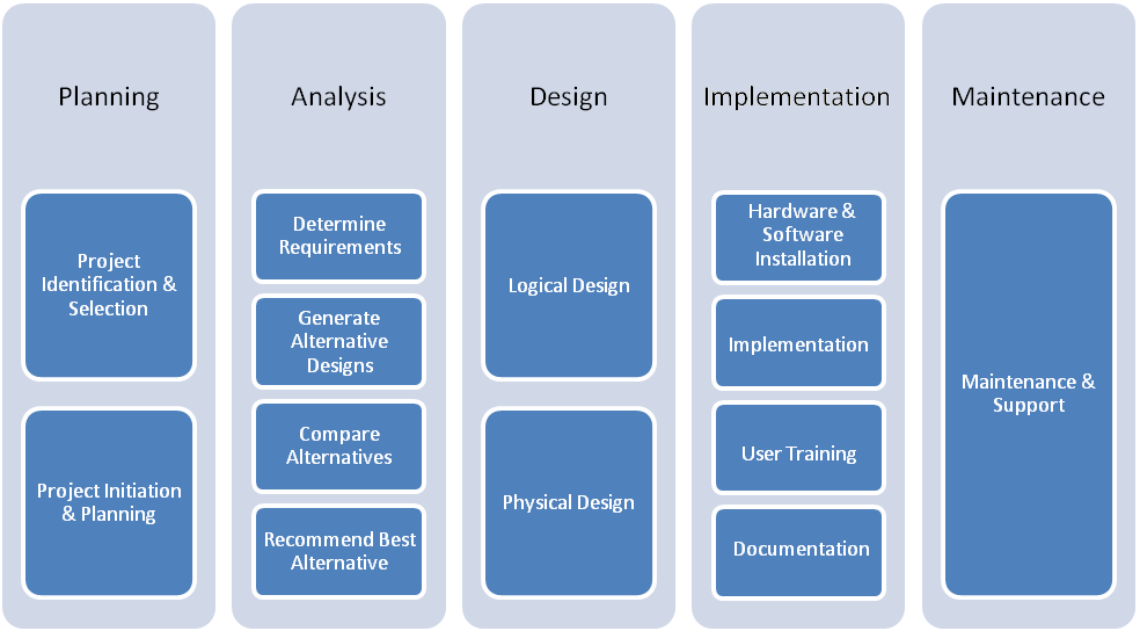


Figure 1.The SDLC Model

(Source: Hoffer et al, 2002)

Figure 1 summarizes the approach for SDLC as fallows;

Planning Phase

Planning is the first phase of the SDLC where project identification and selection can be considered as the first part of it in which organizations total information requirements are identified, analyzed, prioritized and translated into a project schedule. Project initiation and planning can be considered as the second part of the planning phase of the SDLC in which a possible information systems (IS) project is clarified and the project feasibility argued for continuing or not continuing with the project is presented (Hoffer et al., 2002; Satzinger et al, 2000).

Analysis Phase

Analysis is the second phase of the SDLC in which the current system is studied, the requirements of the new system are recognized and documented, the alternative replacement systems are proposed (Hoffer et al., 2002; Satzinger et al, 2000).

Design Phase

The design is the third phase of the SDLC which has the main goal of designing the solution system based on the requirements defined and decisions made during analysis and converting this solution into logical and then physical system specifications (Hoffer et al., 2002; Satzinger et al, 2000). According to Satzinger et al. (2004), less user involvement and more IT professionals' contribution as team members is needed than the other phases in design phase.

Implementation Phase

The implementation is the fourth phase of the SDLC. According to Satzinger et al. (2004), all activities that occur prior to any end-user interaction compose this phase. A large management and technical attempt is required to create an operational system that meets the documented system requirements and physical design that is integrated with any existing system. Whitten et al. (2004) categorize SDLC activities in this phase particularly as construction, testing, installation, and delivery. New hardware and software are established and tested; customization and integration effort is performed (Whitten et al., 2004). According to Stair and Reynolds (2006), associated tasks include obtaining a variety of components in the system design and assembling them into an

operational system. System documentation is completed and adequate end-user and system administration training is accomplished (Marakas, 2006; Satzinger et al., 2004).

Maintenance Phase:

Maintenance is the final phase of SDLC in which an information system is systematically repaired and improved; the new versions or releases of software with the related updates to documentation, training and support are published (Hoffer et al., 2002).

Satzinger et al. (2000) describe that the main goal of the systems support phase is to keep the system running efficiently during many years of systems lifetime following its initial installation.

Stakeholders for ERP Systems Projects

In present IS literature for ERP systems projects, since the purpose of this research to study CHSF of ERP Projects, as systems development environment a stakeholder, by classical definition made by Freeman (1984), is any group or individual who can affect or is affected by the success of the organization's objectives or in other words can be identified as any person who has a concern in an existing or new information system, who can be technical or non-technical (Shelly & Rosenblatt, 2009)

Stakeholders are "the primary source" for software projects by the meaning of requirements (Bittner & Spence, 2003, p.55). Stakeholders have a unique vision of the system and their perceptions affect the viability of strategic action (Haberberg and Rieple, 2001). Application of an ERP System can be defined as an important strategic action which is also a change initiative and such strategic actions require the engagement

and acceptance by stakeholders otherwise it is unlikely that any change will bring the potential benefits undertake (Finney, 2011). The ERP system is conceived, created and maintained by means of stakeholders' coordinated efforts. There are different kinds of stakeholders in ERP projects, such as people as well as groups with different perceptions, attitudes, levels of interest, degrees of power and influence both from inside or from outside an organization, even from different companies and countries (Boonstra & De Vries, 2008; Freeman, 1984). The stakeholder theory detailed by Freeman (1984) offers techniques to identify and manage stakeholder goals and objectives, which is done from two perspectives: "inside-in" and "inside-out". As noted by Freeman (1984)(as cited in Ifinedo & Nahar, 2006a; Finney, 2011) the inside-in perception regards as people internal to the company, such as employees and managers , while the inside-out perspective considers groups associated with the organization, but to a minor level and in a different conception, such as shareholders and partners.

Wilkes and Dickson (1987) define the stakeholders in their study as top management, IS managers and internal auditors. Similarly, Singletary et al. (2003) identify stakeholders as managers, IT professionals, and end users. In their study about measuring ERP success from stakeholder perspective with 27 organizations in Australia, Sedera et al. (2004) classify their stakeholders as strategic employees, technical staff, and end users. Somers and Nelson (2004) list "top management" among key organizational players in ERP systems. Ifinedo and Nahar (2006a) use two groups as stakeholders which are business managers and IT professionals. It reveals in the literature that identified stakeholder groups have included managers, IT professionals, end users, and internal auditors (Infinedo & Nahar, 2007).

Lyytinen et al. (1998) state that the identified stakeholders may extend to broader groups based on research purpose. For example, Legris and Collerette (2006) propose an ERP application process figure which has stakeholders as project managers, vendors, users and system owners while Akkermans and Van Helden (2002) define stakeholders group as project managers, vendors, project champion and top management.

Many researchers in the literature note that there are differences in stakeholder perspectives of an information system. Boonstra (2006) states that "The board of management, the managers of the different business units, the IS-department and an external consultancy" attach different meanings to the system and acts accordingly, also depending on their power, their legitimacy and the degree of urgency they feel." (p.50).

Schein (1992) contend that top management and the IT personnel can be viewed as distinct subcultures which have different IT visions and also there is a cultural gap between business and IT which affects the information flow through the company. Likewise, Ward and Peppard (1999) introduce some cultural gaps between IT and business departments in their research. They state that the way IT is managed in organizations is often dependent on whether business managers perceive IT to be strategic. For the ERP side of the literature, the research of Singletary et al. (2003) introduces that there are significant differences between managers, IT professionals and end-users on characteristics, advantages and disadvantages of ERP projects.

It has been indicated by Finney (2011) that the majority of study in the literature has been managerially focused and there is a lack of stakeholder perspective in the present researches. Kossek's (1989) and Amoako-Gyampah (2004), advise that

understanding of any variations between the stakeholders perceptions can be helpful for the implementers to develop proper intervention methods such as training and communication, for a successful ERP project.

Furthermore, given the different organizational roles and perspectives between the stakeholder groups, this study includes the below four groups as stakeholders by thinking that each group might provide useful insights concerning ERP systems success assessments.

(1) Top Management and Project Managers:

Top management, general managers, IS project managers and project champion as system owners who are the information system's sponsors and chief advocates. Who are usually responsible for setting the scope and purpose of the project according to the organization's vision, goal and objectives defined from the main strategies, funding the project to develop, operate and maintain the information systems and they usually deal with the costs and benefits of the project from an upper level view (Hoffer et al., 2002).

(2) Project Team Members:

Systems analyst who studies the problems and needs of an organization to determine how people, data, processes, communications, and IT can best accomplish improvements for the business, and is responsible for the efficient data capture from its business source; data flow to the computer; data processing and storage by the computer; useful and timely information flow back to the business and its people and whom must be involved in all of the steps of SDLC (Hoffer et al., 2002; Satzinger et al., 2000);

System designers who translate system users' business requirements and constraints into technical solutions and deal with the question that "How the system will be implemented?" by designing the computer files, databases, inputs, outputs, screens, networks, and programs that will meet the requirements of the system users (Hoffer et al., 2002; Satzinger et al., 2000);

System builders (Developers) who construct the information system components based on the design specifications from the system designers and deal with the systems components and actual, technical implementation of the system (Hoffer et al., 2002; Satzinger et al., 2000);

Key users who help the analysts to define the user requirements and who test, evaluate and define the system from the end users' view as a part of the project team.

(3) End Users:

System users who use or are affected by the ERP system on a regular basis by capturing, validating, entering, responding to, storing, and exchanging data and information and interested with the question that "What the system 'is' and 'must do' independent of technology?" which can be divided into two groups as internal users and external users (Hoffer et al., 2002; Satzinger et al., 2000);

(4) IT vendors & Consultants:

External agents of the system who sell hardware, ERP software and services to businesses for merger of these systems, deal with the prospective IT and the architecture and are involved to the SDLC steps as an option and choice of the organizations (Hoffer et al., 2002; Satzinger et al., 2000);

CHAPTER 3

LITERATURE SURVEY

Critical Success Factors for ERP Projects

Consensus exists on the fact that implementing an ERP system is not an inexpensive or risk-free project and it is one of huge complexity (Chetcuti, 2008; Umble et al., 2003). In fact, as it is stated in the facts of ERP section, Cliffe (1999) states that approximately 65% of executives believe that adopting an ERP system would probably hurt their businesses because of the potential problems that occur during the application process of ERP projects.

There are many conditions and factors can potentially affect the result of ERP projects (Chetcuti, 2008). It is therefore useful to examine the factors that, to a broad coverage, decide whether the project will be successful (Umble et al., 2003).

The critical success factors (CSFs) theory was first introduced by Daniel in 1961, in a focused approach on industry-related CSF, which are relevant for any company in a particular industry. Later, Anthony et al. (1972) point the need to adapt CSF to both a company's particular strategic goals and its particular executives. In 1979, Rockart goes a step further by combining the perception of both Daniel (1961) and Anthony et al. (1972), with a study on three organizations to identify the data needs of Chief Executive Officers (CEOs), which states that organizations in the same industry may shows different CSFs. According to Amberg et al. (2005) the motivations for such a gathering stands on the facts as different geographical locations and different strategies among

other factors. Since then CSF approach become popular in a number of studies by many researchers linking business and IT (Rockart, 1992).

Rockart (1979) identifies CSFs as those few significant areas where things should go right for the business's benefit. There exists to be a flourishing competitive advantage for the organizations if the results in these areas are successful, in the other case according to Ives (1993) the organization's effort for the period will be less than expected. According to Hossain & Shakir (2001) critical success factors are often used to describe and categorize the key elements that are necessary for the success of a business function. By pointing the importance of the limitation on the number of the CSFs by stressing 'few' and must go 'right', Khandelwal and Fergusson (1999) indicates that project managers can focus on the CSFs until they are successfully achieved. Chetcuti (2008) and Soja (2006) argue that these critical factors could have a positive effect on the results of an ERP project, while their absence could initiate difficulties during the application. Similarly, it is stated by Yeoh et al. (2006) that meeting the required CSFs may not guarantee the success of the ERP system, but failure to consider the CSFs will be a major constraint for the organization.

Several authors have identified a variety of factors that can be considered to be critical to the success of an ERP project (Umble et al., 2003). Parr et al. (1999) analyses potential CSFs on the basis of a research sample that consists of ten experts who had participated in a total of 42 ERP projects, mainly as project managers, eleven CSFs are indentified as necessary for successful application of ERP systems which are; top management support, external expertise, balanced project team, data accuracy, clear goals, project management, change management, education and training, presence of a

champion, minimal customization, best people full-time (Parr et al., 1999; Shanks et al., 2000; Soja, 2006).

Esteves and Pastor (2000) suggests an ERP project CSFs unified model consists of 22 factors that are categorized into strategic and tactical factors from organizational and technological perspectives. They analyze the evolution of organizational and technological critical success factors along the ERP phases. The highlighted CSFs in Esteves and Pastor's (2000) study are; sustained management support, effective organizational change management, good project scope management, adequate project team composition, adequate project champion role, user involvement and participation, trust between partners, dedicated staff and consultants, strong communication, formalize project plan/schedule, adequate training program, preventive trouble shooting, appropriate usage of consultants, empower decision makers, comprehensive business process reengineering (BPR), adequate ERP implementation strategy, avoid customization, adequate ERP version, adequate infrastructure and interfaces, adequate legacy systems knowledge, formalized testing plan, adequate data migration process (Esteves & Pastor, 2000; Esteves & Pastor, 2006).

Likewise Nah et al. (2001) purposes a model of 11 CSFs based on literature review which are identified by 54 chief information officers (CIOs) adopting ERP to their organizations. These 11 CSFs were appropriate business and legacy systems, business plan and vision, BPR, change management culture and program, communication, ERP teamwork and composition, monitoring and evaluation of performance, project champion, project management, software development, testing and troubleshooting, top management support (Nah et al., 2003).

Somers and Nelson (2001) note 22 CSFs by describing the importance of CSFs through the phases of ERP projects using the responses from 86 organizations adopting ERP. From their broad list of 22 CSFs for ERP projects, in overall ranking, the most important are: top management support, project team competence, interdepartmental cooperation, clear goals and objectives, project management, interdepartmental communication, IT architecture choices, vendor support, user training, careful package selection, change management

Akkermans and Van Helden (2002) describe a list 10 CSFs which were identified by Somers and Nelson (2001) and used to analyze the project performance in one ERP application in the aviation industry. They present that these CSFs are interrelated to each other in a cyclic manner and interdepartmental communication within the project team is the core process for project progress. There is also other CSFs that are found to be important are top management support, project management, project champion and vendor support.

Al-Mashari et al. (2003) presents a classification of ERP CSFs where 12 factors were divided into three dimensions related to the stages of ERP project, which are: setting-up, deployment and evaluation. The taxonomy used in their study reflects necessary characteristics of ERP systems which is built based on the principles of business process management. It also shows the fact that evaluation and monitoring the performance of ERP system's project can lead implementers to the achievement of all the business desired goal and objectives. Finally, the authors suggest that the most crucial factors of achievements and the pre-requisite for successful ERP projects are leadership and commitment (Al-Mashari et al., 2003).

Umble et al (2003) identify success factors, software selection steps, and implementation procedures critical to a successful ERP projects. They present and discuss a case study of a successful ERP project in terms of CSFs during and highlighted 9 CSFs for ERP systems projects as the most prominent in their study; clear understanding of strategic goals, commitment by top management, excellent project management, organizational change management, a great implementation team, data accuracy, extensive education and training, focused performance measures, and multi-site issues.

Bhatti (2005) firstly indentifies 11 CSFs from the ERP literature: project management, business process reengineering, users training, technological infrastructure, change management, top management support in ERP projects, communication in ERP projects, team composition in ERP projects, users' involvement in ERP projects, consultant's involvement in ERP projects, clear goals of ERP projects. Then he validates these CSFs with a survey responded by 53 organizations each had adopted ERP system and the respondents had experience in either been involved in ERP application process of their organization by using 65 item instrument that measures seven dimensions of ERP projects.

Yeoh et al. (2006) conducts in-depth interviews with 15 business intelligence (BI) specialists of engineering asset management area to identify factors critical for successful adoption of BI systems. The project success of Yeoh et al.'s (2006) study takes into account two key dimensions: infrastructure performance and process performance to compare the CSF with the project success. The authors identify ten CSFs from the literature that are important for adopting a BI system and amongst the findings,

CSFs such as committed top management support, user involvement, team skills and composition, quality of data sources, adequate project scoping, found to be decisive for the success of such an undertaking (Yeoh et al., 2006).

In another study by Foster et al. (2007) emphasizes the importance of change management and human factor in a study with responses from 208 European organizations with the experts who applied change management in their projects.

Chetchuti (2008) categorizes known critical success factors and presents these to multiple stakeholder groups for acceptance in a drive to discover the requirements for successful ERP projects; the results show that the top management support and the implementation strategy and project management are the most prominent CSFs according to the stakeholder agreement in the study.

Kronbichler et al. (2009) collects 78 different CSFs identified in the literature and aggregates them into 15 parallel groups because authors mentioned the same CSFs with different notations. These CSFs in Kronbicler's (2009) study were analyzed producing a final list of most outstanding thirteen CSFs that presented in Table 1 including the related literature references. There is a limitation of this methodology that the numbers of CSFs are depending on the detail which is used by the researcher according to their study **(**Kronbichler et al., 2009).

The results of the above-mentioned study on ERP projects success factors show the potential success factors and the results of research differ substantially from each other and the factors proposed by the researchers, covering a wide range of aspects, represent various levels of generalization (Soja, 2006).

Table 1. The CSFs Derived from the Literature

Critical success factors	References
Setting Clear Goals, Objectives and Success Criterias *Business plan and vision, clear understanding of strategic goals, management of expectations, adaquate ERP implementation strategy, motivation behind ERP implementation, business case,* *Performance measures, monitoring and evaluation of performance*	Parr et al, 1999; Somers & Nelson, 2001; Al-Mashari et al., 2003; Umble et al., 2003; Bhatti, 2005; Yeoh et al., 2006; Foster et al., 2007; Chetcuti, 2008 Nah et al., 2003; Umble et al., 2003;
Presence of Top Management Support *Sustained management support, top management commitment to project; fit to business strategy*	Lamont, 1999; Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Nah et al., 2003; Umble et al., 2003; Bhatti, 2005; Yeoh et al., 2006; Foster et al., 2007; Chetcuti, 2008
Presence of a Project Champion *Adaquate project sponsor role, empowered decision makers, project champion*	Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Nah et al., 2003; Yeoh et al., 2006; Chetcuti, 2008
User Training *Education and training, adaquate training program , user involvement and training*	Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Umble et al., 2003; Bhatti, 2005; Yeoh et al., 2006; Foster et al., 2007
Project Team Composition and Quality *Project team and composition, adequate project team composition, ERP teamwork and composition, dedicated resources, project team competence, balanced project team, best people full-time*	Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Nah et al., 2003; Umble et al., 2003; Bhatti, 2005; Yeoh et al., 2006; Chetcuti, 2008
Communications Management Quality *Interdepartmental communication, interdepartmental cooperation, multi-site issues, effective communication, strong communication*	Esteves & Pastor, 2000; Somers & Nelson, 2001; Nah et al., 2003; Bhatti, 2005; Foster et al., 2007; Chetcuti, 2008
Scope and Change Management Quality *Project management, good project scope management, change management, formalized project plan/schedule, alignment of people, effective organizational change management, change management culture and program*	Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Al-Mashari et al., 2003; Nah et al., 2003; Umble et al., 2003; Bhatti, 2005; Yeoh et al., 2006; Foster et al., 2007; Chetcuti, 2008
Vendor Quality *Vendor support, vendor partnership, external expertise, trust between partners, appropriate usage of consultants, consultants involvement in ERP project*	Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Umble et al., 2003; Bhatti, 2005; Chetcuti, 2008
***Legacy Systems Knowledge** *Data analysis and conversion, adaquate legacy system knowledge, appropriate business and legacy systems, data accuracy*	Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Nah et al., 2003; Umble et al., 2003; Yeoh et al., 2006; Chetcuti, 2008
***Business Process Reengineering,** *Business process reengineering (BPR) and minimal customization, vanilla ERP, customization, avoid customization*	Parr et al, 1999; Esteves & Pastor, 2000; Somers & Nelson, 2001; Nah et al., 2003; Bhatti, 2005
***IT Infrastructure** *Architectural choices, adequate infrastructure and interfaces, system analysis and technical implementation, technical implementation*	Esteves & Pastor, 2000; Somers & Nelson, 2001; Bhatti, 2005; Yeoh et al., 2006; Chetcuti, 2008
***ERP Package Selection** *Careful package selection, adaquate software configuration, package configuration*	Esteves & Pastor, 2000; Somers & Nelson, 2001; Yeoh et al., 2006; Chetcuti, 2008
***Systems Testing** *Software development, testing and trouble shooting, preventive trouble shooting, adequate data migration process, formalized testing plan*	Esteves & Pastor, 2000; Nah et al., 2003; Yeoh et al., 2006; Chetcuti, 2008

*The CSFs categorizes as "Technological" by researchers in the literature

There are also different CSF dimensions according to the nature of the studies (Amberg et al, 2005). Most of these dimensions includes technologically categorized CSFs such as business process reengineering, legacy systems knowledge, and minimal customization, IT infrastructure, ERP package selection and systems testing which are also shown in Table 1 with "*". This study focuses on directly human associated CSFs rather than technological CSFs which are indirectly associated with human factor.

Critical Human Success Factors (CHSFs) for ERP Projects

According to Buchanan, (1993) that "The main difficulties lie with organizational and managerial rather than with technical factors". Similarly, Lamont states that "While the complexity and cost of emerging technologies often drive decision making, human issues are far more likely to have hidden costs and to determine the ultimate success of the project" to stress the importance of human factors in a project. In this regard, it is crucial to explore the critical human success factors that are significantly important for ERP projects and directly associated with the project stakeholders. Therefore, this study aims to identify the CHSFs by focusing on the organizational and managerial factors, rather than technical factors, that are associated with stakeholder management in ERP projects.

This study purposes a list of 9 CHSFs, which are italicized in Table 1 and derived through a process that involved identification and synthesis of those critical requirements for ERP projects that have been recommended by practitioners and academicians through an extensive review of the literature and through the interviews that had been conducted with ERP project managers.

Setting Clear Goals, Objectives and Success Criterias

Clear goals and objectives are crucial to lead an ongoing organizational effort for ERP projects as it often exceeds the time framework for a typical business project (Bhatti, 2005). It has long been common knowledge that the initial phase of any project should begin with a conceptualization of goals and potential ways to accomplish these goals (Cleland & King, 1983; Slevin & Pinto, 1987). There must be a clear business plan how the goals can be achieved which requires identifying clear goals and objectives and providing a clear link between business goals and IS strategy (Finney, 2007). According to Al-Mashari et al. (2003) goals should be measurable. Sleven and Pinto (1986) states the importance of setting the goals of the project before even seeking top management support. Bhatti (2005) argues that there must be clear definitions of goals of the project, expectations from the project, deliverables of the project and the organization must carefully define the reason of the ERP system adoption with the critical requirements that system will address. In project management three often competing and interrelated goals that need to be met are mentioned: scope, time, and cost goals (Bhatti, 2005).

Clear goals and objectives have been noted by researchers as one of the important CSF for ERP projects (e.g., Parr & Shanks, 2000; Somers & Nelson, 2001 and 2004; Akkermans & Van Helden, 2002; Umble et al., 2003; Nah & Delgado, 2006; Zhou-Sivunen, 2005).

Setting success criteria is important to measure the project performance. For every goal of the project there should be a formalized plan of actions and for every action there should be a key performance indicator (KPI) to monitor and evaluate the performance that is defined at the beginning of the project according to the business

benefits and the projects goals, objectives. Setting success criteria is mentioned as CSFs for ERP projects by Nah et al. (2001) and by Umble et al. (2003) sequentially under the expressions of monitoring and evaluation of performance and performance measures.

As a matter of fact, clear goals and objectives and setting success criteria are different factors which are highly correlated to each other, therefore in this study they assumed to one combined factor as 'Setting clear goals, objectives and success criteria's' that has a positive impact on ERP project success. Setting clear goals, objectives and success criteria's, summarizes the CSFs business plan and vision, clear understanding of strategic goals, management (of) expectations, adaquate ERP implementation strategy, motivation behind ERP implementation, multi site issues and business case and performance measures, monitoring and evaluation of performance (Kronbichler et al., 2009).

Presence of Top Management Support

Presence of Top management support can be described as the positive commitment, enthusiasm, and support of senior management to ERP projects (Parr et al, 1999, Shanks et al, 2000). In the IT literature, top management support has been considered to be one of the most important factors for IT projects to succeed (Johnson, 1995, Lamont, 1999) and it has been clearly demonstrated and confirmed by many researchers this is also valid for ERP projects (Ang et al., 1995; Bingi et al, 1999; Lamont, 1999; Parr et al, 1999; Esteves & Pastor, 2000; Parr & Shanks, 2000; Somers & Nelson, 2001; Akkermans & Van Helden, 2002; Nah et al., 2003; Umble et al., 2003; Bhatti, 2005; Jiang, 2005; Zhang et al, 2002; Yeoh et al., 2006; Foster et al., 2007; Chetcuti, 2008;

Yusuf et al, 2006). As it is cited by Yingjie (2005), earlier studies (Sumner, 1999; Mabert et al., 2001) in the literature show that ERP adoption is a top-down decision and the success of such a project depended on the alignment of the ERP systems strategy with strategic business goals. Also Zhang et al. (2002) suggests that for a smooth and successful ERP project it is a requirement to organize a steering committee which participates in team meetings, monitors the implementation efforts (Esteves et al., 2002), spends time with people and provides clear directions.

ERP adoption is not a matter of changing the software system; relatively it is a matter of changing the way the employee's do their jobs and how the company does business (Myerson, 2002; Muscatello & Chen, 2008). Therefore, the top management must fully understand the degree of the changes and these changes must receive approval from top management (Bingi et al., 1999). Similarly, Holland and Light, (1999) notes that senior management must be fully committed with their own involvement in every step of the ERP project where Nah et al, (2001) reports that top management should clearly and publicly identify the project as a top priority for to set up the suitable and competent project team, to share the role of new systems and structures through the whole organization. Apart from these, in another research, Yeoh et al. (2006) points out that top management support is also critical to solve the organizational conflicts that may arise during the project and cut the resistance, for project to receive the proper recognition because the users tend to conform to the expectations of top management and so are more likely to accept a system backed by their superiors.

According to the explanation above the CSFs sustained management support, top management commitment to project; fit to business strategy are aggregated to the CSF presence of top management support (Kronbichler et al., 2009).

Presence of a Project Champion

The success of IT projects has often been linked to the presence of a project champion who performs the critical roles as transformational leadership, facilitation, and marketing the project to the users (Beath, 1991, quoted from Somers & Nelson, 2001).

Project champion or project sponsor refers to a person, not always a senior manager (Shanks et al.,2000), who introduces to the project the top management, advocates the benefits of the system (Bancroft, 1996; Parr & Shanks, 2000), approves the major decisions -like scope and change- about the project, promotes the project, motivates the team members (Yeoh et al., 2006, Nah et al, 2001) , encourages the use of the system (Esteves & Pastor, 2006) gives consultancy to the project manager, manages in and out company politics, manages resistance and continually resolves the conflicts (Stefanou, 1999). This champion owns the role of change champion for the life of the project and should understand both the technology and business context (Somers & Nelson, 2001) to translate business requirements into ERP architecture for the system (Yeoh et al., 2006). As cited in Akkermans and Van Helden (2002), Willcocks and Sykes (2000) notes that one obvious place to find a champion role is with the CIO or else the CEO or vice president (VP) in charge of IT.

Presence of a project champion summarizes the CSFs presence of a project champion adequate project sponsor role, empowered decision makers, project champion (Kronbichler et al., 2009).

User Training

Many researches in the IS literature show that user training is an important factor for successful ERP projects (Bingi et al, 1999; Somers & Nelson, 2001; Kumar & Hillegersberg, 2000; Esteves & Pastor, 2001; Zhang et al, 2002; Al-Mashari et al., 2003; Umble et al., 2003; Bhatti, 2005; Jiang, 2005; Yusuf et al, 2006; Woo, 2007; He, 2007). Sommers and Nelson (2001) states that lack of user training and failure to completely understand how enterprise applications change business processes frequently appear to be a reason for ERP system failures (citing Crowley, 1999; Wilder & Davis, 1998). In this regard Yeoh et al.'s (2006) suggests that, based on their research findings, the formal and systematic training for end users must not be ignored for the achievement of system. Kronbichler et al. (2009) report that involving users to application of the ERP process by trainings can decrease their resistance to the potential ERP system.

Bhatti (2005) notes that the major motivation behind user training program for ERP adoption is to make the users comfortable with the system by the same time increasing the expertise and knowledge level of the people. According to Shanks et al. (2000), user training includes both technical knowledge of ERP system and knowledge of ERP operation and use for IT and business people. Bhatti (2005) discusses that training is not only includes learning how to using the new system, but also new processes and understanding the integration within the system how the work of one

employee influences the work of others. Similarly Sommers and Nelson, 2001 recommends that at a minimum level, everyone who uses ERP system needs to be trained on how they work and how they relate to the business process.

Umble at al. (2003) points out that, application of an ERP system requires a critical gathering of knowledge to enable people to solve problems within the system and if the employees do not understand how a system works, they will create their own processes using those parts of the system they are able to control. Therefore, the trainers must have enough knowledge and experience. The training should satisfy the needs by the meaning of training resources and sessions. The training methodology should be efficient and the training material should be easy to understand.

This CSF summarizes the CSFs user training, (extensive) education and training, user involvement and training, adequate training program (Kronbichler et al., 2009).

Project Team Composition and Quality

Project team composition and quality is identified as a very important factor for successful ERP project by many researchers (Falkowski et al., 1998; Bingi et al., 1999; Holland & Light, 1999; Sumner, 1999; Rosario, 2000; Nah et al., 2001). According to Nah et al. (2003) an ERP project engages all of the functional departments in an enterprise and requires the cooperation of technical, business experts and external consultants as well as the participation of end-users in different project phases (Magnusson et al., 2004; Nah & Lau, 2001). Therefore, the ERP team should be balanced and contain a mix of Business people and IT people which also includes external consultants (Holland et al., 1999a; Shanks et al., 2000; Sumner, 1999; Nah et

al., 2001 & 2003; Umble et al., 2003; Somers & Nelson, 2001 & 2004; Nah & Delgado, 2006). The best people in the organization should be employed in the ERP team (Bingi et al., 1999; Buckhout et al., 1999; Falkowski et al., 1998; Rosario, 2000; Shanks et al., 2000; Wee, 2000) and should be supported by the organization by the meaning of access to resources and flexible work hours, job intensity.

The success of ERP projects is associated with the knowledge, the communication skills, the abilities and the experiences of the project team (Al-Mashari, 2006; Sommers & Nelson, 2001). The study of Yeoh et al. (2006) demonstrates that the ERP project members must desire to work as a collective team and be able to work and interact well with users, demonstrating excellent interpersonal skills and communication capabilities. Correspondingly, the exact employees for the team should not only be experts in the company's process but also be familiar with the best business practices in the industry (Fang & Patrecia, 2005). The people in the project team should have the attainment of positioning the organizational and ERP project goals and also should be aware about the KPIs of the project and his/her individual contribution to these KPIs.

Project team composition and quality includes the CSFs project team and composition, adequate project team composition, ERP teamwork and composition, dedicated resources, project team competence, balanced project team, best people full-time (Kronbichler et al., 2009)

Communications Management Quality

Communications management quality is identified as CSFs for IT projects (Falkowski et al., 1998; Holland & Light, 1999; Sumner, 1999; Rosario, 2000) and for ERP projects (Esteves & Pastor, 2000; Somers & Nelson, 2001; Nah et al., 2003; Bhatti, 2005; Foster et al., 2007; Chetcuti, 2008) by many researchers. Communication can either be inwards the project team and outwards to the entire organization (Esteves & Pastor 2000; Esteves & Pastor 2001; Ranzhe & Xun, 2007) According to Bhatti (2005) communications management is necessary for building an understanding and gaining an approval of the ERP adoption by sharing information among the project team and communicating the results and the defined goals to the rest of the organization in each SDLC step. Nah et al. (2003) states that, goals and expectations at every level need to be communicated (Falkowski et al., 1998; Wee, 2000) to help an organization identify milestones in ERP project. Complete and open communication can influence achievements and facilitate enterprise-wide learning (Falkowski et al., 1998). Therefore, the information travelling by the communication media must be accurate and easy to understand, as well as the communication resources and frequency should be in adequate levels.

Slevin and Pinto (1986) noted that "communication is essential within the project team, between the team and the rest of the organization, and with the client" (p. 60) whom can either be together or in different locations. Thus brings the fact that there should be no barriers to communication such as different locations or different medium. Likewise, Fang and Patrecia, 2005 argues that the environment of efficient communication should be formed and refined across the organization while implementing the ERP systems because the high-quality communication could

maximize the support from vendors and consultants, which means that an organization can better make use of its technique resources from ERP.

This CSF consists of communications management, interdepartmental communication, interdepartmental cooperation, multi-site issues, effective communication, and strong communication (Kronbichler et al., 2009).

Scope and Change Management Quality

Scope and change management quality refers to the body knowledge that is used to ensure that a complex change, like integration of an ERP system, obtains the exact outcome quality, in the exact timeframe, at the exact costs (Esteves & Pastor, 2001). Kronbichler et al, (2009) notes that change management is the hardest challenge for many companies while implementing ERP (Hoffman, 2007) likewise, Sommers and Nelson (2001) reports that ERP adoptions introduce large-scale change that can cause resistance, confusion, idleness and errors. Bhatti (2005) specifies that resistance can be destructive since it can cause conflicts between actors and can be very time consuming, so in order to achieve successful result, the way organizations do business will need to change as well as the way people do their jobs will need to change (Davenport, 1998a).

The existence of an efficient change management plan by the meaning of organizational roles and balancing cost, scope, quality and time is essential because the success in ERP projects, as in most IS projects, is commonly assessed based on the degree to which quality, time and budget requirements are met (Nah et al., 2003). For that reason, the change in cost, scope, quality, time dimensions should be monitored

frequently otherwise any small change can cause program failure if not estimated or managed well (Nah et al., 2003).

Sumner (1999) noted that, scope expansion requests require to be evaluated in terms of the additional time and cost of proposed changes. Identification and intervention of any change in business processes should be well-managed and documented effectively in order to track changes and respond quickly. Timeliness of the project should be enforced and escalation of issues and conflicts should be managed (Rosario, 2000, Nah et al., 2003). The study of Foster et al. (2007) illustrated that across all project success criteria, projects with change management are more successful than projects without change management.

Scope and change management quality consists of the fallowing CSF: project management, good project scope management, change management, formalized project plan/schedule, alignment of people, effective organizational change management and change management culture and program (Kronbichler et al., 2009).

Vendor Quality

Use of experts and consultants as ERP vendors, to facilitate the application process, in various missions of the project: performing requirements analysis, recommending a suitable solution, and managing the implementation, during the whole ERP project and after the implementation phase is important for a company to succeed (Sommers & Nelson, 2001; He, 2007).

Consultants may have experience in specific industries, broad knowledge about certain modules, and may be better able to determine which ERP package will work best

for a given company (Piturro, 1999). Therefore, the level of professionalism, experience, knowledge as well as the project management, training and technical support quality of consultants and the project team of the vendor are vital terms for a successful vendor support in an ERP project.

The ERP implementer-vendor partnership is a key success factor influencing ERP project success (Parr et al., 1999; Esteves & Pastor, 2000; Nah & Lau, 2001; Somers & Nelson, 2001; Umble et al., 2003; Zhang et al., 2002; Bhatti, 2005; Chetcuti, 2008). The vendor's sales approach and their interest in helping to achieve the defined objectives, the vendor's relation and communication with the organization is important to establish a strong partnership. It is also required to work with a vendor that has sufficient references, credibility, and reliability from their previous works. According to Esteves and Pastor (2000) a good commercial partnership will ease realization of the goals identified. Willcocks and Sykes (2000) noted that external views and knowledge can contribute much to the ERP project because suppliers can be utilized as resources brought in, to work under in-house direction and control (Kronbichler et al, 2009).

The vendor's response to problems and issues encountered during the project should be effective and timely and it shouldn't be ignored that although consultants and vendors are mastery in the best business practice of the industry, only the people inside the company know more about their business operation, therefore the management must carefully analyze each situation for accepting consultants or vendors suggestions (Fang & Patrecia, 2005). Bowen (1998) indicates that a close working relationship between consultants and companies' project team can guide to valuable knowledge transfer in both directions.

The affecting CSFs are vendor quality, vendor support, vendor partnership, external expertise, trust between partners, appropriate usage of consultants, and consultant's involvement in ERP implementation (Kronbichler et al, 2009).

ERP Success Measurement Factors (SMFs)

The perception of a successful application of ERP is the key point in the ERP project success factors issue (Soja, 2006). Over the past years, it has been a recurring issue (Ballantine et al., 1998; Myers et al.1997) that assessing the value and success of organizational IS and various evaluation techniques were used (Ifinedo & Nahar, 2006).

DeLone and Mclean (1992) designed an "integrated, multi-dimensional, and inter-related IS project success model" (Ifinedo & Nahar, 2006, p.1555) which is now used as a base model for defining and evaluating IS project success by many researchers (Ballantine et al., 1998; Myers et al.1997; Gable et al., 2003; Westhuizen and Fitzgerald, 2005; Ifinedo & Nahar, 2006; Wu, 2008, see figure 2).

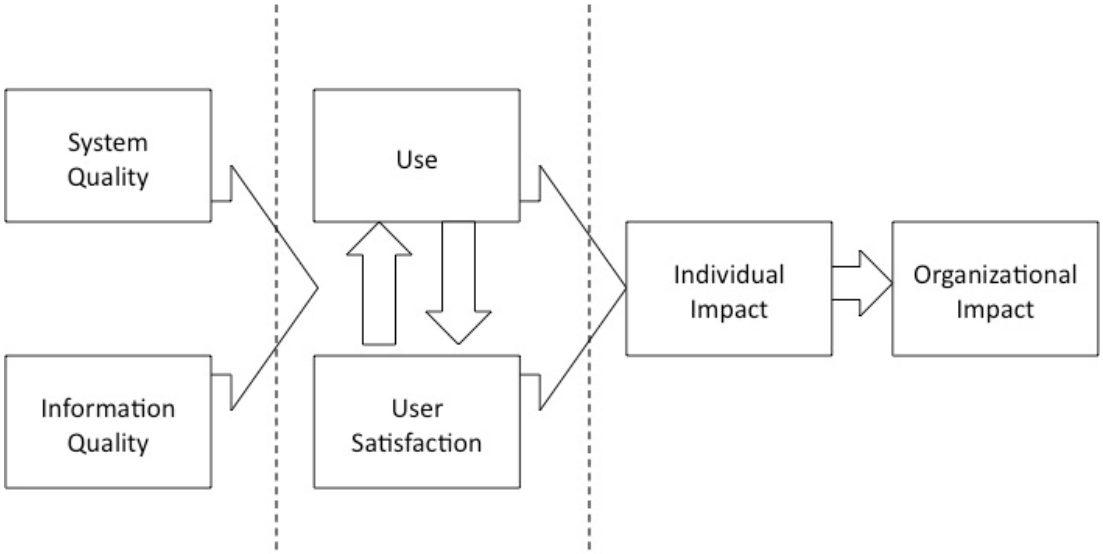


Figure 2. DeLone and McLean's IS success model 1992

(Source: DeLone & McLean, 1992, p.12)

DeLone and McLean (1992) imply that researchers should "systematically combine individual measures from the IS success categories to create a comprehensive measurement instrument" (pp.87-88).

Their model represents the relationships of six IS success dimensions consisting of *system quality* (SQ), *information quality* (IQ), *use, user satisfaction*, *individual impact* (II) and *organizational impact* (OI) (Myers et al., 1997, DeLone & McLean, 1992) where; "system quality is a measure of the information processing system itself, information quality is a measure of information system output, use is a measure of recipient consumption of the output of an information system, user satisfaction is a measure of recipient response to the use of the output of an IS, individual impact is a measure of the effect of information on the recipient, organizational impact is a measure of the effect of information on organizational performance" (Westhuizen & Fitzgerald, 2005, p.6). Supporting the McLean model, firstly, Seddon and Kiew (1994) examines the DeLone and McLean's (1992) IS model by making an empirical test with the first four dimensions (Myers et al, 1997).

Then in 1997, Myers et al. suggests a comprehensive IS assessment framework which includes, in addition DeLone and McLean's (1992) original model, a *"service quality"* dimension (Pitt et al., 1995) and a "*workgroup impact*" dimension because of the contributions made by work teams and groups toward organizational productivity" (Ifinedo & Nahar, 2006, p.1555, see figure 3).

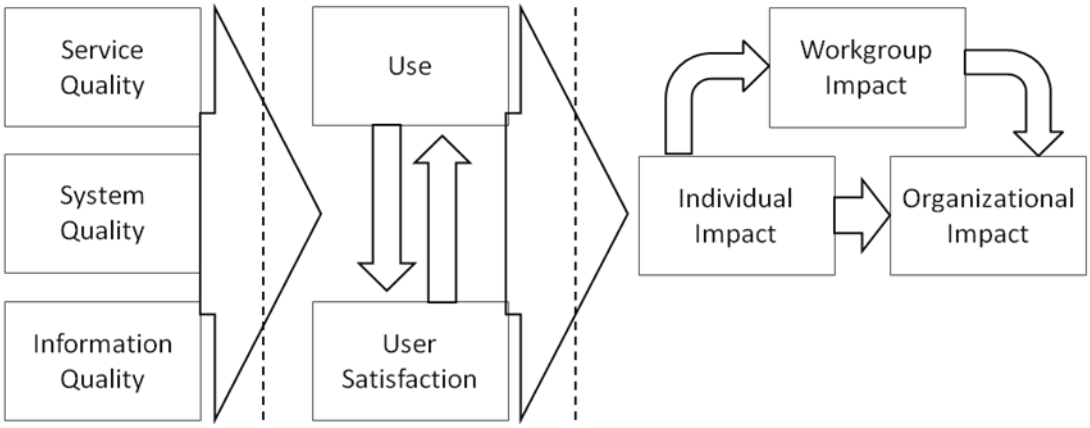


Figure 3. Myers et al.'s IS success model

(Source: Myers et al. 1997, p.13)

Gable et al., (2003) presented an additive model by removing the *use* and *user satisfaction* dimensions from traditional Delone and McLean's (1992) IS model, with regard to ERP system success assessment (Ifinedo & Nahar, 2007) (see figure 4-a). In this model "satisfaction is treated as an overall measure of success, rather than as a dimension of success" (Gable et al., 2003, p.586) which consists of four quadrants which are *system quality, information quality, individual impact and organizational impact.*

By using the measures and constructs validated in the literature Ifinedo and Nahar (2006) developed an ERP systems success measures model which has six main dimensions as *systems quality, information quality, vendor/consultant quality, individual impact, workgroup impact, organizational impact* as success measures (see figure 4-b). In this model Ifinedo and Nahar (2006) used vendor/consultant quality instead of service quality, which indicates "the role and quality of vendors/consultants throughout the life span of any ERP adoption*"* (p.1555) (Davenport, 1998b; Markus & Tanis, 2000; Sommers and Nelson, 2004).

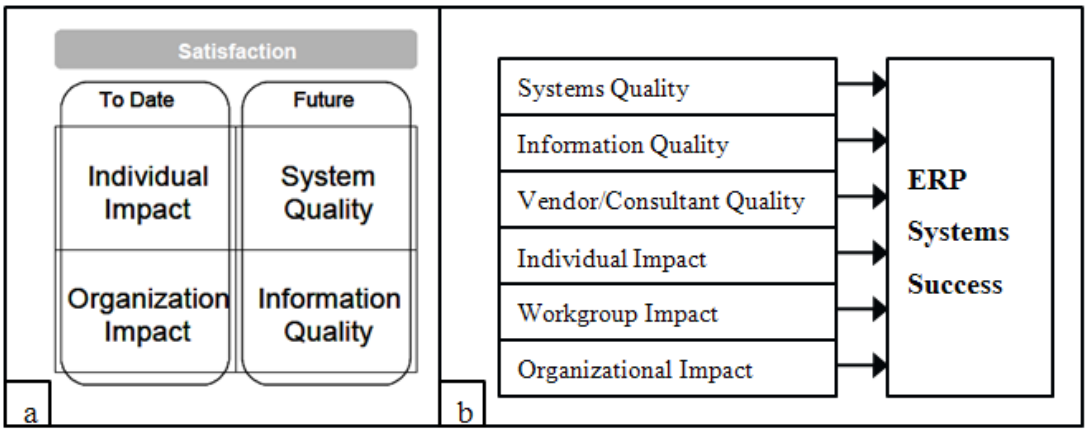


Figure 4. IS success models of a.Gable et al. and b.Ifinedo and Nahar

(Source: a. Gable et al., 2003, p.586 and b. Ifinedo and Nahar, 2006, p.1555)

DeLone and McLean (2003, p. 24) publishes an updated model ten years after the original model was published in 1992 (see figure 5).

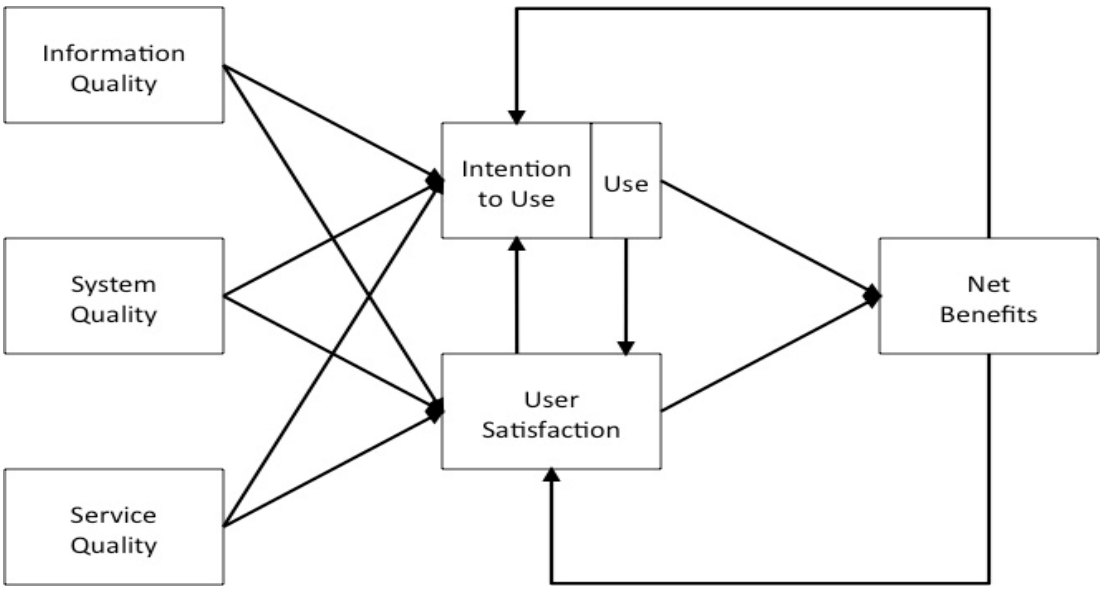


Figure 5. DeLone and McLean's IS success model 2003

(Source: DeLone & McLean 2003, p.24)

The main changes in this model are: "'Service quality' was added as an extra dimension to 'information quality' and 'system quality'. 'Intention to use' was placed alongside 'use'. 'Individual impact' and 'organizational impact' were collapsed into a 'net benefits' dimension." (Westhuizen & Fitzgerald, 2005, p.8).

Baccarini argues that (1999) project success includes two separate items, which are project management success and project product success.

(1) Project management success traditionally focuses on the successful completion of the project upon the dimensions that *within time* (WT), *within budget* (WB) and *according to requirements (quality and functional qualifications), which* specify the degree of the effectiveness of project according to Pinkerton (2003) (Westhuizen & Fitzgerald, 2005). On the other hand Westhuizen and Fitzgerald, defends that (2005), additional to this specifications, to measure project management success it is required to have dimensions such as the *quality of the project management process* and *project stakeholders satisfaction* (Baccarini 1999).

(2) Project product success focuses on the impacts of the project's end-product and includes dimensions as *system quality, information quality, service quality, use, intention to use, user satisfaction and net benefits* (Westhuizen & Fitzgerald, 2005).

Westhuizen et al., (2005) analyze project success by combining project management success and project product success (Baccarini, 1999) and propose a set of dimensions as an extension of the DeLone and Mclean (2003) model (see figure 6).

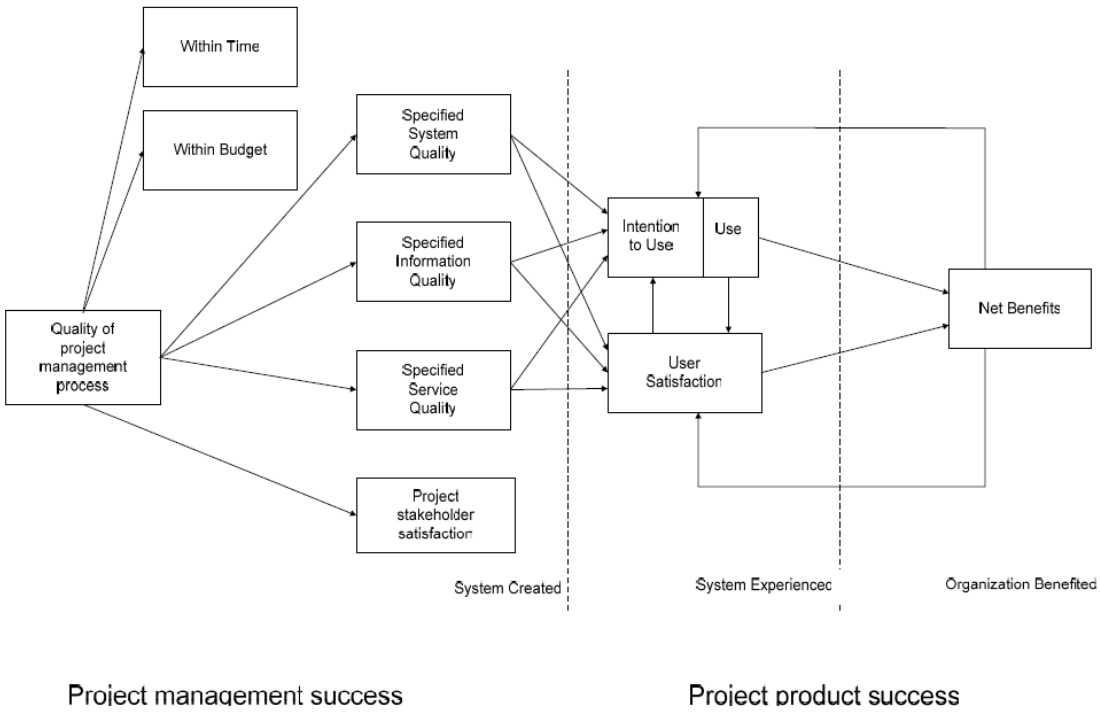


Figure 6. Westhuizen and Fitzgerald's IS success model

(Source: Westhuizen & Fitzgerald 2005, p.13)

As an addition to previous models the added dimensions depicts as follows;

- Within time is the completion time of the project, which should be matched.
- Within budget is the completion cost of the project should be in the planned budget interval.
- Project stakeholder satisfaction is the stakeholder satisfaction and profitability such as reduced operating costs and increased savings.
- User satisfaction and involvement is the knowledge and involvement of the user, which the degree to which the user perceives that using the ERP System is important and self-relevant.

This study uses the interpretation of DeLone and McLean's (1992, p. 87) , Myers et al.'s (1997, p.13) and Westhuizen et al.'s (2005, p.13) IS success measurement models for defining the ERP project success metrics and offers a combined model for assessing the ERP project success which consists of system quality (SQ), information quality (IQ), individual impact (II), workgroup impact (WI), organizational impact (OI), within time (WT) , within budget (WB), project stakeholder satisfaction (PSS), user satisfaction and involvement (USI) (Figure 7).

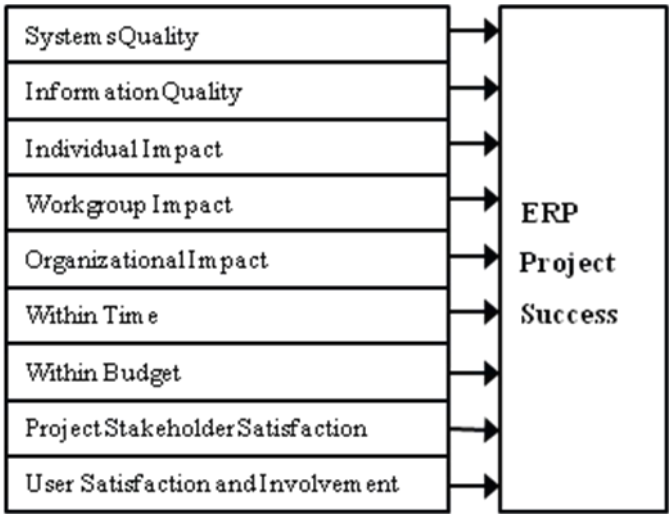


Figure 7. The identified ERP success measurement model

Since, Vendor Quality used as a CHSF in this research it is not included to success measures of this study and "Use can only be a measure of success where IS use is not mandatory." as pointed out by Ifinedo and Nahar (2006) so use is also not counted as a success measure of this study (Ifinedo & Nahar, 2006). There exists only one item asked to respondents as a sub-question of user satisfaction and involvement success measure such as "I use the system efficiently" which can be considered as related to use.

As shown in table 2, the success dimensions of this model satisfy the requirements of project success definitions found in the IS and ERP literature, thus indicating the validity of this model. In table 2 the project success dimensions of figure 7 are compared to project success definitions or discussions found in literature.

Table 2. Validation of the Success Dimensions of the Study

	DeLone & McLean, 1992	Seddon & Kiew,1994	Myers et al., 1997	Baccarini, 1999	DeLone & McLean, 2003	Gable et al., 2003	Westhuizen & Fitzgerald, 2005	Ifinedo & Nahar, 2006
System Quality	x	x	x	x	x	x	x	x
Information Quality	x	x	x	x	x	x	x	x
Individual Impact	x		x			x		x
Workgroup Impact	x		x					x
Organizational Impact	x		x			x		x
Within Time				x			x	
Within Budget				x			x	
Project Stakeholder Satisfaction				x			x	
User Satisfaction and Involvement	x	x	x	x	x		x	

CHAPTER 4

THEORETICAL MODEL AND HYPOTHESES

In this part of the study, the theoretical models are proposed. The first two sections contain a comprehensive set of variables, which shape the characteristics of the study.

The first theoretical model developed by using these variables is expected to explain the relationships among the identified CHSFs of ERP and the ERP project success, which is defined by the critical success measures, based on a critical review of both scholarly and managerial literature.

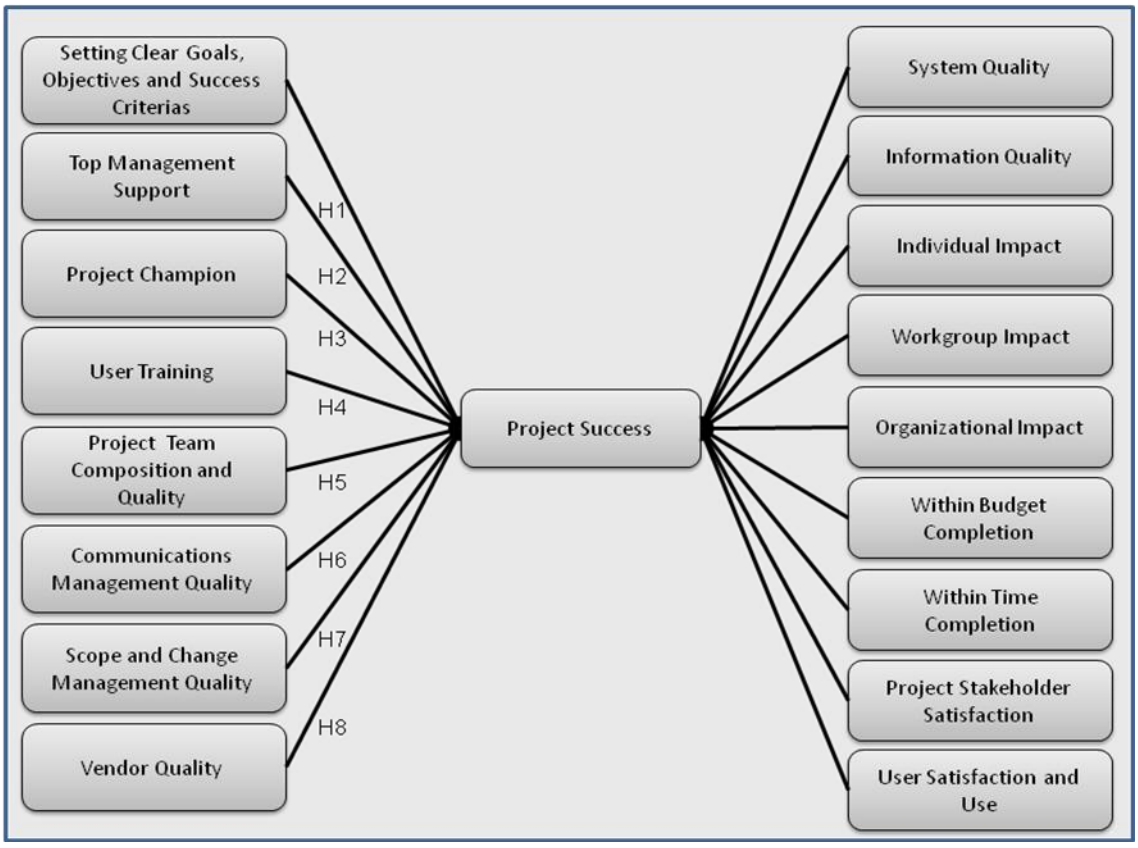


Figure 8. Theoretical model 1-The critical human success factors for ERP

The hypotheses of this model are shown in table 3.

Table 3. Hypotheses for Theoretical Model 1

H1: Setting Clear Goals, Objectives and Success Criterias (SCGOSC) has a positive impact on ERP project success (SUCC).
H2: Presence of Top Management Support (TMS) has a positive impact on ERP project success (SUCC).
H3: Presence of a Project Champion (PC) has a positive impact on ERP project success (SUCC).
H4: User Training (UT) has a positive impact on ERP project success (SUCC).
H5: Project Team Composition and Quality (PTCQ) has a positive impact on ERP project success (SUCC).
H6: Communications Management Quality (CMQ) has a positive impact on ERP project success (SUCC).
H7: Scope and Change Management Quality (SCMQ) has a positive impact on ERP project success (SUCC).
H8: Vendor Quality (VQ) has a positive impact on ERP project success (SUCC).

For simplicity, abbreviations generated for each of the modules are going to be used in the rest of the study.

As an action for research relevance the author herself was actively involved as an interior ERP analyst to an international-wide ERP project of a well-known industry leader company group for 9 months.

CHSFs in this study appeared to be highly correlated and changes in any one of them would influence most of the others, as well. This brings out the other objective of this research, which is not just to test the explanatory power of the identified CHSFs but also to extend it into a richer framework that would describe the interrelations between

the individual CHSFs. For this purpose one to one linear regressions of each CHSF with other CHSFs are studied (Appendix D) and according to the results with the literature survey and the interviews the CHSFs relationships are examined in a three staged framework, shown in Figure 9, in which:

(1) Vendor, top management and project champion are assumed to be involved to the project from the beginning to initialize the project;

(2) Vendor, top management and project champion participate the process of defining the goals, objectives and the success criteria's and selecting the project team;

(3) Then the project team starts to work on the project according these goals and the KPI's and the activities related to communications management, scope and change management and training of the users takes part as complementary to project success.

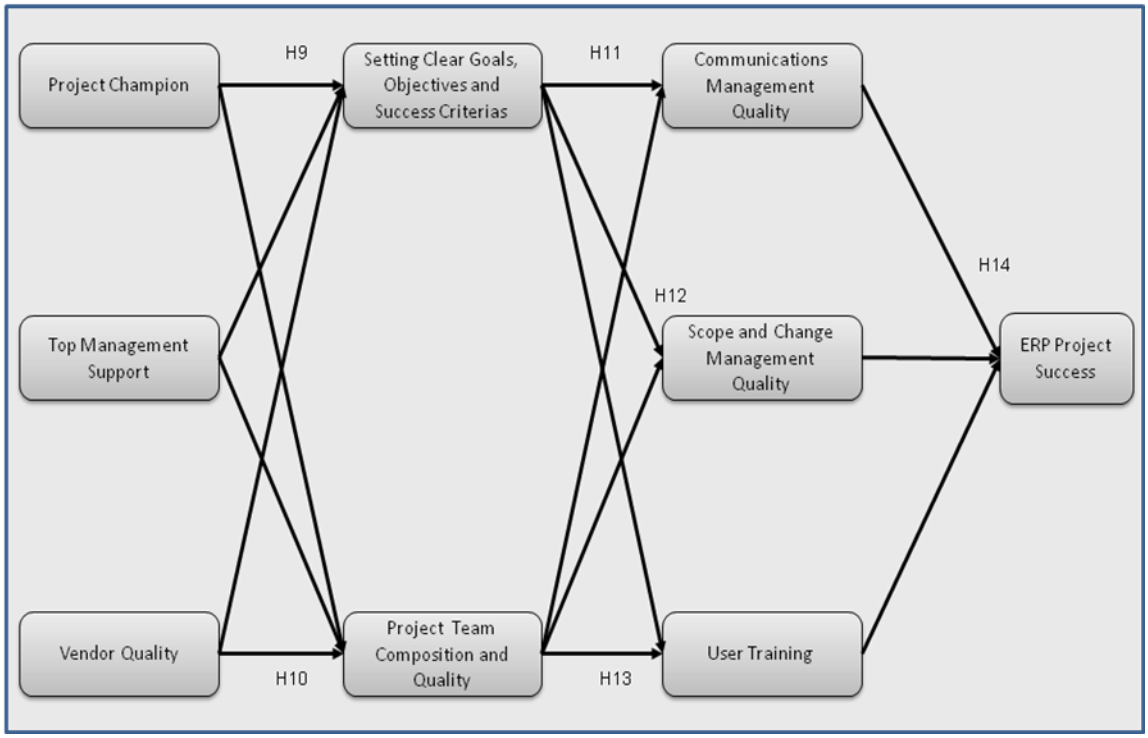


Figure 9. Theoretical model 2- Interrelations between CHSFs

The hypothesized paths shown in the Figure 9 and the hypotheses presented in Table 4 were analyzed for the interrelations between the CHSFs.

Table 4. Hypotheses for Theoretical Model 2

H9: Presence of a Project Champion (PC), Presence of Top Management Support (TMS) and Vendor Quality (VQ) have a positive impact on Setting Clear Goals, Objectives and Success Criteria's (SCGOSC).
H10: Presence of a Project Champion (PC), Presence of Top Management Support (TMS) and Vendor Quality (VQ) have a positive impact on Project Team Composition and Quality (PTCQ).
H11: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on Communications Management Quality (CMQ).
H12: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on Scope and Change Management Quality (SCMQ).
H13: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on User Training (UT).
H14: Communications Management Quality (CMQ), Scope and Change Management Quality (SCMQ) and User Training (UT) have a positive impact on ERP project success (SUCC).

CHAPTER 5

RESEARCH METHODOLOGY

To study CSFs relevance, with regarding to the research approach, researchers have used surveys (Esteves and Pastor, 2006). In this study, survey methodology is used to collect data to test the hypotheses stated previously. The questionnaires used for this purpose were prepared consistent with the IS literature for questions about the CHSFs and some success measures and partially adopted from Ifinedo and Nahar's (2006) study for questions related to ERP success measures that are defined in their study. Three different questionnaires are prepared for three different respondent groups from one main questionnaire; Project Managers questionnaire, Project Team Members questionnaire, End Users questionnaire. The details of sample, structure and administration of the questionnaires are presented in the following sections.

Sample

Data were collected using online questionnaire surveys administered in Turkey and companies were analyzed by using descriptive, reliability, linear regression analyses and structural equation modeling techniques to test the hypotheses and provide findings.

The top-100 firms in Turkey were included, but only those with ERP systems implemented by a vendor were selected. This provided a sample of 76 firms; of these, 50 received initial phone calls explaining the purpose of our project and inquiring whether the firm would be willing to participate in the study. A contact person was identified at each company; this person was asked to distribute the 3 different questionnaires to 3 different respondent groups; Project Managers, Project Team Members, End Users.

The Structure of the Questionnaires

As a first step a main questionnaire prepared including all demographic, CHSFs and ERP success measures related questions. Then due to the fact that each stakeholder involves in different parts of the project with different point of views and different expectations, in order to cover all these views three different questionnaires prepared with the questions picked from the main questionnaire (See Appendix B for the project managers survey in Turkish and Appendix C for the question distribution of the main questionnaire according to different stakeholder types.).

The main questionnaire used in this study consisted of 5 demographic questions, 8 sets of CHSFs questions and 9 sets of CSMs questions (See Appendix C). The cover mail of the questionnaires included information about the subject and the aims of the study as well as some practical information such as the expected duration required to fill in the surveys, the expected respondent profiles and the expected number of responses. The questions for each CHSFs set and CSMs sets of the questionnaire are given in the Appendix C. Respondents in this study indicated their agreement with statements using 5-point Likert-type scales, where 1= strongly agree/ very sufficient and 5= strongly agree/ very insufficient for the CHSFs and CSMs questions.

Administration of the Questionnaires

The questionnaires are revised according to pilot studies made with two ERP project managers, two team members and two end users of the project in which the author also take part in and also according to the conference talks about the ERP project CSFs that the author participated in, in order to check for possible measurement problems and

enhance the perception of the questions in a more respondent oriented way. The respondents reported that, in general, the measurement items and the questions were easy to understand. Those items, which led to confusion, were revised. The average duration recorded for the project manager's survey as 10 minutes, team member's survey as 5 minutes and end users survey as 3 minutes.

After the pilot study, the cover mails with the online questionnaire links was sent to the contact persons via email (See Appendix A). For each e-mail sent, a return receipt was requested. The respondents who received the questionnaire but did not provide a response in two weeks received a reminder. The questionnaires were successfully delivered to 530 respondents and 262 completed questionnaires were returned. 47 responses were considered incomplete and had to be discarded. This left 215 valid responses from 28 companies, a response rate of 41% of the original.

CHAPTER 6

ANALYSES AND FINDINGS

The statistical analyses of the research models were conducted in multiple steps. First, descriptive statistics for demographic questions were evaluated, and then the multiple item scales were tested for validity of question sets by examining the individual items' loadings. Next, linear and multiple regression analyses were conducted on item sets to analyze the relationships between the CHSFs and the ERP project success by SPSS 18.0 tool. Finally as a structural equation modeling (SEM) technique partial least squares (PLS) method was applied for hypotheses testing to analyze the second theoretical model. The details of these steps are provided in the following sections.

Descriptive Statistics for Demographic Questions

There are six demographic questions about company sector, age, gender, ERP product, project managers' role in the company, team members' role in the project included in this research.The company sector ingredient as a variable resulted in an immense variety that is not possible to make any categorization at all; therefore company sector will not be analyzed as demographical result in this study.

As it is summarized in the Table 5, the majority of the respondents are at the age interval of 30-39, then the age interval of 24-29. This sequence is not changing for the team members and end users. For the project managers while the majority of the respondents still at the age interval of 30-39, the second majority changes to the age interval 40-49 which shows that project managers are required to be more experienced.

Table 5. Age Distribution of the Respondents

	18-23	24-29	30-39	40-49	>50	Total
Age (General)	1	71	95	39	9	215
	1%	33%	44%	18%	4%	
Age (Project Manager)	0	5	15	13	1	34
	0%	15%	44%	38%	3%	
Age (Team Member)	0	18	23	14	1	56
	0%	32%	41%	25%	2%	
Age (End User)	1	48	57	12	7	125
	1%	38%	46%	10%	6%	

The gender variable results for the respondents companies that illustrated in Table 6 show that most of the people with % 73 percentages involved in the ERP projects are male. This proportion slightly increase for the project managers as ERP stakeholders, which may be interpreted as IS has became a more interesting issue for women lately.

Table 6. Gender Distribution of the Respondents

	Female	Male	Total
Gender (General)	57	158	215
	27%	73%	
Gender (Project Manager)	4	30	34
	12%	88%	
Gender (Team Member)	17	39	56
	30%	70%	
Gender (End User)	36	89	125
	29%	71%	

The questionnaires are sent to companies, which are using SAP, ORACLE, MICROSOFT, NETSIS, SOFT YAZILIM, LIKOM, DINAMO, GLOBALSOFT, IAS-CANIAS, LOGO BUSINESS SOLUTIONS and IFS as an ERP product, and 44 companies responded. Only 28 of the respondent companies provided acceptable survey results that are using SAP, ORACLE, MICROSOFT and NETSIS. According to the survey results for the ERP product variable in Table 7, we can say that SAP is the most used ERP solution with the percentage of 64 within the respondent companies of this survey.

Table 7. ERP Product Distribution of the Respondent Firms

ERP Product	# Companies	Percentage
SAP	18	64.3%
ORACLE	6	21.4%
MICROSOFT	2	7.1%
NETSİS	2	7.1%
Total	28	

In this study as it is mentioned in the literature review section and shown in Table 8, mostly, with a 61 percentage, IS/IT managers are involved in ERP projects as the project manager for respondent companies since this is an issue directly related to IS/IT department and should be monitored by top management. For %21 of the respondent companies, top management such as CIO or IT coordinator involved in the projects as a project manager. By the proportion of %14, 4 companies resulted having an IS/IT Specialist as the project manager which means these companies either not had the

enough resource as managerial staff due to their organizational structure or not giving that much attention for the ERP project.

Then lastly one respondent company had a project manager as a general manager, in this case, the general managers IS knowledge critical for the project success as the general manager undertakes many business functions instead of IS.

Table 8. Role Distribution of the Project Managers' Survey Respondents

Project Managers' Role in The Company	# Companies	Percentage
IS/IT Manager	17	61%
CIO/IT Coordinator	6	21%
IS/IT Specialist (Sen.\ Jun.\ Ass.)	4	14%
General Manager	1	4%
Total	28	

The role distribution of the team members' in ERP projects resulted with the highest proportion of %57, that is shown in Table 9, as key users which is also parallel with the literature review section.

Table 9. Role Distribution of the Team Members' Survey Respondents

Team Members' Role In The Project	# Companies	Percentage
Key user as a Team Member	32	57%
Analyst as a Team Member	16	29%
Designer & Builder as a Team Member	8	14%
Total	56	

The major team member role as key users can be interpreted the respondent firms are aware about this fact that the more key users are involved to the ERP project the more they accept the change and adapt to the change, therefore the projects resulted in high level of user satisfaction. System analysts as the ERP projects second most critical stakeholder for the systems development projects, after the end users, had a role proportion of %29 for the respondent companies.

The respondent firms chosen in a wide spectrum of industries including building materials, defense system technologies, finance, fast moving consumer goods, food & beverages, healthcare & pharmaceuticals, retail, telecommunications and transportation & logistics. Therefore it is not possible to make any categorization for the company sector ingredient as a variable so the company sector will not be analyzed for a demographical result in this study.

Findings of the Theoretical Model 1

Reliability / Internal Consistency Analysis

Cronbach's Alpha analysis is used to measure the interrelatedness of the survey items for the model 1 that includes eight scales as CHSFs and seven scales as SMFs.

The level of alpha (α) that indicates an acceptable level of reliability of the scale and will be evaluated as;

- If $0{,}00 \leq \alpha < 0{,}40$ then the scale is non-reliable
- If $0{,}40 \leq \alpha < 0{,}60$ then the scale has a low reliability
- If $0{,}60 \leq \alpha < 0{,}80$ then the scale has a high reliability
- If $0{,}80 \leq \alpha < 1{,}00$ then the scale has a very high reliability (Kalaycı 2008, p.405).

In SPSS, when a scale is non-reliable or has a low reliability according to Cronbach's alpha results, by looking to the 'Item-Total Statistics' table's 'Cronbach's Alpha if Item Deleted' column, it can be decided whether or not to remove an item form the scale in order to increase the Cronbach's Alpha coefficient.

In this study the third question of the project stakeholder satisfaction scale, which is shown in Appendix C, is removed according to this method. The results of the Cronbach's alpha test are shown in Table 10, in which the items in each category are appeared to have a good internal consistency and all scales are assumed to be reliable.

Table 10. Reliability / Internal Consistency of the Survey Items

Survey Items	*# of Items*	*Cronbach's Alpha*
Setting Clear Goals, Objectives and Success Criteria	5	0,862
Presence of Top Management Support	3	0,639
Presence of a Project Champion	5	0,842
User Training	5	0,950
Project Team Composition and Quality	8	0,921
Communications Management Quality	5	0,944
Scope and Change Management Quality	5	0,897
Vendor Quality	9	0,951
System Quality	9	0,853
Information Quality	4	0,924
Individual Impact	4	0,821
Workgroup Impact	6	0,884
Organizational Impact	7	0,858
Project Stakeholder Satisfaction	4	0,682
User Satisfaction and Involvement	3	0,791

Data Preparation for Analysis

Survey answers are collected by an online survey tool and the results are obtained in numerical format in excel sheets for ERP project managers, team members and end users separately.

The data is cleaned according to the completeness of the surveys and the number of the people in each stakeholder group, which at least one for each group of a company. Then the results are gathered in the main survey sequence on one platform, which makes 215 rows for 28 companies. Based on the reliability analyses, 'the average of the items in a scale' is accepted as the scale value to.

It is assumed that each company answered these questions for one project. In order to analyze each project separately, the answers are grouped initially for the same stakeholder types in each company, then for each company by the average value of stakeholder groups averages.

According to another Cronbach's Alpha analysis (Table 11) which is applied to this prepared data in order to get one 'ERP Project Success (SUCC)' scale by accepting every SMFs scale as a success item, the SMFs scales are gathered and the average named as 'Project Success'.

Table 11. Reliability / Internal Consistency of SMFs Scales as 'Project Success' Items

Model=Alpha.	*Cronbach's Alpha*	*N of Items*
Variables= IQ SQ II WI OI WT WB PSS USI Scale= Project Success	,791	9

Linear Regression Analysis

Linear regression analysis is used for specifying the one to one relations between the CHSFs and the ERP project success (SUCC) in the theoretical model 1.

According to the F statistics significance (Sig.) values in Table 12, all the constructs except Top Management Support are meaningful, because all of them below the 0.50, which means these constructs, can be accepted as statistically meaningful with the confidence level of %95 and the ERP project success can be explained by the related CHSFs. The R^2 values for the significant constructs show that the percentage of the variance in ERP project success is explained by the related CHSF and the B values demonstrates the path coefficients or slopes which means 1 unit change in the related CHSF will impact the ERP project success by the proportion of path coefficient value.

The results in table 12 can be explained for the Hypotheses 1 as Setting Clear Goals, Objectives and Success Criterias factor explains the %58 of the variance in the project success, and have a positive impact by the proportion of 0.414 on ERP project success.

Table 12. Linear Regression Analysis of Theoretical Model 1

CHSFs as Independent Variables	*R^2*	*Sig.*	*B*	*Hypothesis*	*Hypothesis Acceptance*
Setting Clear Goals, Objectives and Success Criteria	0.575	0.001	0.414	H1	Accepted
Presence of Top Management Support	-	0.221	-	H2	Rejected
Presence of a Project Champion	0.380	0.046	0.321	H3	Accepted
User Training	0.593	0.001	0.376	H4	Accepted
Project Team Composition and Quality	0.512	0.005	0.344	H5	Accepted
Communications Management Quality	0.453	0.016	0.288	H6	Accepted
Scope and Change Management Quality	0.390	0.040	0.250	H7	Accepted
Vendor Quality	0.636	0.000	0.413	H8	Accepted

Since the significance level of the construct for the Hypothesis 2 is outside the confidence level, the F statistics will not be meaningful to interpret the model therefore the Hypothesis 2 for the top Management support will be rejected.

Similarly to Hypothesis 1 the remaining hypotheses will be accepted and interpreted by the constructs as it is shown in Table 12. And the results for project managers', team members', end user' group sequentially shown in Table 13, 14, 15.

Table 13. Linear Regression Analysis of Theoretical Model 1 for Project Managers

CHSFs as Independent Variables	R^2	*Sig.*	*B*	*Hypothesis*	*Hypothesis Acceptance*
Setting Clear Goals, Objectives and Success Criteria	0.526	0.004	0.387	H1	Accepted
Presence of Top Management Support	-	0.221	-	H2	Rejected
Presence of a Project Champion	0.380	0.046	0.321	H3	Accepted
User Training	0.554	0.002	0.352	H4	Accepted
Project Team Composition and Quality	-	0.107	-	H5	Rejected
Communications Management Quality	-	0.217	-	H6	Rejected
Scope and Change Management Quality	0.390	0.040	0.250	H7	Accepted
Vendor Quality	0.610	0.001	0.387	H8	Accepted

According to the stakeholder focused linear regression analysis results, for each stakeholder, the 'Vendor Quality' as a variable has the highest explanation proportion and very high path coefficients, which show the variables' impact on 'ERP Project Success'. By comparing the results in Table 13,14,15 it can be noted that for team members the 'Vendor Quality' has more impact on 'ERP Project Success', than for project managers. For the project managers' level, as an additional to 'Top Management Support' variable, 'Project Team Composition and Quality' and 'Communications Management Quality' variables are also found statistically insignificant while they are still important, for the team members with proportions that are more than %52 to explain the variances in 'ERP Project Success' and coefficients that are more than %24. 'Setting

Clear Goals, Objectives and Success Criteria' has slightly more impact on 'ERP Project Success' for team members and end users than project managers.

Table 14. Linear Regression Analysis of Theoretical Model 1 for Team Members

CHSFs as Independent Variables	R^2	*Sig.*	*B*	*Hypothesis*	*Hypothesis Acceptance*
Setting Clear Goals, Objectives and Success Criteria	0.311	0.002	0.336	H1	Accepted
Presence of Top Management Support	-	0.221	-	H2	Rejected
Presence of a Project Champion	0.380	0.046	0.321	H3	Accepted
User Training	0.492	0.008	0.224	H4	Accepted
Project Team Composition and Quality	0.543	0.003	0.261	H5	Accepted
Communications Management Quality	0.521	0.005	0.248	H6	Accepted
Scope and Change Management Quality	0.390	0.040	0.250	H7	Accepted
Vendor Quality	0.651	0.000	0.425	H8	Accepted

On the project managers' basis 'User Training' has third important impact after 'Vendor Quality' and 'Setting Clear Goals, Objectives and Success Criteria' variables on 'ERP Project Success' while this impact is getting lower for the team members' and the lowest for the end users. 'Project Champion' and 'Scope and Change Management Quality' are also important variables that impact the 'ERP Project Success' for each group.

Table 15. Linear Regression Analysis of Theoretical Model 1 for End Users

CHSFs as Independent Variables	R^2	*Sig.*	*B*	*Hypothesis*	*Hypothesis Acceptance*
Setting Clear Goals, Objectives and Success Criteria	0.556	0.002	0.397	H1	Accepted
Presence of Top Management Support	-	0.221	-	H2	Rejected
Presence of a Project Champion	0.380	0.046	0.321	H3	Accepted
User Training	0.406	0.032	0.193	H4	Accepted
Project Team Composition and Quality	0.512	0.005	0.344	H5	Accepted
Communications Management Quality	0.453	0.016	0.288	H6	Accepted
Scope and Change Management Quality	0.390	0.040	0.250	H7	Accepted
Vendor Quality	0.636	0.000	0.413	H8	Accepted

Correlation Analysis

Akkermans & Van Helden (2002) notes that there are high correlations between the CHSFs, which is examined in Table 16, therefore the Theoretical Model 2 is proposed and analyzed to study the relational associations between the CHSFs.

Table 16. Correlations Matrix for the CHSFs

	SCGOSC	TMS	PC	UT	PTCQ	CMQ	SCMQ	VQ
SCGOSC	1	,281	,314	,661	,751	,552	,616	,612
		,148	,104	,000	,000	,002	,000	,001
TMS	,281	1	,364	,130	,208	,003	,244	,204
	,148		,057	,509	,288	,986	,211	,297
PC	,314	,364	1	,369	,553	,266	,351	,336
	,104	,057		,053	,002	,171	,067	,080
UT	,661	,130	,369	1	,810	,844	,547	,618
	,000	,509	,053		,000	,000	,003	,000
PTCQ	,751	,208	,553	,810	1	,820	,537	,598
	,000	,288	,002	,000		,000	,003	,001
CMQ	,552	,003	,266	,844	,820	1	,449	,593
	,002	,986	,171	,000	,000		,017	,001
SCMQ	,616	,244	,351	,547	,537	,449	1	,412
	,000	,211	,067	,003	,003	,017		,030
VQ	,612	,204	,336	,618	,598	,593	,412	1
	,001	,297	,080	,000	,001	,001	,030	

Findings of Theoretical Model 2

The PLS Technique

To determine causal models there are two different statistical methods available: a covariance structure analysis and the partial-least-squares (PLS) analysis (Chin and Newsted, 1999; Rabl, 2010). Due to the scales are not distributed normally in this study, the PLS technique was chosen that is able to handle this restriction (Chin and Newsted, 1999). XLSTAT-PLSPM tool is used to make the empirical analysis in this study.

PLS-Path Modeling

As a PLS method PLS-path modeling (PLSPM) focuses on maximizing the prediction power and minimizing the errors (Aparicio et al., 2009) and is applied to estimate the weights that defining scores of a set of non measurable variables, called latent variables, as linear combinations of their measurable sets of variables called manifest variables (Aparicio et al., 2009). As it is shown in Appendix C, in this study the manifest variables are the questions of the survey, and the latent variables are the CHSFs and the ERP project success "PLS-PM is used in problems without previous theoretical knowledge, a small sample size and large set of variables" (Aparicio et al., 2009, p.2). The latent variables without predecessors are called exogenous variables while all others that has predecessors are called endogenous variables.

Each arrow of the Theoretical Model 2 as a PLS path diagram indicates a causal relationship between variables. Two models are supposed to compose these relationships; the inner model refers to the latent variables relationships whereas the outer model refers to manifest variables relationships (Aparicio et al., 2009).

The latent variable scales were validated by using the factor analysis technique. The loadings the manifest variables are shown in Appendix C. If all the items load of a scale, highly on one factor, then the scale presents satisfactory convergent validity hence, the items with loadings lower than 0.5 should be removed from the scale (Aslan, 2008) if the associated latent variables is also have a low level of reliability. Since only one indicator TMS_3 has a very slightly lower value of 0,498 than 0, 5 and the reliability of TMS is satisfactory (Dg. Rho=0.807 > 0, 7 and Cronbach's Alpha=0,618 > 0,6), it has not been removed from the model.

To examine the scales' internal consistency, three measures were used:

(1) Cronbach's alpha, where according to Kalaycı (2008, p.405) in basic research a value higher than 0.60 is acceptable,

(2) The composite reliability evaluated by Dillon-Goldstein's rho (D.G. rho) (Tenenhaus et al., 2005), that should be higher than 0.70 (Ringle et al., 2006),

(3) Fornell and Larcker's (1981) mean communalities as average variance extracted (AVE) measures, which should be greater than 0.50 (Chin, 1998) which means "that a latent variable is able to explain more than half of the variance of its indicators on average" (Henseler et al., 2009, p.299).

Table 17 shows the reliability indexes, the Cronbach's Alpha and D. G. rho. In this analysis, the single dimensionality of the latent variables has been confirmed by D. G. Rho for all latent variables that have higher values than 0.7. All latent variables have a Cronbach's Alpha value that is higher than 0.6 and have an AVE value is higher than 0.5, confirming the consistency of the manifest variables.

Table 17. Composite Reliability Analysis for Theoretical Model 2

Latent variable	*Items*	*Cronbach's alpha*	*D.G. rho (PCA)*	*AVE*
Setting Clear Goals, Objectives and Success Criteria	5	0,872	0,917	0,692
Presence of Top Management Support	3	0,618	0,807	0,516
Presence of a Project Champion	5	0,836	0,891	0,636
User Training	8	0,945	0,958	0,874
Project Team Composition and Quality	5	0,963	0,973	0,728
Communications Management Quality	5	0,851	0,896	0,867
Scope and Change Management Quality	5	0,958	0,970	0,639
Vendor Quality	9	0,948	0,958	0,708

According to Rabl (2010) for evaluating discriminant validity, the average variance extracted AVEs by the correlated latent variables is greater than the square of the correlation between the latent variables which means that a latent variable as a construct is strongly correlated with its manifest variables as its indicators than with the other latent variables in the model, then discriminant validity obtains (Fornell et al. 1982; Chin, 1998). As shown in the Table 18 the discriminant validity appears satisfactory for all constructs at both the item and construct levels.

Table 18. Discriminant Validity Analysis for Theoretical Model 2

	TMS	PC	VQ	SCGOSC.	PTCQ	UT	SCMQ	CMQ	SUCC	AVE
TMS	**1**	0,120	0,148	0,191	0,150	0,073	0,123	0,042	0,091	0,516
PC	0,120	**1**	0,195	0,160	0,407	0,186	0,166	0,164	0,195	0,636
VQ	0,148	0,195	**1**	0,408	0,419	0,425	0,194	0,386	0,513	0,708
SCGOSC	0,191	0,160	0,408	**1**	0,564	0,433	0,390	0,314	0,413	0,692
PTCQ	0,150	0,407	0,419	0,564	**1**	0,647	0,301	0,676	0,343	0,728
UT	0,073	0,186	0,425	0,433	0,647	**1**	0,299	0,726	0,433	0,874
SCMQ	0,123	0,166	0,194	0,390	0,301	0,299	**1**	0,199	0,186	0,639
CMQ	0,042	0,164	0,386	0,314	0,676	0,726	0,199	**1**	0,301	0,867
SUCC	0,091	0,195	0,513	0,413	0,343	0,433	0,186	0,301	**1**	0,530
AVE	0,516	0,636	0,708	0,692	0,728	0,874	0,639	0,867	0,530	**0**

Discriminant validity (Squared correlations < Mean Communalities (AVE)

The Structural Model Assessment

Reliable and valid outer model estimation allow an assessment of the inner path model estimates (Henseler et al., 2009) Similarly R^2, Goodness-of-Fit Index (GFI) is another measure of model fit which measures the relative amount of variance and covariance in the sample covariance matrix that is together explained by the population covariance matrix. As it is stated by Schermelleh-Engel et al. (2003) the GFI value should be

between 0 and 1, with values close to 1 of good fit otherwise the data probably do not fit the model if the GFI is negative or much larger than 1 (Schermelleh-Engel et al., 2003).

It is shown in the Table 19 that the outer model GFI indexes for combined and partial stakeholder based constructs are higher than 0.960 which indicates that there is a very good fit between the manifest variables and latent variables of these models. Relatively the inner model GFI indexes for the latent constructs are higher than the minimum of 0.720, which also can be accepted as a satisfactory model fit.

The absolute GFI = $\sqrt{((\text{mean}(R2)*(\text{mean communality}))}$ values for all constructs in the Theoretical Model 2 are also in the acceptable limits according to the Schermelleh-Engel et al.'s (2003) measures.

Table 19. Goodness of Fit Indexes Results for the Theoretical Model 2

1 > The Goodness of Fit Index (GFI) > 0				
Stakeholder Type	*All Stakeholders*	*Project Manager*	*Team Member*	*End User*
Inner Model	0,766	0,758	0,723	0,722
Outer Model	0,988	0,993	0,965	0,988
Absolute	0,607	0,565	0,567	0,575
Mean R^2	0,537	0,511	0,496	0,484

Results of the Hypotheses

In PLSPM approach the structural model evaluates the causal associations between the latent variables and the statistics of concern are (a) path coefficients and (b) R-squares (Aslan, 2008).

According to the in Table 20, all the constructs in the theoretical model 2 are meaningful, because as it is stated in the analysis of previous framework of this study all

significance values are below the 0.50 which means these constructs can be accepted as statistically meaningful with the confidence level of %95 and the constructs can be explained by the related CHSFs.

The R^2 values for the significant constructs show that the percentage of the variance in an endogenous latent variable is explained by the associated exogenous latent variables. Chin (1998) defines the values of 0.67, 0.33 or 0.19, for R^2 measurement, respectively as 'substantial',' moderate' and 'weak', and states that if certain inner path model structures explain an endogenous latent variable by only a few exogenous latent variables then the 'moderate' R^2 may be acceptable (Henseler et al., 2009). From this point of view the it can be accepted that Theoretical Model 2 explains 45.9 percent of variance in Setting clear goals, objectives and success criteria's, 57.8 percent of variance in Project team composition and quality, 65.4 percent of variance in Communications management quality, 40.5 percent of variance in Scope and change management quality, 68.4 percent of variance in User training, 44.1 percent of variance in ERP project success. Also for the stakeholder based dimensions (Appendix E), variations in the same latent variables are explained just with percentages at a minimum of 37.7, except the Scope and Change Management Quality construct of team members' dimension. Therefore it can be interpreted as all constructs in this model, both for the whole of the data and for each stakeholder group level, can be defined as acceptable by moderate and substantial levels according to Chin's (1998) statements except the team members' Scope and Change Management Quality construct.

Table 20. Test Results for the Hypotheses of Theoretical Model 2

H9: Presence of a Project Champion (PC), Presence of Top Management Support (TMS) and Vendor Quality (VQ) have a positive impact on Setting Clear Goals, Objectives and Success Criteria's (SCGOSC).	
Significance	0,002
R^2	0,459
VQ- path coef.	0,515
TMS- path coef.	0,203
PC- path coef.	0,103
H10: Presence of a Project Champion (PC), Presence of Top Management Support (TMS) and Vendor Quality (VQ) have a positive impact on Project Team Composition and Quality (PTCQ).	
Significance	0,000
R^2	0,578
PC- path coef.	0,421
VQ- path coef.	0,433
TMS- path coef.	0,076
H11: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on Communications Management Quality (CMQ).	
Significance	0,000
R^2	0,684
SCGOSC- path coef.	-0,132
PTCQ- path coef.	0,922
H12: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on Scope and Change Management Quality (SCMQ).	
Significance	0,002
R^2	0,405
SCGOSC- path coef.	0,487
PTCQ- path coef.	0,183
H13: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on User Training (UT).	
Significance	0,000
R^2	0,654
SCGOSC- path coef.	0,122
PTCQ- path coef.	0,712
H14: Communications Management Quality (CMQ), Scope and Change Management Quality (SCMQ) and User Training (UT) have a positive impact on ERP project success (SUCC).	
Significance	0,003
R^2	0,441
UT- path coef.	0,635
SCMQ- path coef.	0,101
CMQ- path coef.	-0,037

Path coefficient value of an exogenous variable in a construct demonstrates that 1 unit change on that variable will impact the endogenous variable of the construct by the proportion of path coefficient value. The hypotheses 8, 9, 10, 12 and 13 will be accepted statistically, since all the path coefficients of related exogenous latent variables are positive and significant, which means these variables have a positive impact by the proportion of their path coefficients on the endogenous latent variable of their construct. According to the table 20 the User Training and the Scope and Change Management Quality have positive impacts on ERP Project Success (SUCC) while the Communications Management Quality (CMQ) impacts the ERP project success negatively, similar to Setting Clear Goals, Objectives and Success Criteria's impact on communications management quality with a negative proportion of 0,132 therefore the Hypotheses 11 and 14 will be rejected partially for the path between CMQ-SUCC and SCGOSC-CMQ.

The detailed results of the PLSPM analysis are given in Appendix E, respectively for the whole data set, project managers' dimension, team members' dimension and for end users' dimension. Please see the comparative test results of each scale for different stakeholder dimensions in Appendix F.)

CHAPTER 7

CONCLUSION, IMPLICATIONS AND FUTURE STUDIES

Two CHSFs models have been constructed using reliability, linear regression analysis and structural equation modeling (SEM), which allow measuring latent variables with manifest variables from surveys. The estimation method is Partial Least Squares Path Modeling (PLS-PM) and the analysis tool is XLSTAT-PLSPM. The proposed methodologies have been applied to a sample of 215 respondents from 28 companies for three stakeholder groups respectively; ERP project managers, ERP project team members and ERP system end users.

Recent research describes how the collected publications were used to identify the main critical success factors (CSFs) within ERP projects (Kronbichler at al., 2009). This study evaluates these critical success factors from the human aspect by indicating the related literature and gathers these factors under the critical human success factors concept.

As a result of analysis carried out, this paper identifies 8 critical human success factors which should help further investigations and ERP implementers to define possible problems and to identify the possible negative influence on the ERP in an early phase and to guide a successful route during the application of ERP.

The scales defined based on literature and expertise's are found reliable and meaningful project success , which are including critical human success factors as; Setting Clear Goals, Objectives and Success Criterias, Presence of Top Management Support, Presence of a Project Champion, User Training, Project Team Composition and

Quality, Communications Management Quality, Scope and Change Management Quality and Vendor Quality; and the success measurement factors as; System Quality, Information Quality, Individual Impact, Workgroup Impact, Organizational Impact, Within Time, Within Budget, Project Stakeholder Satisfaction, User Satisfaction and Involvement.

The effects of these factors on ERP project success are analyzed one by one, which resulted as Setting Clear Goals, Objectives and Success Criterias, Presence of a Project Champion, User Training, Project Team Composition and Quality, Communications Management Quality, Scope and Change Management Quality and Vendor Quality have a positive impact on ERP Project Success and there are some significant differences between the stakeholders about the perception of these factors.

Contradictory to the existing literature the presence of the 'Top Management Support' (TMS) is not supported by the Theoretical Model 1. The TMS questions are answered only by the project managers and these results show just their perception of top management support which is defined by questioning the top managements' perception of IS function, participation of the CIO's to the planning meetings and the frequency of the review meetings with the top management. For explaining this controversial issue, it shouldn't be ignored that there are different kind of project managers who answered this survey by the meaning of project managers' role in the company. Varying from top management to IS managers and to IS workers as respondent profiles of the project managers' survey there will be major perceptional differences for the interpretation of the TMS questions. Such as the TMS-3question, with the lowest factor loading; if the one, as a project managers' survey respondent, is a

top manager then the review meetings with the top management will not make any sense for questioning. This can be accepted as a limitation of this study and there can be an implication for future studies that, Top management questions should be answered by the respondents which has similar profiles and the questions should be prepared according to this profiles, and there can also be questions about the top managements resource oriented support to the project.

Furthermore, the PLS analysis findings show that: as initial stage Presence of a Project Champion, Presence of Top Management Support and Vendor Quality have a positive impact on Setting Clear Goals, Objectives and Success Criteria's and Project Team Composition and Quality; at the second stage, Project Team Composition and Quality resulted as having a positive impact on Scope and Change Management Quality, Communications Management Quality and User Training while Setting Clear Goals, Objectives and Success Criteria's resulted as having a positive impact on Scope and Change Management Quality and User Training and a negative impact on Communications Management Quality; finally, Scope and Change Management Quality and User Training show positive impact on ERP project success while Communications Management Quality resulted negatively and there are again perceptional differences observed on project stakeholders views.

Since the main aim of this study is to analyze the CHSFs of ERP projects as a perceptional composition of different stakeholder groups, therefore the all the respondent groups did not answer every question in the main survey. Some questions show only the related respondent profile's opinion therefore it is not possible a hundred percent separation of the results for each respondent stakeholder group. The future

studies about this topic may include categorizations and questions that can be answered from each group to evaluate the differences of these stakeholder groups by the meaning of ERP system projects' CHSFs perception.

Regarding to low absolute GFI values for the 'Theoretical Model 2', it can also be suggested that the future studies should look for more homogeneous segments among the CHSFs.

The future studies should also include more CHSFs and more direct relations between CHSFs and the 'ERP Project Success' since the results of the second theoretical model in this study couldn't explained the one hundred percent of the variations in the 'ERP Project Success' and in the CHSFs.

This study is a pioneer study for following studies from the aspect of its analyzing critical human success factors for ERP projects with their interrelations by combining three major ERP stakeholders' perceptions together.

APPENDICES

A. The Mail Sent To the Respondent Firm Responsibles

ERP Projelerinin Başarısı Değerlendirme Anketleri Inbox | x

show details Reply

Turkish ▾ > English ▾ Translate message Turn off for: Turkish

From: Nuket Iyigun
Sent: Monday, January 01, 2008 4:37 PM
To: [redacted]
Subject: SAP Projelerinin Başarısı Değerlendirme Anketleri

Merhaba [redacted] Bey,
ben Nüket Iyigün, Boğaziçi Üniversitesi Yönetim Bilişim Sistemleri Bölümü'nde **"ERP Projelerinin Başarısını Etkileyen Faktörler"** üzerine tezimi hazırlıyorum.

Sizlerden tezim için online birankete katılımınızı rica ediyorum.
Bu anket çalışması ile hem kendi şirketinizde kullandığınız ERPuygulamasının proje başarısını değerlendirmiş, hem de bana tezimde çok önemli bir katkıda bulunmuş olacaksınız.
(Anketler, kendi şirket sonucunuzu öğrenmek isteyebilirsiniz diye, şirket bazında raporlanacak şekilde hazırlandı.)

Daha önceki deneyimlerimiz süre uzadıkça cevap alma oranının düştüğü yönündedir bu nedenle Anketler için **15 Ocak 2008** sizin için uygun bir deadline mıdır?
İlginiz için teşekkürler.

ERP Projelerinin Başarısı Değerlendirme Anketleri

ERP değerlendirme ekibi projemizde **Yönetici, Proje Takımı ve Son Kullanıcı** olmak 3 farklı gruba ayrılmıştır ve her grubun kendine ait sorularının bulunduğu 3 farklı anketimiz vardır. Anketler maksimum **5dk** sürmektedir.

1) **ERP Proje Yönetim Ekibi Anketi**
Cevaplaması beklenen Kişi Sayısı: 1-3 Anket süresi maksimum **10dk**
(Anketi cevaplayacak kişilerin projenin süre ve maliyet yönünden sonuçlarını, proje boyunca üst yönetim ile iletişimi değerlerndirebilecek bilgi ve yetkinlikte olması beklenmektedir.)
Anket Linki: http://FreeOnlineSurveys.com/rendersurvey.asp?sid=muqb0248b7t5u6i693089

2) **ERP Proje Ekibi Anketi**
Cevaplaması beklenen Kişi Sayısı: 3-5 Anket süresi maksimum **5dk**
(Anketi cevaplayacak kişilerin proje içerisinde aktif olarak çalışmış projenin Temel Performans Göstergeleri ve hedefleri hakkından bilgi sahibi olması beklenmektedir.)
Anket Linki: http://FreeOnlineSurveys.com/rendersurvey.asp?sid=8xt4iov6h21zq4t693087

3) **ERP Son Kullanıcı Anketi**
Cevaplaması beklenen Kişi Sayısı: 5-10 Anket süresi maksimum **3dk**
(Anketi cevaplayacak kişilerin uygulamayı kullanan ve ERP öncesindeki durum ile ERP varlığındaki durumu karşılaştırabilecek kişiler olması önemlidir.)
Anket Linki: http://FreeOnlineSurveys.com/rendersurvey.asp?sid=fe972uz2hmrqqe1693088

Lütfen soruları cevaplarken ERP projesi öncesindeki dönem ile ERP projesi sonrasındaki dönemi karşılaştırınız.

İyi çalışmalar.
Nüket İyigün

B. Project Manager Questionnaire

ERP Proje Yöneticisi Anketi

.

Lütfen kendiniz ve şirketinizle ilgili aşağıdaki soruları cevaplayınız.

*1) **Şirketinizin adı:** (Bu bilgi sadece anket değerlendirilirken, projeleri birbirinden ayırabilmek için kullanılacaktır. Kesinliklikle hiçbir amaçla hiçbir yerde yazılı veya sözlü kullanılmayacaktır.)

*2) **Şirketinizin içinde bulunduğu sektör:**

*3) **Cinsiyetiniz:**

○ Kadın ○ Erkek

4) **Yaşınız:**

○ 18-23 yaş arası ○ 24-29 yaş arası ○ 30-39 yaş arası ○ 40-49 yaş arası ○ 50-59 yaş arası ○ 60 yaş ve üstü

Lütfen şirketinizde kullandığımız ERP uygulaması ile ilgili aşağıdaki soruları cevaplayınız.

*5) **Lütfen şirketinizde kullanılandığımız ERP uygulamasını seçiniz:**

○ SAP ○ Oracle ○ GlobalSoft ○ IAS-CANIAS ○ NETSİS ○ LOGO BUSINESS SOLUTIONS
○ Microsoft ○ IFS ○ Soft Yazılım ○ Likom ○ Diğer (Lütfen belirtiniz):

*6) **Şirketinizde gerçekleştirilen ERP projesindeki rolünüz:**

○ CIO/ Genel Koordinatör ○ Genel Müdür ○ Bilgi İşlem Müdürü/Yöneticisi
○ Bilgi İşlem Departmanı Çalışanı ○ Diğer (Lütfen Belirtiniz):

*7) **Lütfen şirketinizde gerçekleştirilen ERP projesinin amaç ve hedefleri ile ilgili size verilen aşağıdaki bilgileri yeterlilikleri bakımından değerlendiriniz.**

	Kesinlikle Yeterli	Yeterli	Kısmen Yeterli	Yetersiz	Kesinlikle Yetersiz
Proje amaç ve hedefleriyle ilgili verilen bilgiler	○	○	○	○	○
Proje temel performans göstergeleri(KPI) ve bunlara bireysel katkılarınız hakkında verilen bilgiler	○	○	○	○	○
Proje planları ve ilerleyişi ile ilgili verilen bilgiler	○	○	○	○	○

*8) **Lütfen şirketinizde gerçekleştirilen ERP projesinin başarı kriterlerinin belirlenmesi ile ilgili olarak aşağıdaki öğeleri değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Projenin planlama aşamasında belirlenmişlerdir.	○	○	○	○	○
Şirketin iş hedeflerine bağlı olarak belirlenmişlerdir.	○	○	○	○	○

*9) **Lütfen şirketinizde gerçekleştirilen ERP projesi süresinde ve öncesindeki üst yönetimin projeye yaklaşımı ile ilgili aşağıdaki öğeleri değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Üst yönetim için "Bilgi Sistemleri" bir araçtan öte ana bir operasyondur.	○	○	○	○	○
Şirket Bilgi Sistemleri Koordinatörü (CIO) proje boyunca tüm önemli planlama toplantılarına katılmıştır.	○	○	○	○	○
Üst yönetim ile proje boyunca değerlendirme ve bilgilendirme toplantıları sık sık tekrarlanmıştır.	○	○	○	○	○

*10) **Lütfen şirketinizde gerçekleştirilen ERP projesindeki proje sponsorunuzun görevleri ile ilgili aşağıdaki öğeleri değerlendiriniz.**

Proje Sponsoru, projeyi üst yönetime tanıtan, reklamını yapan, proje ile ilgili önemli kararları veren, projenin varlığını sürdürmesini sağlayan kişidir

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Projeyi üst yönetime tanıtmış ve faydalarını savunmuştur.	○	○	○	○	○
Projeyi teşvik etmiştir.	○	○	○	○	○
Proje yöneticisine danışmanlık yapmıştır.	○	○	○	○	○
Proje kapsamı ve değişiklikleriyle ilgili kararları onaylamıştır.	○	○	○	○	○
Proje ile ilgili şirket içi ve dışı politikaları yönetmiştir.	○	○	○	○	○

*11) **Lütfen şirketinizde gerçekleştirilen ERP projesi için verilen eğitimlerle ilgili aşağıdaki öğeleri yeterlilikleri bakımından değerlendiriniz.**

	Kesinlikle Yeterli	Yeterli	Kısmen Yeterli	Yetersiz	Kesinlikle Yetersiz
Eğitmen personelin bilgi birikimi ve deneyimi	○	○	○	○	○
Eğitim ve uygulamaların miktarı ve kalitesi	○	○	○	○	○
Eğitim yönteminin etkinliği	○	○	○	○	○
Eğitim meteryalinin anlaşılabilirliği	○	○	○	○	○
Verilen eğitimin geneli	○	○	○	○	○

*12) **Lütfen şirketinizde gerçekleştirilen ERP projesi için kurulan proje ekibi ile ilgili aşağıdaki öğeleri değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Bilgi teknolojileri ve diğer departman çalışanları komposizyonu bakımından dengeliydi.	○	○	○	○	○
Yeterli bilgi birikimine sahip kişilerden oluşmaktaydı.	○	○	○	○	○
Yeterli deneyime sahip kişilerden oluşmaktaydı.	○	○	○	○	○
Yeterli iletişim becerilerine sahip kişilerden oluşmaktaydı.	○	○	○	○	○
Kuruluş hedefleri ile proje hedeflerini konumlandırabilecek organizasyonel bilgi düzeyine sahip kişilerden oluşmaktaydı.	○	○	○	○	○
Proje temel performans göstergelerinin (KPI) neler olduğunu ve bunlara bireysel katkısı hakkında bilgi sahip kişilerden oluşmaktaydı.	○	○	○	○	○
Kaynaklara erişim bakımından kuruluş tarafından desteklenmekteydi.	○	○	○	○	○
Projeye ayrılacak zaman bakımından kuruluş tarafından desteklenmekteydi.	○	○	○	○	○

*13) **Lütfen ERP projesi boyunca kullanılan aşağıdaki iletişim öğelerini yeterlilikleri bakımından değerlendiriniz.**

	Kesinlikle Yeterli	Yeterli	Kısmen Yeterli	Yetersiz	Kesinlikle Yetersiz
Proje boyunca iletişim sıklığı	○	○	○	○	○
İletişim araçları ile iletilen bilginin kalitesi	○	○	○	○	○
İletişim araçları ile iletilen bilginin anlaşılabilirlik düzeyi	○	○	○	○	○
İletişime engel olacak, farklı lokasyonlar gibi bariyerlere karşı alınan önlemler	○	○	○	○	○
Proje boyunca kullanılan iletişim kaynakları	○	○	○	○	○

*14) **Lütfen şirketinizde gerçekleştirilen ERP projesi boyunca yapılan kapsam ve değişim yönetimi ile ilgili aşağıdaki öğeleri değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Maliyet, Kapsam, Kalite ve Zaman dengelenmesi bakımından iyi bir değişim yönetimi planı hazırlanmıştır.	○	○	○	○	○
Maliyet, Kapsam, Kalite ve Zaman boyutlarındaki değişiklikler sık aralıklarla kontrol edilmiştir.	○	○	○	○	○
İş süreclerindeki herhangi bir değişikliğin tespiti ve zamanında müdahalesi başarılı bir şekilde yönetilmiştir.	○	○	○	○	○
Proje süresince yapılan ve karşılaşılan değişikliklerin dokümantasyonu efektif olarak yapılmıştır.	○	○	○	○	○
Rol dağılımı ile ilgili değişiklikler de planlı ve efektif bir şekilde yönetilmiştir.	○	○	○	○	○

*15) **Lütfen şirketinizde gerçekleştirilen ERP projesinin sistem ve bilgi kalitesi ile ilgili aşağıdaki öğeleri değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Kolay kullanılabilir bir sistemdir.	○	○	○	○	○
Kolay öğrenilebilir bir sistemdir.	○	○	○	○	○
Esnek ve kolayca adapte edilebilir bir sistemdir.	○	○	○	○	○
Diğer bilgi teknolojileri sistemleriyle veri entegrasyonuna açık bir sistemdir.	○	○	○	○	○
Yeniliklere ve geliştirilmeye açık bir sistemdir.	○	○	○	○	○
Modüler özelleştirmelere açık bir sistemdir.	○	○	○	○	○
Kullanıcı isteklerini karşılama hızı bakımından yeterli bir sistemdir.	○	○	○	○	○
Veri denetimi ve kontrolünün kolaylığı bakımından yeterli bir sistemdir.	○	○	○	○	○
Çıktı tutarlılığı bakımından güvenilir bir sistemdir.	○	○	○	○	○
Veritabanı güncel bir içeriğe sahiptir.	○	○	○	○	○
Çıktı olarak sağlanan bilgi yeterli kapsama sahiptir.	○	○	○	○	○
Çıktı olarak sağlanan bilgi anlaşılabilirdir.	○	○	○	○	○
Çıktı olarak sağlanan bilgi kullanışlıdır.	○	○	○	○	○

Şirketinizde ERP projesi boyunca Dış Kaynak kullanılmadıysa lütfen 18. soruya geçiniz.

*16) **Lütfen şirketinizde gerçekleştirilen ERP projesinde alınan dış kaynak hizmeti ile ilgili aşağıdaki öğeleri yeterlilikleri bakımından değerlendiriniz.**

	Kesinlikle Yeterli	Yeterli	Kısmen Yeterli	Yetersiz	Kesinlikle Yetersiz
Dış kaynak sağlayıcısının sunduğu teknik destek	○	○	○	○	○
Dış kaynak sağlayıcısının bu alandaki referansları	○	○	○	○	○
Dış kaynak sağlayıcısının kredibilitesi ve güvenirliği	○	○	○	○	○
Dış kaynak sağlayıcısının organizasyon ile ilişkisi ve iletişimi	○	○	○	○	○
Dış kaynak sağlayıcısının deneyimi ve bilgi birikimi	○	○	○	○	○
Dış kaynak sağlayıcısının satış yaklaşımı veprojeye ilgisi	○	○	○	○	○
Dış kaynak sağlayıcısının müdahale hızı ve çözümün efektifliği	○	○	○	○	○
Dış kaynak sağlayıcısının eğitim ve uygulamalarının kalitesi	○	○	○	○	○
Dış kaynak sağlayıcısının proje yönetimindeki başarısı	○	○	○	○	○

*17) **Lütfen şirketinizde gerçekleştirilen ERP projesinin etkileri ile ilgili aşağıdaki öğeleri değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Sistem organizasyonel öğrenmeyi geliştirmiştir.	○	○	○	○	○
Sistem kişisel verimliliği arttırmıştır.	○	○	○	○	○
Sistem daha etkin ve daha kaliteli kararlar alınmasını sağlamıştır.	○	○	○	○	○
Sistem iş için harcanan zamanı kısaltarak iş alanında kişinin kendini geliştirmesine olanak sağlamıştır.	○	○	○	○	○
Sistem çalışanların organizasyona katılımının artmasına yardımcı olmuştur.	○	○	○	○	○
Sistem organizasyon çapında iletişimi arttırmıştır.	○	○	○	○	○
Sistem bölümler arası koordinasyonu gelişmesine katkıda bulunmuştur.	○	○	○	○	○
Sistem çalışanların işlerini daha çok sahiplenmesini sağlamıştır.	○	○	○	○	○
Sistem organizasyonel alt birimlerin verimliliğinin artmasına yardımcı olmuştur.	○	○	○	○	○
Sistem daha etkin çözümler alınmasını sağlamıştır.	○	○	○	○	○
Sistem organizasyonel maliyetleri düşürmüştür.	○	○	○	○	○

Sistem yapısı itibariyle elektronik ticaret yapılmasına olanak sağlamıştır.	○	○	○	○	○
Sistem şirket genelindeki üretkenliği arttırmıştır.	○	○	○	○	○
Sistem rakiplere karşı rekabet avantajı sağlamıştır.	○	○	○	○	○
Sistem müşteri hizmet kalitesini ve dolayısıyla müşteri memnuniyetini artımıştır.ı	○	○	○	○	○
Sistem iş süreci değişimlerine olanak sağlamıştır.	○	○	○	○	○
Sistem organizasyonel veri kaynaklarının daha iyi değerlendirilmesine katkıda bulunmuştur.	○	○	○	○	○

Lütfen 19. ve 20.soruları şirketinizde gerçekleştirilen ERP projesinin proje sonu değerleri ile ilgili olarak cevaplayınız.

*18) **Projenin tamamlandığı tarih ile ilgili olarak:**

- ○ Planlanan proje bitiş tarihinden çok sonra tamamlanmıştır.
- ○ Planlanan proje bitiş tarihinden bir kaç gün gecikme ile tamamlanmıştır.
- ○ Planlanan proje bitiş tarihinde tamamlanmıştır.
- ○ Planlanan proje bitiş tarihinden bir kaç gün önce tamamlanmıştır.
- ○ Planlanan proje bitiş tarihinden çok önce tamamlanmıştır.

*19) **Projenin tamamlandığı bütçe ile ilgili olarak:**

- ○ Planlanan proje bütçesinin çok üstünde bir maliyetle tamamlanmıştır.
- ○ Planlanan proje bütçesinin biraz üstünde bir maliyetle tamamlanmıştır.
- ○ Planlanan proje bütçesini tam karşılayan bir maliyetle tamamlanmıştır.
- ○ Planlanan proje bütçesine yakın ama altında bir maliyetle tamamlanmıştır.
- ○ Planlanan proje bütçesinin çok altında bir maliyetle tamamlanmıştır.

*20) **Lütfen şirketinizde gerçekleştirilen ERP Projesinin proje sonu değerlerilerinin paydaşlara yansıması ile ilgili olarak aşağıdaki öğeleri değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Sistem karlılığı ve dolayısıyla hissedarların karlılığı artmıştır.	○	○	○	○	○
Proje hissedarları ve üst yönetim proje sonuçlarından memnun kalmışlardır.	○	○	○	○	○
Kullanıcılar ERP sistemini kullanmaya karşı direnç göstermişlerdir.	○	○	○	○	○
Kullanıcılar sistem ve fonksiyonları hakkında yüksek bir bilgi düzeyine ve sistem anlayışına sahiptir.	○	○	○	○	○
Kullanıcılar için ERP sistemi yüksek öneme sahiptir.	○	○	○	○	○

*21) **Şirketinizde kurulan ERP sistemi ile ilgili aşağıdaki öğeleri kendi memnuniyetiniz bakımından değerlendiriniz.**

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
Kurulan ERP sisteminini faydali buluyorum.	○	○	○	○	○
Kurulan ERP sistemi ihtiyaclarımı karşılıyor.	○	○	○	○	○
Kurulan ERP sistemini etkin bir şekilde kullanıyorum.	○	○	○	○	○

GONDER

C. Questions According To the Questionnaire Type Table

Questions included in the questionnaire type: E: End User T: Team Member M: Project Manager					
Fac.	Item No	Factor (Latent Variables)	Type	Questions (Manifest Variables)	Factors Loadings
Critical Human Success Factors (CHSFs)					
SCGOSC	SCGOSC_1	Setting Clear Goals, Objectives and Success Criterias	ETM	The information provided about the scope and definition of the ERP project	0,745
	SCGOSC_2	Setting Clear Goals, Objectives and Success Criterias	TM	The information provided about project KPI's and your individual added values to these KPI'S	0,736
	SCGOSC_3	Setting Clear Goals, Objectives and Success Criterias	TM	The information provided about the project plan and the project progress	0,799
	SCGOSC_4	Setting Clear Goals, Objectives and Success Criterias	M	The success criteria for the project has been set on the planning phase of the project	0,895
	SCGOSC_5	Setting Clear Goals, Objectives and Success Criterias	M	The project success criteria's link to companies business results	0,892
TMS	TMS_1	Presence of Top Management Support	M	Our top management perception of IS function is as a core operation rather than an IT tool	0,903
	TMS_2	Presence of Top Management Support	M	The CIO participated in all of the project planning meetings	0,755
	TMS_3	Presence of Top Management Support	M	The review meetings with the top management are frequently held.	0,498
PC	PC_1	Presence of a Project Champion	M	Our project has a project sponsor who benefits from the project and advocates the benefits of the system	0,820
	PC_2	Presence of a Project Champion	M	Our project has a project sponsor who promotes the project	0,875
	PC_3	Presence of a Project Champion	M	Our project has a project sponsor who gives consultancy to project manager	0,629
	PC_4	Presence of a Project Champion	M	Our project has a project sponsor who approves the Scope / Change decisions	0,687
	PC_5	Presence of a Project Champion	M	Our project has a project sponsor who manages politics	0,928

Table continued

UT	UT_1	User Training	ETM	Trainer knowledge and experience	0,868
	UT_2	User Training	ETM	The amount and quality of education and practices	0,975
	UT_3	User Training	ETM	The efficiency of the training methods	0,931
	UT_4	User Training	ETM	The intelligibility of the education material	0,935
	UT_5	User Training	ETM	The training in general	0,960
PTCQ	PTCQ_1	Project Team Composition and Quality	TM	The composition of the project team is balanced by the meaning of IT people/Business people	0,918
	PTCQ_2	Project Team Composition and Quality	TM	The people in project team has the sufficient knowledge in order to fulfill the project requirements	0,867
	PTCQ_3	Project Team Composition and Quality	TM	The people in project team has the sufficient experience in order to fulfill the project requirements	0,890
	PTCQ_4	Project Team Composition and Quality	TM	The people in project team has the sufficient communication skills in order to fulfill the project requirements	0,822
	PTCQ_5	Project Team Composition and Quality	TM	The people in the project team is aware about his/her organizations goals and objectives	0,936
	PTCQ_6	Project Team Composition and Quality	TM	The people in the project team is aware about project goals and objectives, KPI's of the project	0,921
	PTCQ_7	Project Team Composition and Quality	TM	The project team is supported by the organization by the meaning of access to resources	0,811
	PTCQ_8	Project Team Composition and Quality	TM	The project team is supported by the organization by the meaning of flexible work hours, job intensity	0,619
CMQ	CMQ_1	Communications Management Quality	TM	The communication frequency was enough during the project	0,920
	CMQ_2	Communications Management Quality	TM	The information travelling by the communication media is accurate	0,959
	CMQ_3	Communications Management Quality	TM	The information travelling by the communication media is easy to understand	0,904
	CMQ_4	Communications Management Quality	TM	There are no barriers to communication (such as location barriers etc.)	0,918
	CMQ_5	Communications Management Quality	TM	There is sufficient communication resource to use in the project	0,957

Table continued

SCMQ	SCMQ_1	Scope and Change Management Quality	M	There is a good change management plan by the meaning of balancing Cost, Scope, Quality, Time	0,790
	SCMQ_2	Scope and Change Management Quality	M	The change in Cost, Scope, Quality, Time frequently monitored	0,689
	SCMQ_3	Scope and Change Management Quality	M	Tracking of the business process changes done effectively during the project	0,784
	SCMQ_4	Scope and Change Management Quality	M	Documentation process changes done effectively during the project	0,877
	SCMQ_5	Scope and Change Management Quality	M	Changes in the roles distribution planned and managed effectively during the project	0,845
VQ	VQ_1	Vendor Quality	TM	System vendor/consultant provides adequate technical support	0,848
	VQ_2	Vendor Quality	M	System vendor/consultant has good references	0,689
	VQ_3	Vendor Quality	M	System vendor/consultant is credible and trustworthy	0,741
	VQ_4	Vendor Quality	M	System vendor/consultant communicates well and has good relationships, with my organization	0,873
	VQ_5	Vendor Quality	M	System vendor/consultant has a good domain knowledge and expertise	0,903
	VQ_6	Vendor Quality	M	System vendor/consultants has a good sales approach and interest on project	0,848
	VQ_7	Vendor Quality	TM	System vendor/consultant exhibits fast and effective solution performances expertise by the meaning of competency	0,850
	VQ_8	Vendor Quality	M	The quality of instruction and practices that is afforded to the user by System vendor/consultant is sufficient	0,882
	VQ_9	Vendor Quality	M	System vendor/consultants are good at project management	0,923

Table continued

Success Measurement Factors (SMFs)					
IQ	IQ_1	Information Quality	ETM	Systems database contents are up-to-date	
	IQ_2	Information Quality	ETM	System has complete information	
	IQ_3	Information Quality	ETM	The information on system is understandable	
	IQ_4	Information Quality	ETM	The information on system is usable	
SQ	SQ_1	System Quality	ETM	System is easy to use	
	SQ_2	System Quality	ETM	System is easy to learn	
	SQ_3	System Quality	TM	System is flexible and easy to adapt	
	SQ_4	System Quality	M	System allows for integration with other IT Systems	
	SQ_5	System Quality	TM	System allows for developments and changes	
	SQ_6	System Quality	M	System allows modular customization	
	SQ_7	System Quality	ETM	System is sufficient by the meaning of speed of meeting users' requirements	
	SQ_8	System Quality	TM	The type and quality of auditing and inspection rendered by the ERP system.	
	SQ_9	System Quality	ETM	System is reliable :the consistency and dependency of the output information provided by ERP	
II	II_1	Individual Impact	ETM	System enhances organizational learning and recall for individual worker	
	II_2	Individual Impact	ETM	System improves individual productivity	
	II_3	Individual Impact	ETM	System enhances higher-quality of decision making	
	II_4	Individual Impact	ETM	System saves time for individual tasks and duties	

Table continued

WI	WI_1	Workgroup Impact	ETM	System helps to improve workers' participation in the organization	
	WI_2	Workgroup Impact	ETM	System improves organizational-wide communication	
	WI_3	Workgroup Impact	ETM	System improves inter-departmental coordination	
	WI_4	Workgroup Impact	ETM	System creates a sense of responsibility	
	WI_5	Workgroup Impact	ETM	System improves the efficiency of sub-units in the organization	
	WI_6	Workgroup Impact	ETM	System enhances solution effectiveness	
OI	OI_1	Organizational Impact	ETM	System reduces organizational costs	
	OI_2	Organizational Impact	ETM	System enables e-business / e-commerce by its structure	
	OI_3	Organizational Impact	ETM	System improves overall productivity	
	OI_4	Organizational Impact	ETM	System provides us with competitive advantage	
	OI_5	Organizational Impact	ETM	System increases customer service quality and satisfaction	
	OI_6	Organizational Impact	ETM	System facilitates business process change	
	OI_7	Organizational Impact	ETM	System allows for better use of organizational data resource	
PSS	PSS_1	Project Stakeholder Satisfaction	M	System profitability and consequently shareholders profitability are increased	
	PSS_2	Project Stakeholder Satisfaction	M	Project shareholders and top management is satisfied with the project results	
	(removed from the list due to the reliability analysis)				
	PSS_3	Project Stakeholder Satisfaction	TM	Users didn't show resist1nce to use the new ERP system	
	PSS_4	Project Stakeholder Satisfaction	TM	Users have a high level of system understanding and knowledge about the functions of the system	
	PSS_5	Project Stakeholder Satisfaction	TM	ERP system has high importance for the users	

Table continued

USI	USI_1	User Satisfaction and Involvement	ETM	I think the ERP system in my company is useful.	
	USI_2	User Satisfaction and Involvement	ETM	System meets my requirements	
	USI_3	User Satisfaction and Involvement	ETM	I use the system effectively	
	USI_4	User Satisfaction and Involvement	ET	I have a high level of system understanding and knowledge about the functions of the system/	
	USI_5	User Satisfaction and Involvement	ET	ERP system has a high importance for me/	
WT	WT_1	Within Time	M	Project Completion Date	
WB	WB_1	Within Budget	M	Project Completion Budget	

D. One to One Linear Regression Analysis of CHSFs for the Model 2

Table 21.One to One Linear Regressions of CHSFs

	SCGOSC	TMS	PC	UT	PTCQ	CMQ	SCMQ	VQ
SCGOSC		,148	,104	,000	,000	,002	,000	,001
TMS	,148		,057	,629	,288	,986	,211	,297
PC	,104	,057		,035	,002	,171	,067	,080
UT	,000	,629	,035		,000	,000	,012	,002
PTCQ	,000	,288	,002	,000		,000	,003	,001
CMQ	,002	,986	,171	,000	,000		,017	,001
SCMQ	,000	,211	,067	,012	,003	,017		,030
VQ	,001	,297	,080	,002	,001	,001	,030	

E. XLSTAT PLSPM Analysis Results for the Theoretical Model 2

R^2 (SCGOSC / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,459	6,776	0,002	0,540	0,114	4,038

Path coefficients (SCGOSC / 1):

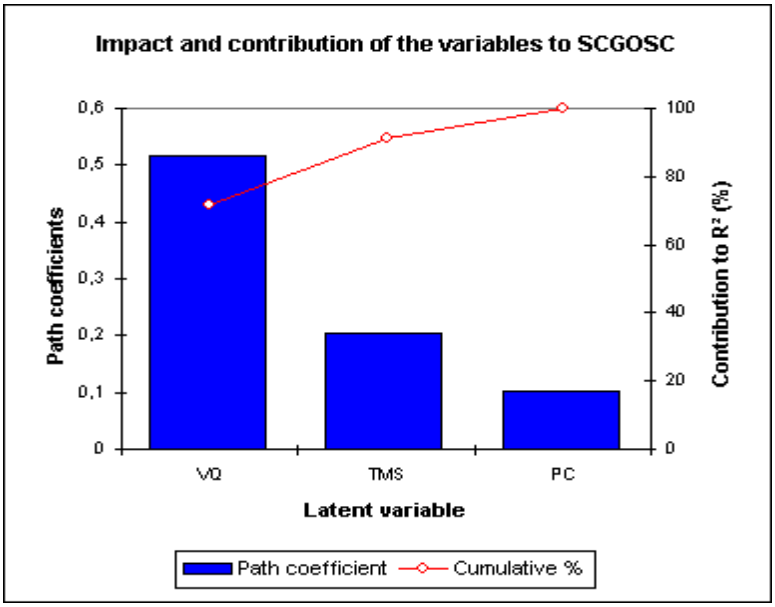
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,103	0,171	0,599	0,555	0,015
VQ	0,515	0,174	2,959	0,007	0,365
TMS	0,203	0,167	1,220	0,234	0,062

Equation of the model:

SCGOSC = 0,102529514206564*PC+0,515138363331205*VQ+0,203098034429846*TMS

Impact and contribution of the variables to SCGOSC (Dimension 1):

	VQ	TMS	PC
Correlation	0,638	0,437	0,400
Path coefficient	0,515	0,203	0,103
Correlation * path coefficient	0,329	0,089	0,041
Contribution to R^2 (%)	71,719	19,334	8,947
Cumulative %	71,719	91,053	100,000



R^2 (PTCQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,578	10,954	0,000	0,665	0,106	5,443

Path coefficients (PTCQ / 1):

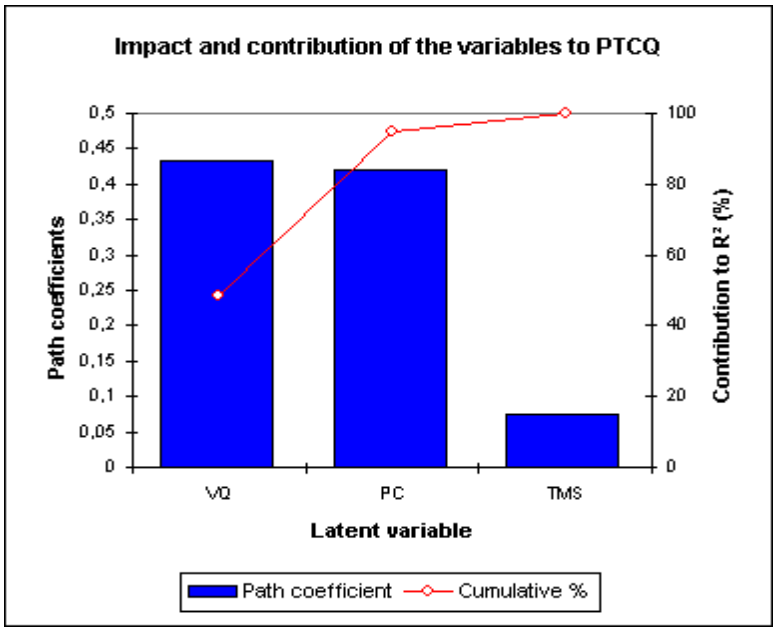
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,421	0,151	2,781	0,010	0,322
VQ	0,433	0,154	2,815	0,010	0,330
TMS	0,076	0,147	0,516	0,611	0,011

Equation of the model:

PTCQ = 0,42066442942786*PC+0,432704793614022*VQ+7,58565993826477E-02*TMS

Impact and contribution of the variables to PTCQ (Dimension 1):

	VQ	PC	TMS
Correlation	0,648	0,638	0,388
Path coefficient	0,433	0,421	0,076
Correlation * path coefficient	0,280	0,268	0,029
Contribution to R^2 (%)	48,481	46,430	5,089
Cumulative %	48,481	94,911	100,000



R^2 (UT / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,654	23,581	0,000	0,675	0,090	7,233

Path coefficients (UT / 1):

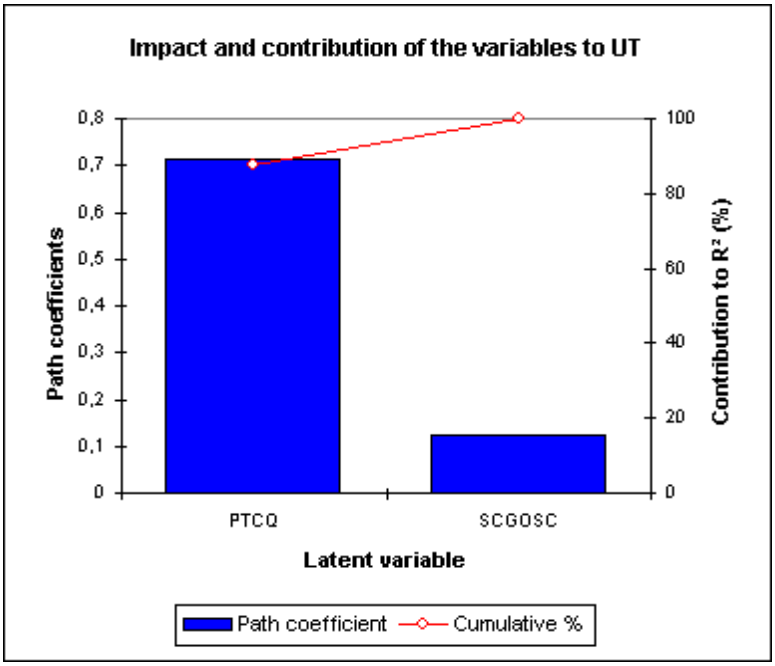
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	0,122	0,178	0,687	0,499	0,019
PTCQ	0,712	0,178	3,994	0,001	0,638

Equation of the model:

UT = 0,122458145087566*SCGOSC+0,712375433120209*PTCQ

Impact and contribution of the variables to UT (Dimension 1):

	PTCQ	SCGOSC
Correlation	0,804	0,658
Path coefficient	0,712	0,122
Correlation * path coefficient	0,573	0,081
Contribution to R^2 (%)	87,677	12,323
Cumulative %	87,677	100,000



R^2 (SCMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,405	8,493	0,002	0,456	0,115	3,514

Path coefficients (SCMQ / 1):

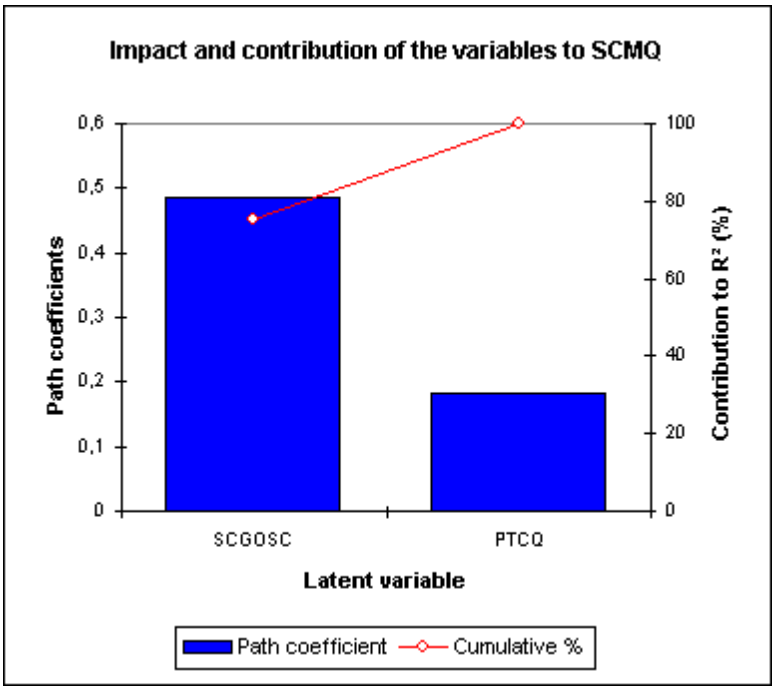
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	0,487	0,234	2,081	0,048	0,173
PTCQ	0,183	0,234	0,785	0,440	0,025

Equation of the model:

SCMQ = 0,486596479221336*SCGOSC+0,183458183317684*PTCQ

Impact and contribution of the variables to SCMQ (Dimension 1):

	SCGOSC	PTCQ
Correlation	0,624	0,549
Path coefficient	0,487	0,183
Correlation * path coefficient	0,304	0,101
Contribution to R^2 (%)	75,103	24,897
Cumulative %	75,103	100,000



R^2 (CMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,684	27,018	0,000	0,704	0,108	6,336

Path coefficients (CMQ / 1):

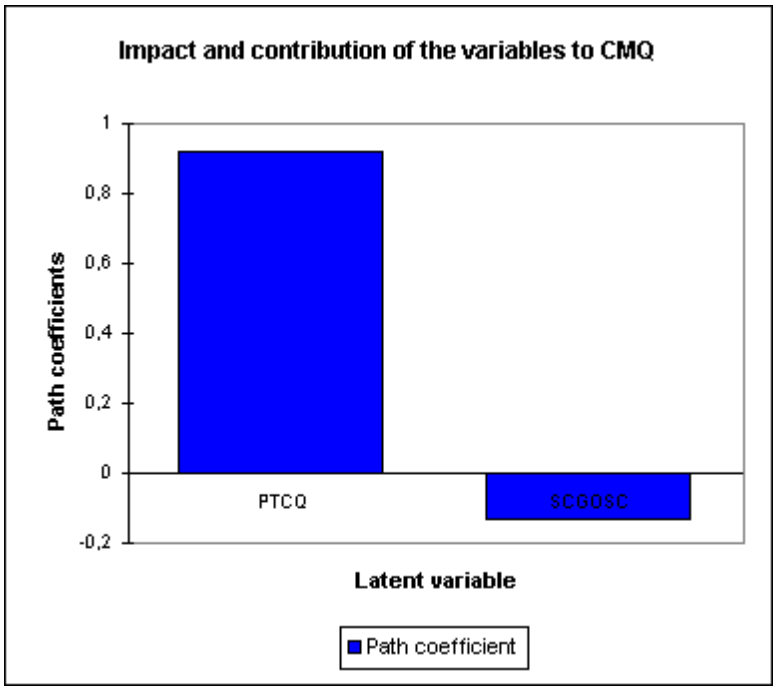
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	-0,132	0,170	-0,777	0,444	0,024
PTCQ	0,922	0,170	5,408	0,000	1,170

Equation of the model:

CMQ = -0,132449509910223*SCGOSC+0,921729823392098*PTCQ

Impact and contribution of the variables to CMQ (Dimension 1):

	PTCQ	SCGOSC
Correlation	0,822	0,560
Path coefficient	0,922	-0,132
Correlation * path coefficient	0,758	-0,074
Contribution to R^2 (%)		
Cumulative %		



R^2 (SUCCESS / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,441	6,309	0,003	0,571	0,110	4,016

Path coefficients (SUCCESS / 1):

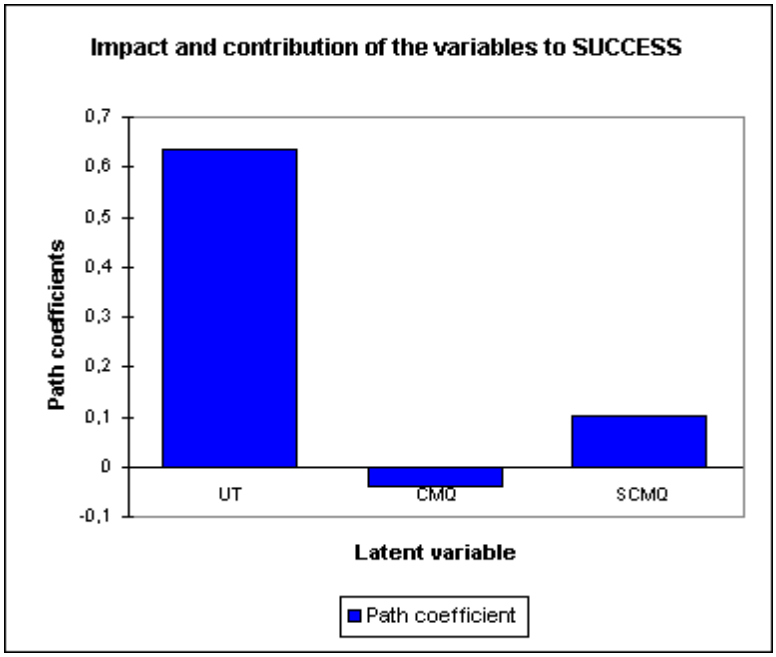
Latent variable	Value	Standard error	t	Pr > |t|	f^2
UT	0,635	0,312	2,036	0,053	0,173
SCMQ	0,101	0,182	0,554	0,585	0,013
CMQ	-0,037	0,292	-0,128	0,899	0,001

Equation of the model:

SUCCESS = 0,634843419714584*UT+0,101005839993984*SCMQ-3,74016197344693E-02*CMQ

Impact and contribution of the variables to SUCCESS (Dimension 1):

	UT	CMQ	SCMQ
Correlation	0,658	0,549	0,431
Path coefficient	0,635	-0,037	0,101
Correlation * path coefficient	0,418	-0,021	0,044
Contribution to R^2 (%)			
Cumulative %			



Analysis of the Project Managers' Dimension

R^2 (SCGOSC / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,449	6,522	0,002	0,538	0,171	2,626

Path coefficients (SCGOSC / 1):

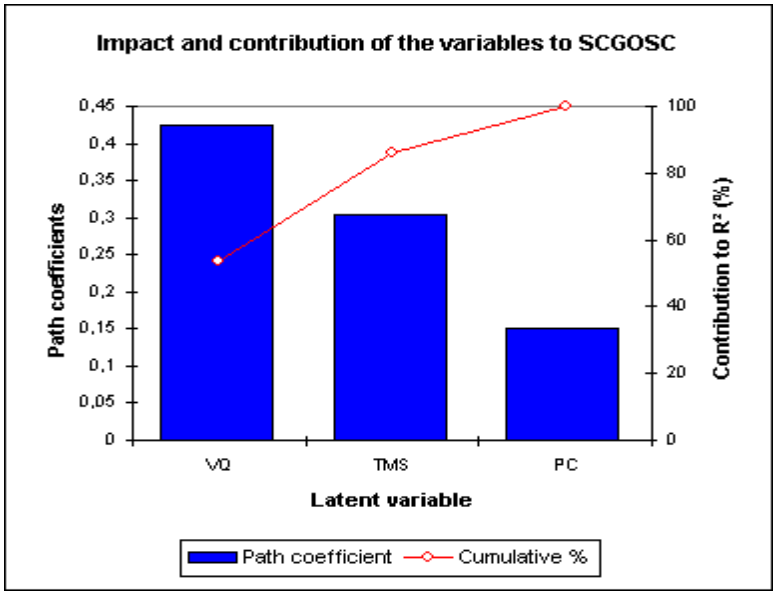
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,152	0,169	0,897	0,379	0,034
VQ	0,423	0,167	2,541	0,018	0,269
TMS	0,303	0,164	1,852	0,076	0,143

Equation of the model:

SCGOSC = 0,151767181253248*PC+0,423426127405142*VQ+0,3034860827842*TMS

Impact and contribution of the variables to SCGOSC (Dimension 1):

	VQ	TMS	PC
Correlation	0,570	0,478	0,414
Path coefficient	0,423	0,303	0,152
Correlation * path coefficient	0,241	0,145	0,063
Contribution to R^2 (%)	53,695	32,330	13,975
Cumulative %	53,695	86,025	100,000



R^2 (PTCQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,592	11,587	0,000	0,684	0,124	4,788

Path coefficients (PTCQ / 1):

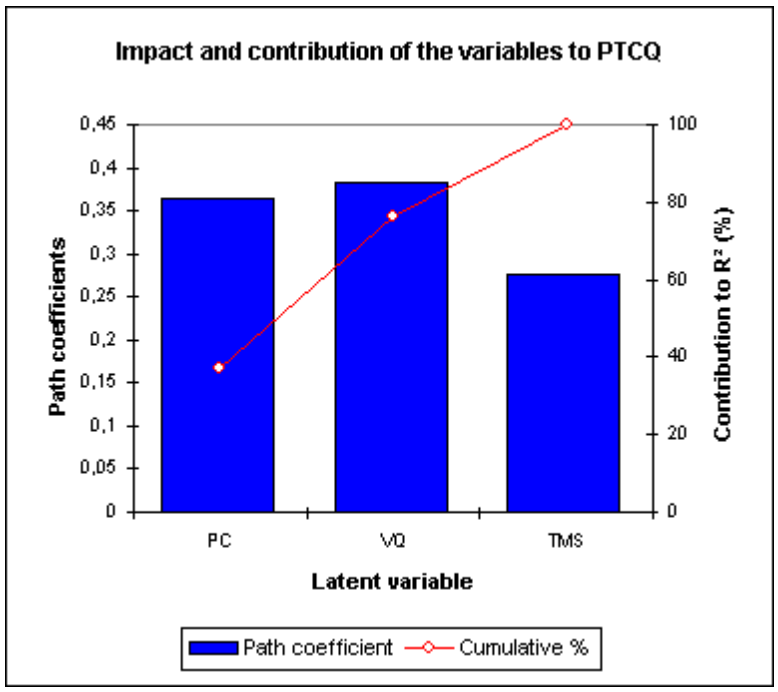
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,365	0,146	2,506	0,019	0,262
VQ	0,382	0,143	2,665	0,014	0,296
TMS	0,277	0,141	1,963	0,061	0,161

Equation of the model:

PTCQ = 0,365123709892787*PC+0,382374752760482*VQ+0,276936701564205*TMS

Impact and contribution of the variables to PTCQ (Dimension 1):

	PC	VQ	TMS
Correlation	0,603	0,601	0,512
Path coefficient	0,365	0,382	0,277
Correlation * path coefficient	0,220	0,230	0,142
Contribution to R^2 (%)	37,188	38,862	23,950
Cumulative %	37,188	76,050	100,000



R^2 (UT / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,524	13,749	0,000	0,551	0,098	5,333

Path coefficients (UT / 1):

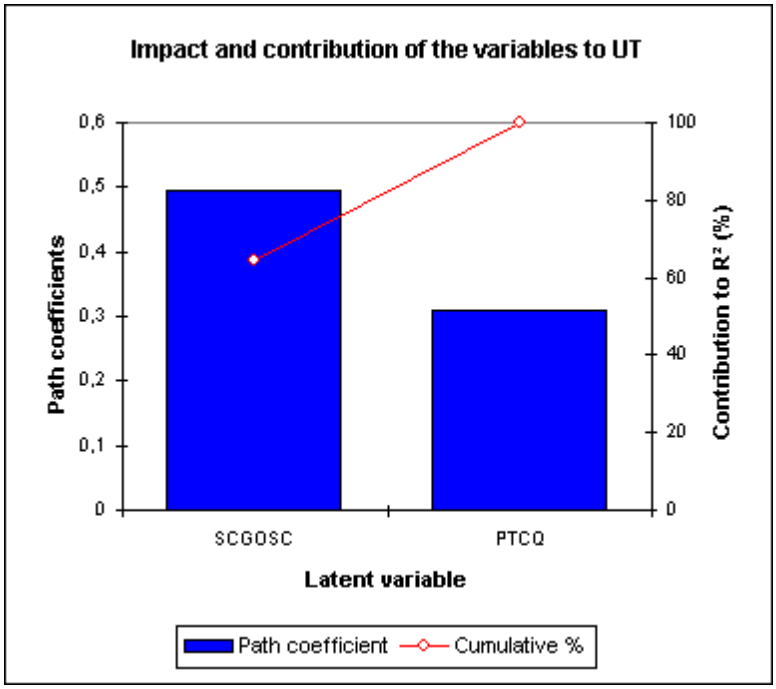
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	0,494	0,174	2,841	0,009	0,323
PTCQ	0,308	0,174	1,774	0,088	0,126

Equation of the model:

UT = 0,493743617854532*SCGOSC+0,30828864945832*PTCQ

Impact and contribution of the variables to UT (Dimension 1):

	SCGOSC	PTCQ
Correlation	0,681	0,608
Path coefficient	0,494	0,308
Correlation * path coefficient	0,336	0,188
Contribution to R^2 (%)	64,199	35,801
Cumulative %	64,199	100,000



R^2 (SCMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,537	14,470	0,000	0,547	0,110	4,899

Path coefficients (SCMQ / 1):

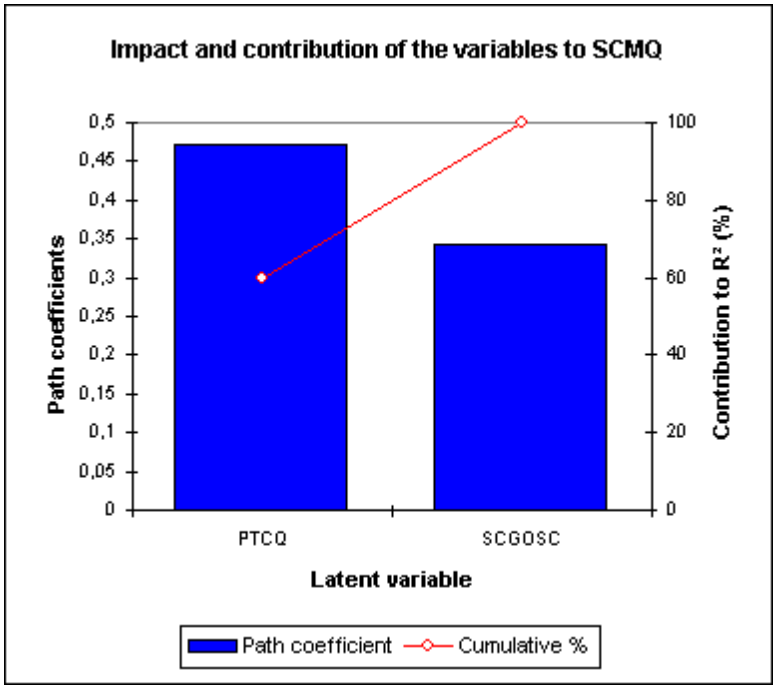
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	0,342	0,171	1,993	0,057	0,159
PTCQ	0,473	0,171	2,758	0,011	0,304

Equation of the model:

SCMQ = 0,34163676196159*SCGOSC+0,472800013577431*PTCQ

Impact and contribution of the variables to SCMQ (Dimension 1):

	PTCQ	SCGOSC
Correlation	0,680	0,629
Path coefficient	0,473	0,342
Correlation * path coefficient	0,322	0,215
Contribution to R^2 (%)	59,955	40,045
Cumulative %	59,955	100,000



R^2 (CMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,500	12,501	0,000	0,531	0,141	3,542

Path coefficients (CMQ / 1):

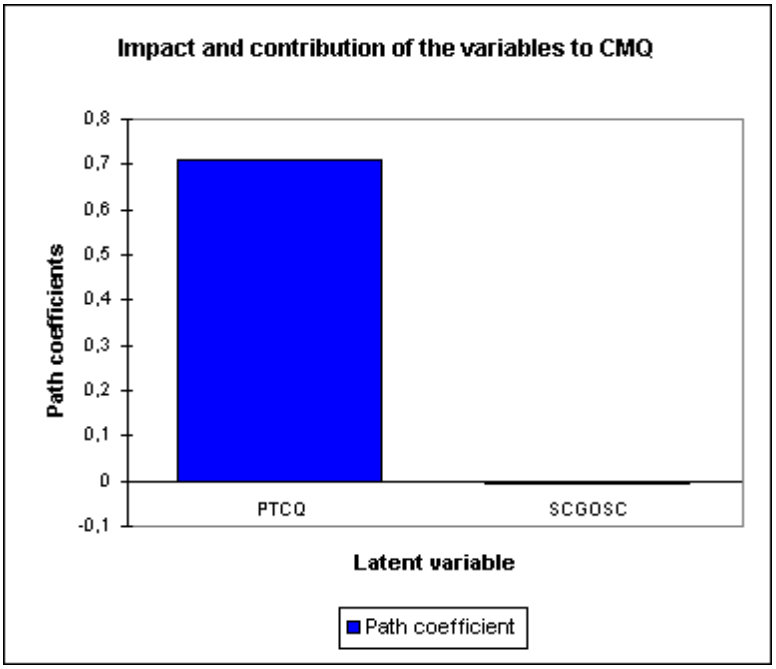
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	-0,006	0,178	-0,035	0,973	0,000
PTCQ	0,711	0,178	3,993	0,001	0,638

Equation of the model:

CMQ = -6,19387934633252E-03*SCGOSC+0,710873564675726*PTCQ

Impact and contribution of the variables to CMQ (Dimension 1):

	PTCQ	SCGOSC
Correlation	0,707	0,426
Path coefficient	0,711	-0,006
Correlation * path coefficient	0,503	-0,003
Contribution to R^2 (%)		
Cumulative %		



R^2 (SUCCESS / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,467	7,010	0,002	0,550	0,121	3,850

Path coefficients (SUCCESS / 1):

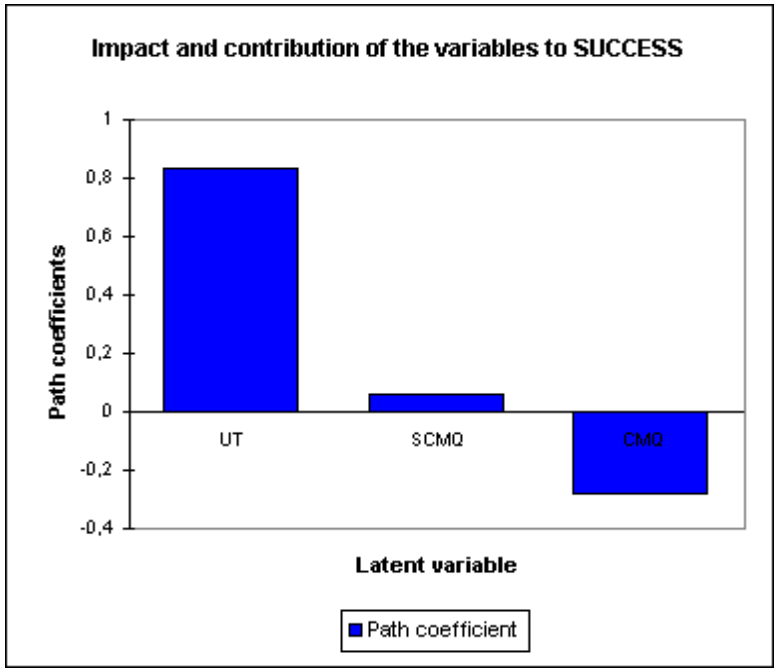
Latent variable	Value	Standard error	t	Pr > |t|	f^2
UT	0,833	0,249	3,342	0,003	0,465
SCMQ	0,062	0,190	0,328	0,746	0,004
CMQ	-0,282	0,229	-1,232	0,230	0,063

Equation of the model:

SUCCESS = 0,832871304754147*UT+6,23502942401195E-02*SCMQ-0,28233611196947*CMQ

Impact and contribution of the variables to SUCCESS (Dimension 1):

	UT	SCMQ	CMQ
Correlation	0,658	0,430	0,381
Path coefficient	0,833	0,062	-0,282
Correlation * path coefficient	0,548	0,027	-0,107
Contribution to R^2 (%)			
Cumulative %			



Analysis of the Team Members' Dimension

R^2 (SCGOSC / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,456	6,693	0,002	0,533	0,095	4,798

Path coefficients (SCGOSC / 1):

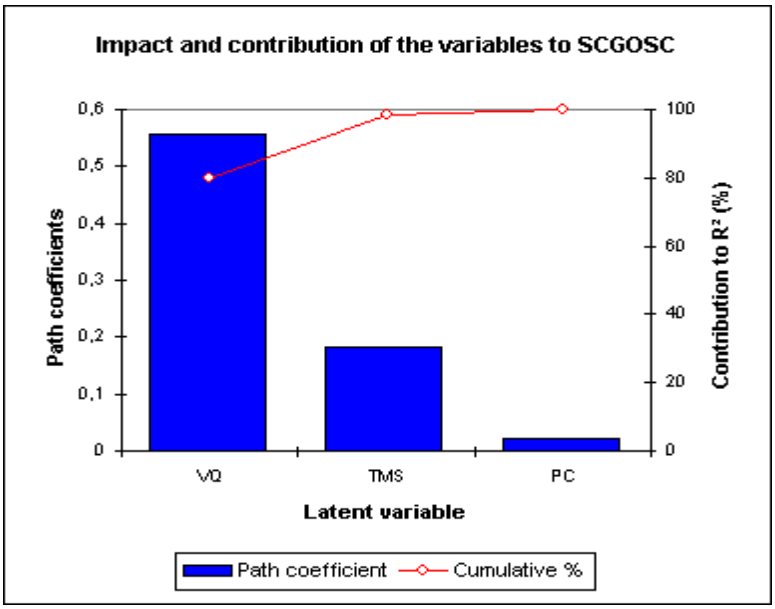
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,022	0,177	0,127	0,900	0,001
VQ	0,557	0,190	2,936	0,007	0,359
TMS	0,184	0,171	1,076	0,293	0,048

Equation of the model:

SCGOSC = 2,23724388610681E-02*PC+0,557175990157919*VQ+0,183845333291575*TMS

Impact and contribution of the variables to SCGOSC (Dimension 1):

	VQ	TMS	PC
Correlation	0,654	0,450	0,367
Path coefficient	0,557	0,184	0,022
Correlation * path coefficient	0,365	0,083	0,008
Contribution to R^2 (%)	80,031	18,167	1,802
Cumulative %	80,031	98,198	100,000



R^2 (PTCQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,484	7,504	0,001	0,594	0,101	4,771

Path coefficients (PTCQ / 1):

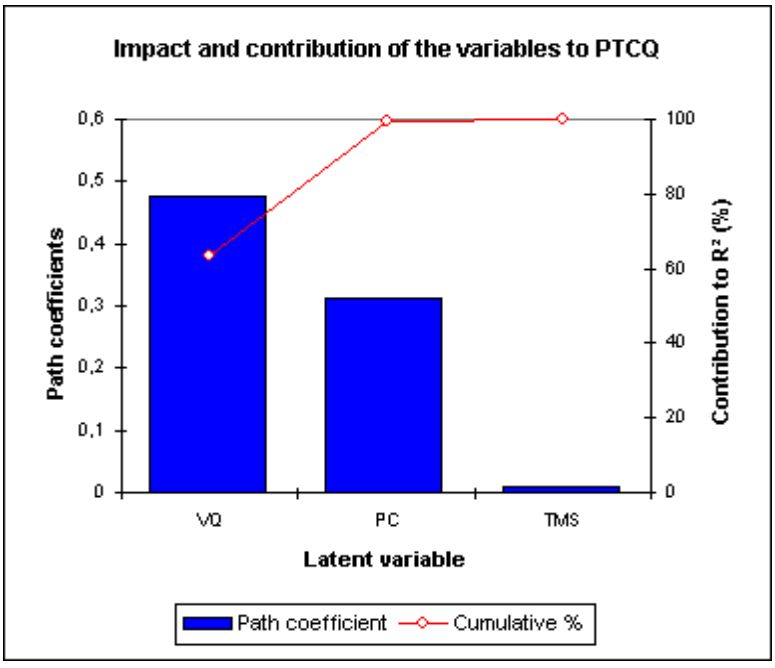
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,311	0,172	1,811	0,083	0,137
VQ	0,477	0,185	2,584	0,016	0,278
TMS	0,009	0,166	0,055	0,957	0,000

Equation of the model:

PTCQ = 0,311326052993901*PC+0,477281084560227*VQ+9,07398073696076E-03*TMS

Impact and contribution of the variables to PTCQ (Dimension 1):

	VQ	PC	TMS
Correlation	0,642	0,561	0,328
Path coefficient	0,477	0,311	0,009
Correlation * path coefficient	0,307	0,175	0,003
Contribution to R^2 (%)	63,331	36,055	0,614
Cumulative %	63,331	99,386	100,000



R^2 (UT / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,640	22,226	0,000	0,692	0,077	8,355

Path coefficients (UT / 1):

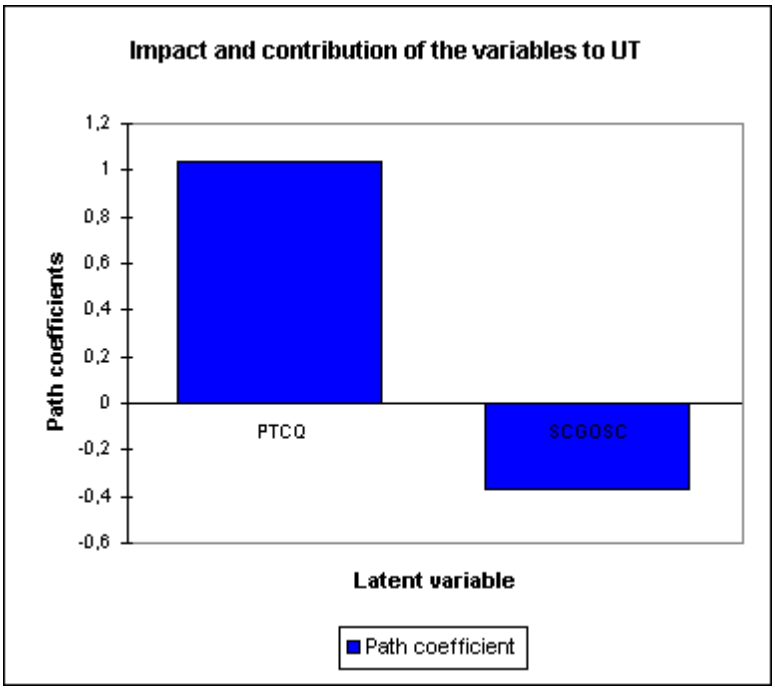
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	-0,371	0,182	-2,035	0,053	0,166
PTCQ	1,041	0,182	5,711	0,000	1,305

Equation of the model:

UT = -0,370978966073456*SCGOSC+1,04109838455795*PTCQ

Impact and contribution of the variables to UT (Dimension 1):

	PTCQ	SCGOSC
Correlation	0,762	0,413
Path coefficient	1,041	-0,371
Correlation * path coefficient	0,793	-0,153
Contribution to R^2 (%)		
Cumulative %		



R^2 (SCMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,258	4,336	0,024	0,319	0,159	1,623

Path coefficients (SCMQ / 1):

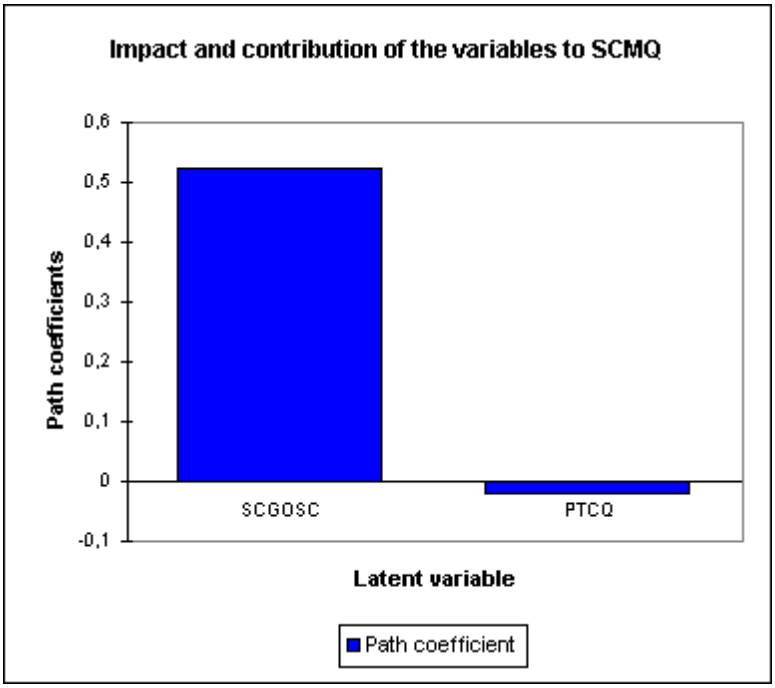
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	0,522	0,262	1,995	0,057	0,159
PTCQ	-0,020	0,262	-0,076	0,940	0,000

Equation of the model:

SCMQ = 0,522232624681966*SCGOSC-1,97880023587178E-02*PTCQ

Impact and contribution of the variables to SCMQ (Dimension 1):

	SCGOSC	PTCQ
Correlation	0,507	0,373
Path coefficient	0,522	-0,020
Correlation * path coefficient	0,265	-0,007
Contribution to R^2 (%)		
Cumulative %		



R^2 (CMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,742	36,008	0,000	0,772	0,066	11,313

Path coefficients (CMQ / 1):

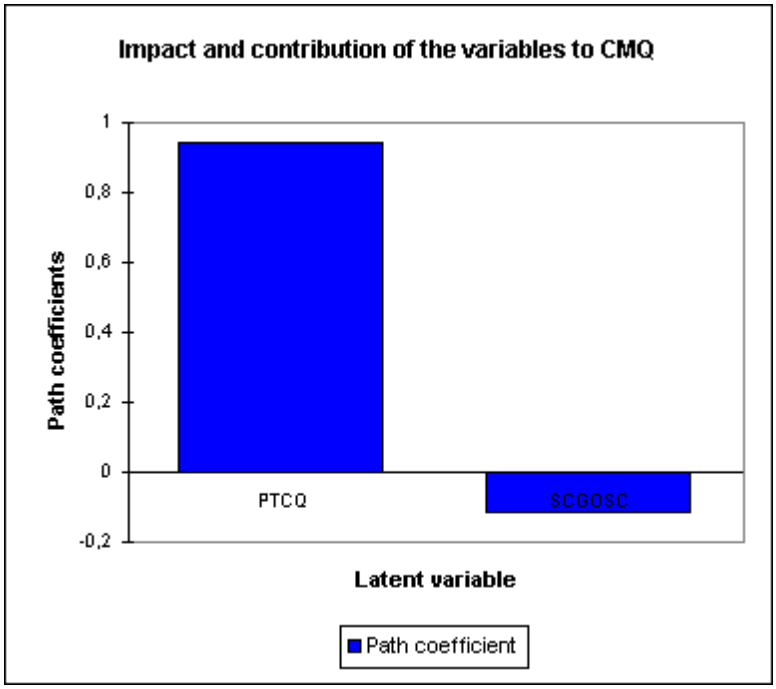
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	-0,115	0,154	-0,746	0,462	0,022
PTCQ	0,945	0,154	6,127	0,000	1,501

Equation of the model:

CMQ = -0,115098382288319*SCGOSC+0,944879077102499*PTCQ

Impact and contribution of the variables to CMQ (Dimension 1):

	PTCQ	SCGOSC
Correlation	0,858	0,596
Path coefficient	0,945	-0,115
Correlation * path coefficient	0,811	-0,069
Contribution to R^2 (%)		
Cumulative %		



R^2 (SUCCESS / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,397	5,268	0,006	0,532	0,123	3,235

Path coefficients (SUCCESS / 1):

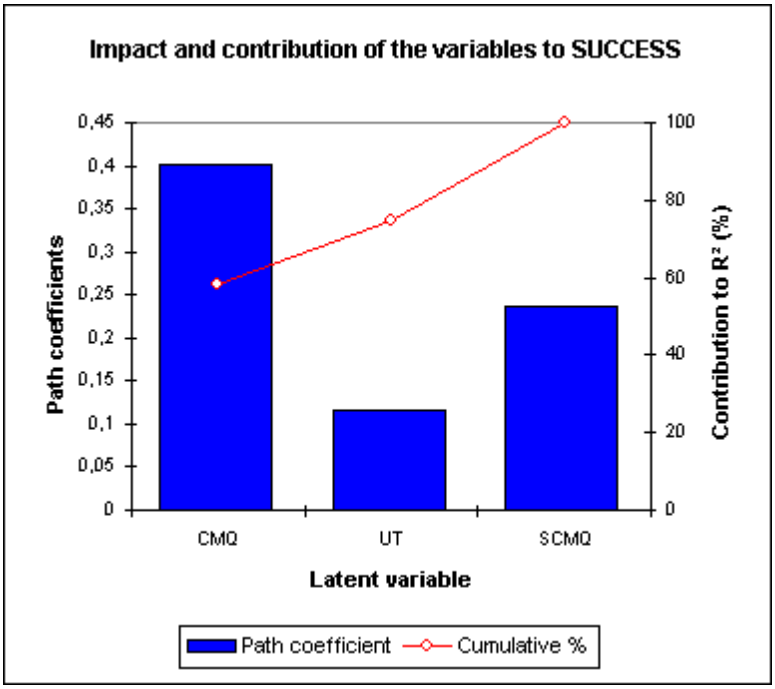
Latent variable	Value	Standard error	t	Pr > |t|	f^2
UT	0,115	0,302	0,381	0,707	0,006
SCMQ	0,237	0,176	1,349	0,190	0,076
CMQ	0,400	0,291	1,376	0,182	0,079

Equation of the model:

SUCCESS = 0,114951531213758*UT+0,236932177584536*SCMQ+0,400256879073813*CMQ

Impact and contribution of the variables to SUCCESS (Dimension 1):

	CMQ	UT	SCMQ
Correlation	0,580	0,553	0,428
Path coefficient	0,400	0,115	0,237
Correlation * path coefficient	0,232	0,064	0,101
Contribution to R^2 (%)	58,486	16,000	25,514
Cumulative %	58,486	74,486	100,000



Analysis of the End Users' Dimension

R^2 (SCGOSC / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,442	6,325	0,003	0,538	0,113	3,891

Path coefficients (SCGOSC / 1):

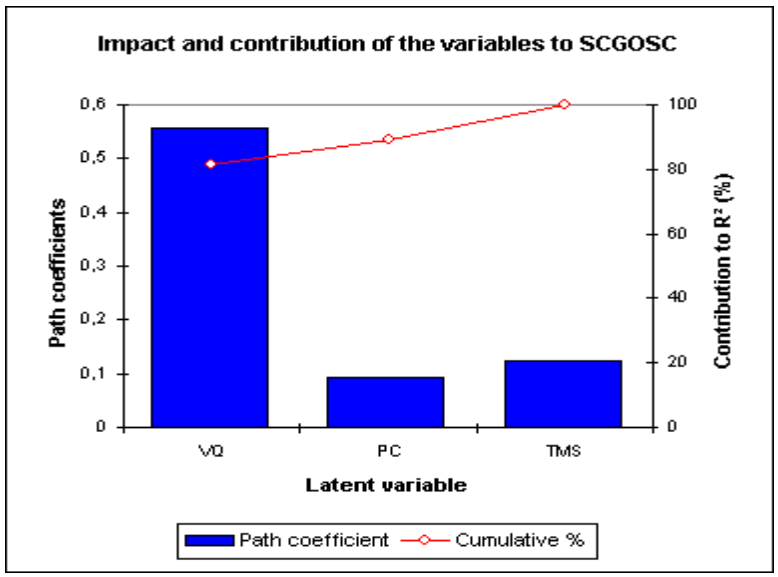
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,094	0,173	0,546	0,590	0,012
VQ	0,555	0,178	3,119	0,005	0,405
TMS	0,124	0,169	0,733	0,471	0,022

Equation of the model:

SCGOSC = 0,094214769968952*PC+0,555333249007939*VQ+0,124182295925623*TMS

Impact and contribution of the variables to SCGOSC (Dimension 1):

	VQ	PC	TMS
Correlation	0,646	0,378	0,378
Path coefficient	0,555	0,094	0,124
Correlation * path coefficient	0,359	0,036	0,047
Contribution to R^2 (%)	81,302	8,073	10,626
Cumulative %	81,302	89,374	100,000



R^2 (PTCQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,578	10,946	0,000	0,658	0,093	6,227

Path coefficients (PTCQ / 1):

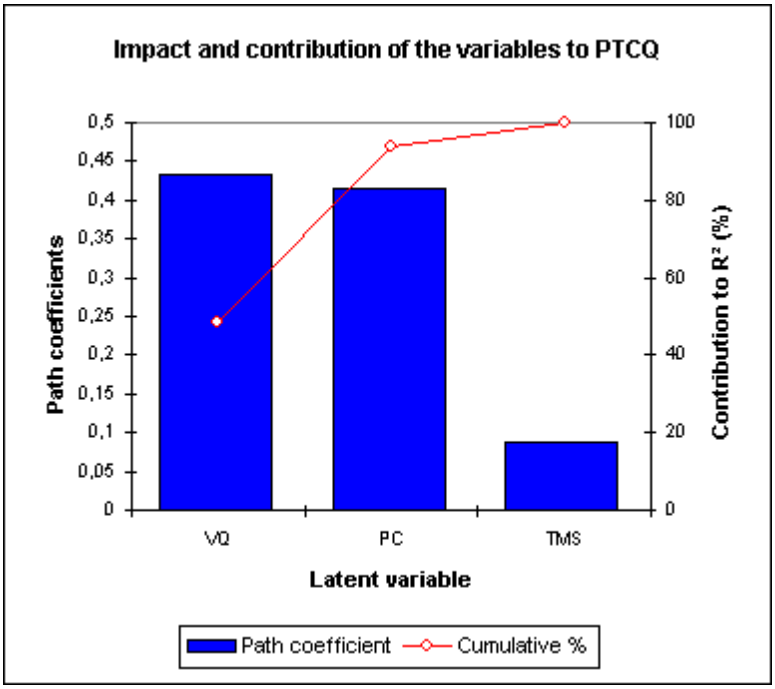
Latent variable	Value	Standard error	t	Pr > |t|	f^2
PC	0,415	0,150	2,764	0,011	0,318
VQ	0,432	0,155	2,792	0,010	0,325
TMS	0,087	0,147	0,590	0,561	0,015

Equation of the model:

PTCQ = 0,415054040927747*PC+0,432280862903618*VQ+8,69417179733741E-02*TMS

Impact and contribution of the variables to PTCQ (Dimension 1):

	VQ	PC	TMS
Correlation	0,649	0,633	0,397
Path coefficient	0,432	0,415	0,087
Correlation * path coefficient	0,281	0,263	0,034
Contribution to R^2 (%)	48,556	45,475	5,969
Cumulative %	48,556	94,031	100,000



R^2 (UT / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,377	7,561	0,003	0,456	0,131	2,869

Path coefficients (UT / 1):

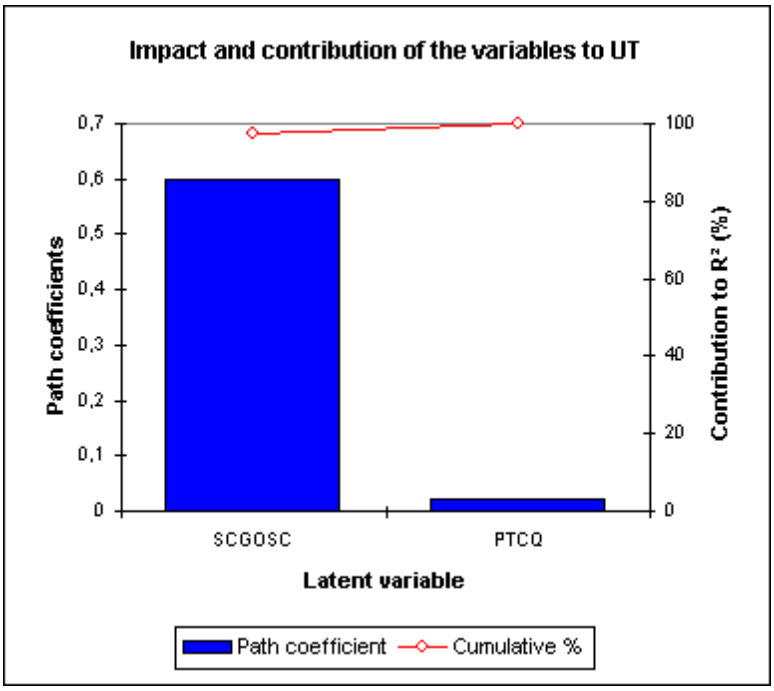
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	0,598	0,243	2,457	0,021	0,241
PTCQ	0,021	0,243	0,085	0,933	0,000

Equation of the model:

UT = 0,598077948160466*SCGOSC+2,06158246112383E-02*PTCQ

Impact and contribution of the variables to UT (Dimension 1):

	SCGOSC	PTCQ
Correlation	0,614	0,476
Path coefficient	0,598	0,021
Correlation * path coefficient	0,367	0,010
Contribution to R^2 (%)	97,397	2,603
Cumulative %	97,397	100,000



R^2 (SCMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,443	9,926	0,001	0,479	0,125	3,550

Path coefficients (SCMQ / 1):

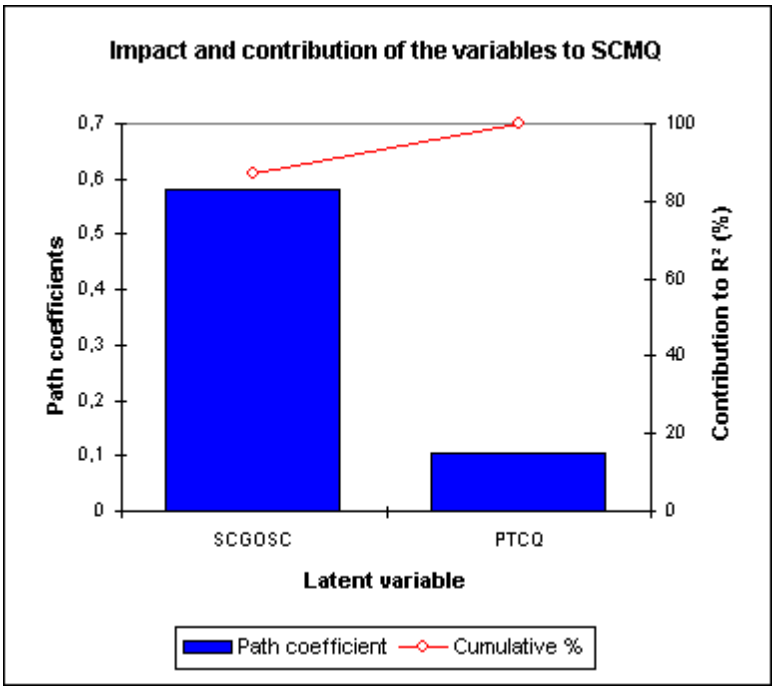
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	0,582	0,230	2,527	0,018	0,255
PTCQ	0,105	0,230	0,456	0,652	0,008

Equation of the model:

SCMQ = 0,581787451407103*SCGOSC+0,105097192230034*PTCQ

Impact and contribution of the variables to SCMQ (Dimension 1):

	SCGOSC	PTCQ
Correlation	0,662	0,548
Path coefficient	0,582	0,105
Correlation * path coefficient	0,385	0,058
Contribution to R^2 (%)	86,988	13,012
Cumulative %	86,988	100,000



R^2 (CMQ / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,680	26,507	0,000	0,691	0,119	5,728

Path coefficients (CMQ / 1):

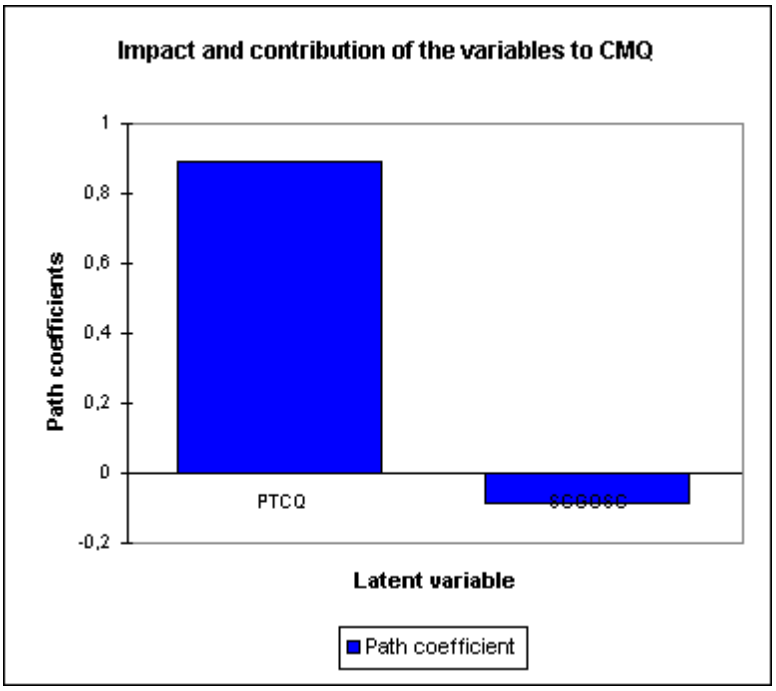
Latent variable	Value	Standard error	t	Pr > |t|	f^2
SCGOSC	-0,088	0,175	-0,502	0,620	0,010
PTCQ	0,889	0,175	5,092	0,000	1,037

Equation of the model:

CMQ = -8,76691208270043E-02*SCGOSC+0,88912000754782*PTCQ

Impact and contribution of the variables to CMQ (Dimension 1):

	PTCQ	SCGOSC
Correlation	0,822	0,589
Path coefficient	0,889	-0,088
Correlation * path coefficient	0,731	-0,052
Contribution to R^2 (%)		
Cumulative %		



R^2 (SUCCESS / 1):

R^2	F	Pr > F	R^2(Bootstrap)	Standard error	Critical ratio (CR)
0,387	5,045	0,007	0,508	0,129	2,987

Path coefficients (SUCCESS / 1):

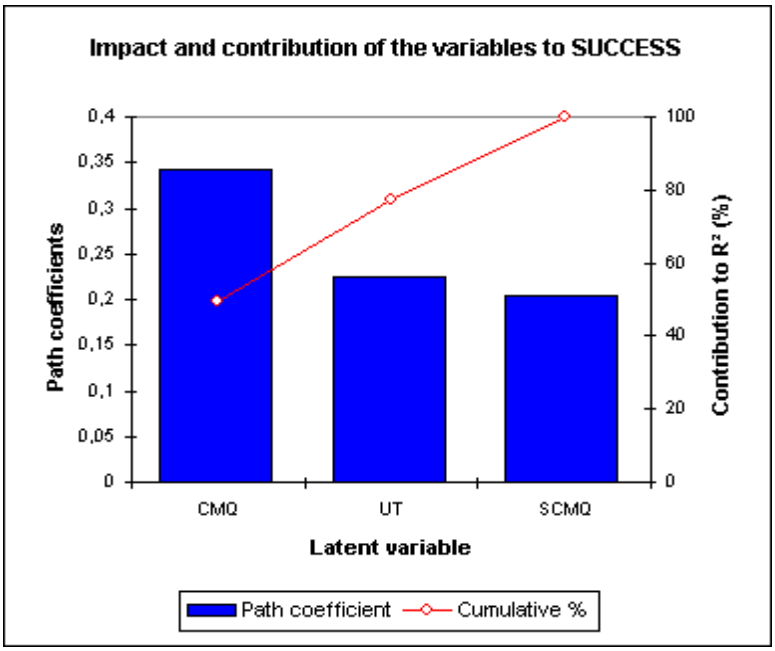
Latent variable	Value	Standard error	t	Pr > |t|	f^2
UT	0,224	0,194	1,155	0,260	0,056
SCMQ	0,205	0,179	1,141	0,265	0,054
CMQ	0,343	0,206	1,667	0,108	0,116

Equation of the model:

SUCCESS = 0,223808942760829*UT+0,204580927969259*SCMQ+0,342706605293766*CMQ

Impact and contribution of the variables to SUCCESS (Dimension 1):

	CMQ	UT	SCMQ
Correlation	0,559	0,480	0,428
Path coefficient	0,343	0,224	0,205
Correlation * path coefficient	0,192	0,108	0,088
Contribution to R^2 (%)	49,575	27,796	22,629
Cumulative %	49,575	77,371	100,000



F. Comparative test results for the hypotheses of Theoretical Model 2

Table 22. Comparative Test Results for the Hypothesis 9

H9: Presence of a Project Champion (PC), Presence of Top Management Support (TMS) and Vendor Quality (VQ) have a positive impact on Setting Clear Goals, Objectives and Success Criteria's (SCGOSC).				
Stakeholder Type	*All Stakeholders*	*Project Manager*	*Team Member*	*End User*
Significance	0,002	0,002	0,002	0,003
R^2	0,459	0,449	0,456	0,442
VQ- path coef.	0,515	0,423	0,557	0,555
TMS- path coef.	0,203	0,303	0,184	0,124
PC- path coef.	0,103	0,152	0,022	0,094

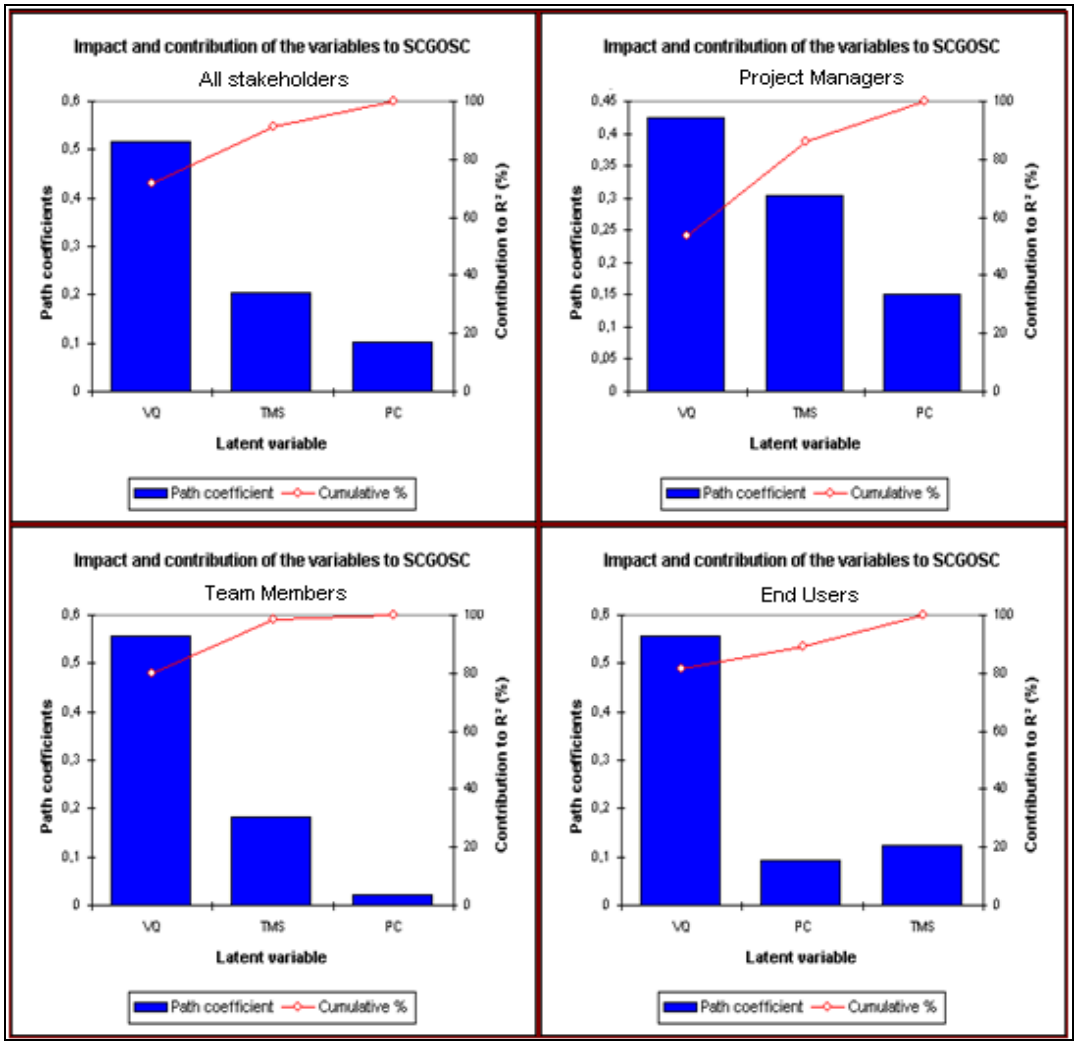


Figure 10. Path coefficient-Contribution to R2 graphics for the Hypothesis 9

Table 23. Comparative Test Results for the Hypothesis 10

H10: Presence of a Project Champion (PC), Presence of Top Management Support (TMS) and Vendor Quality (VQ) have a positive impact on Project Team Composition and Quality (PTCQ).

Stakeholder Type	*All Stakeholders*	*Project Manager*	*Team Member*	*End User*
Significance	0,000	0,000	0,001	0,000
R^2	0,578	0,592	0,484	0,578
PC- path coef.	0,421	0,365	0,311	0,415
VQ- path coef.	0,433	0,382	0,477	0,432
TMS- path coef.	0,076	0,277	0,009	0,087

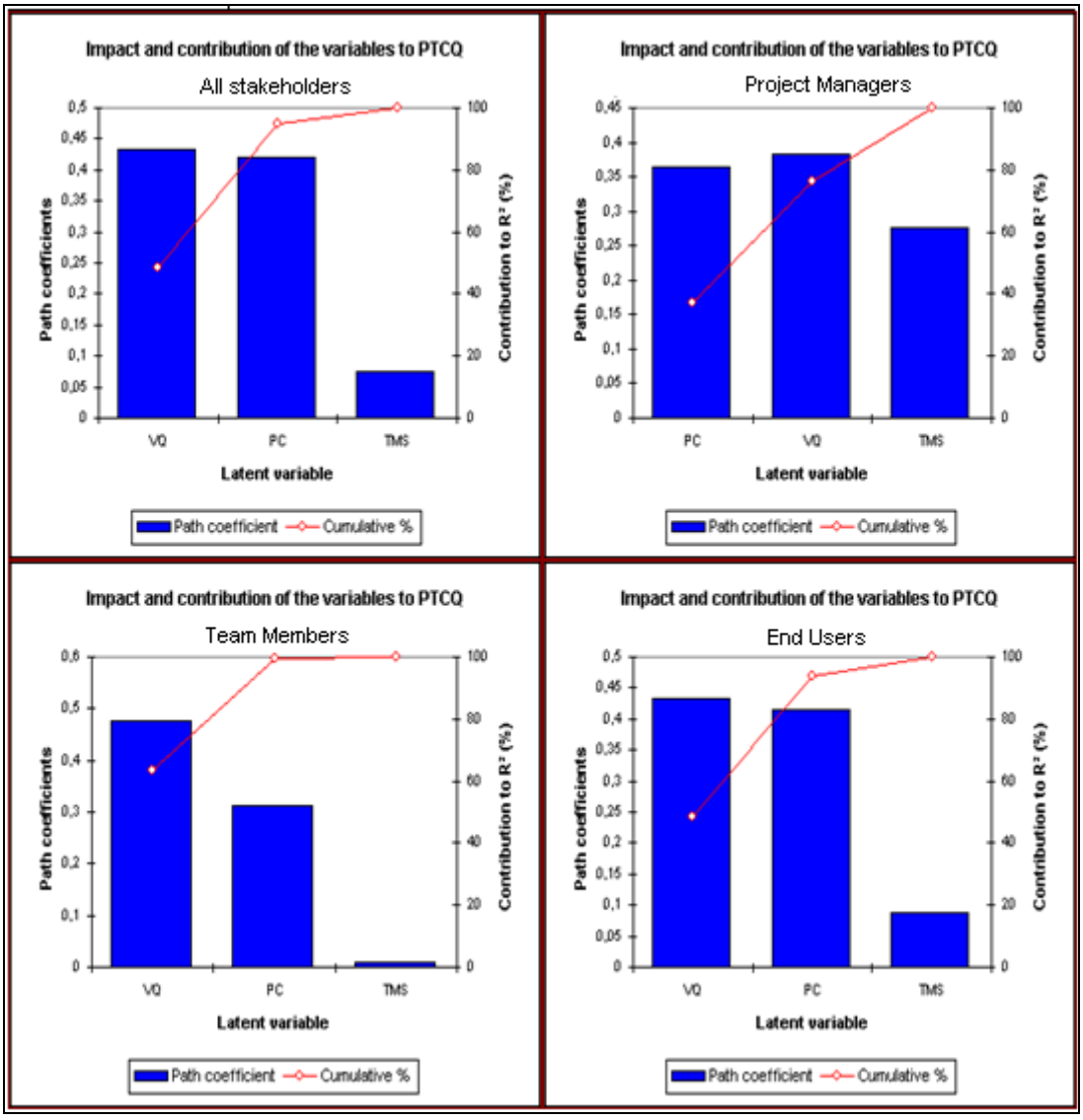


Figure 11. Path coefficient-Contribution to R2 graphics for the Hypothesis 10

Table 24. Comparative Test Results for the Hypothesis 11

H11: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on Communications Management Quality (CMQ).				
Stakeholder Type	*All Stakeholders*	*Project Manager*	*Team Member*	*End User*
Significance	0,000	0,000	0,000	0,000
R^2	0,684	0,500	0,742	0,680
SCGOSC- path coef.	-0,132	-0,006	-0,115	-0,088
PTCQ- path coef.	0,822	0,711	0,945	0,889

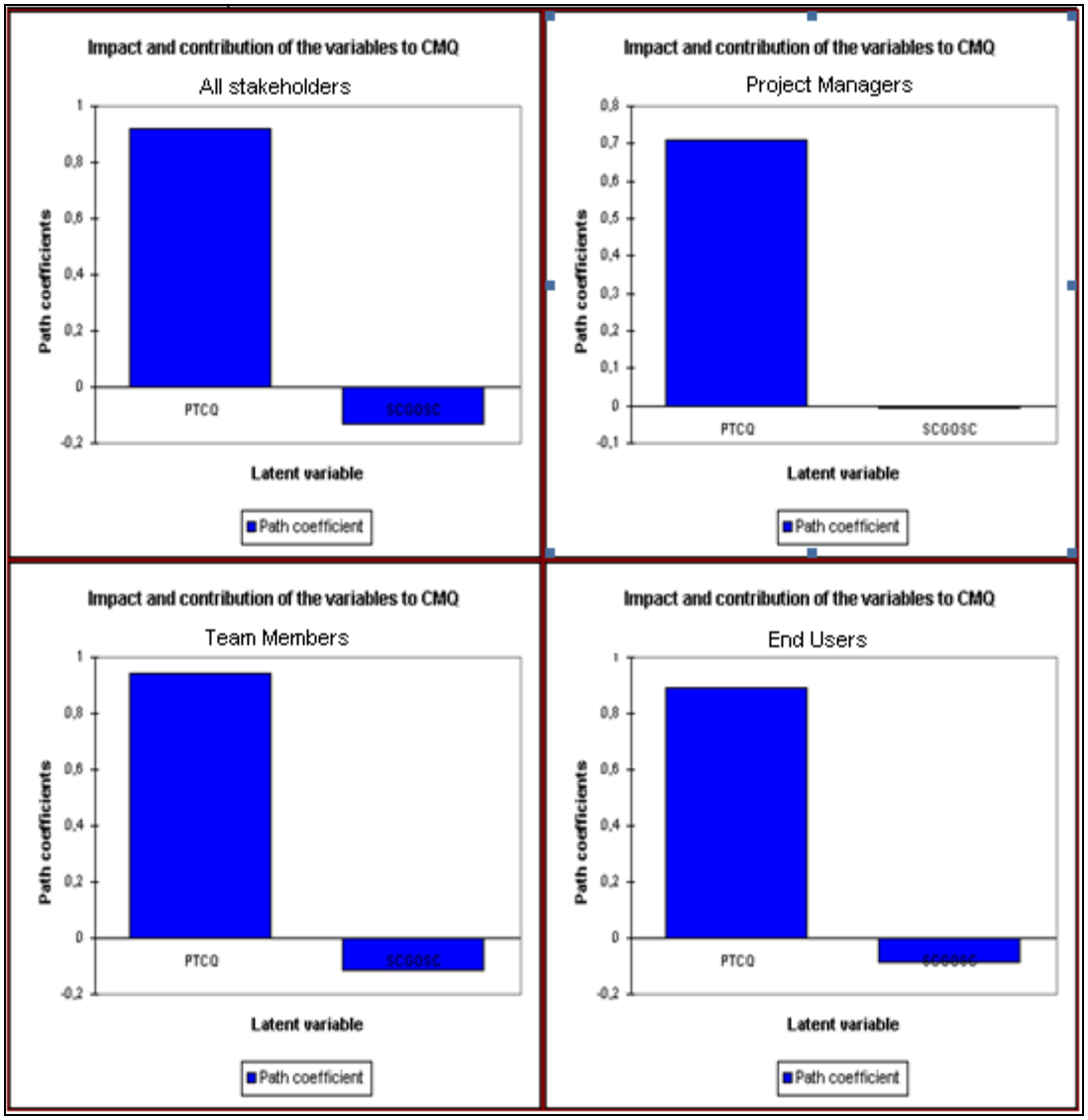


Figure 12. Path coefficient-Contribution to R2 graphics for the Hypothesis 11

Table 25. Comparative Test Results for the Hypothesis 12

H12: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on Scope and Change Management Quality (SCMQ).				
Stakeholder Type	*All Stakeholders*	*Project Manager*	*Team Member*	*End User*
Significance	0,002	0,000	0,024	0,001
R^2	0,405	0,537	0,258	0,443
SCGOSC- path coef.	0,487	0,342	0,522	0,582
PTCQ- path coef.	0,183	0,473	-0,020	0,105

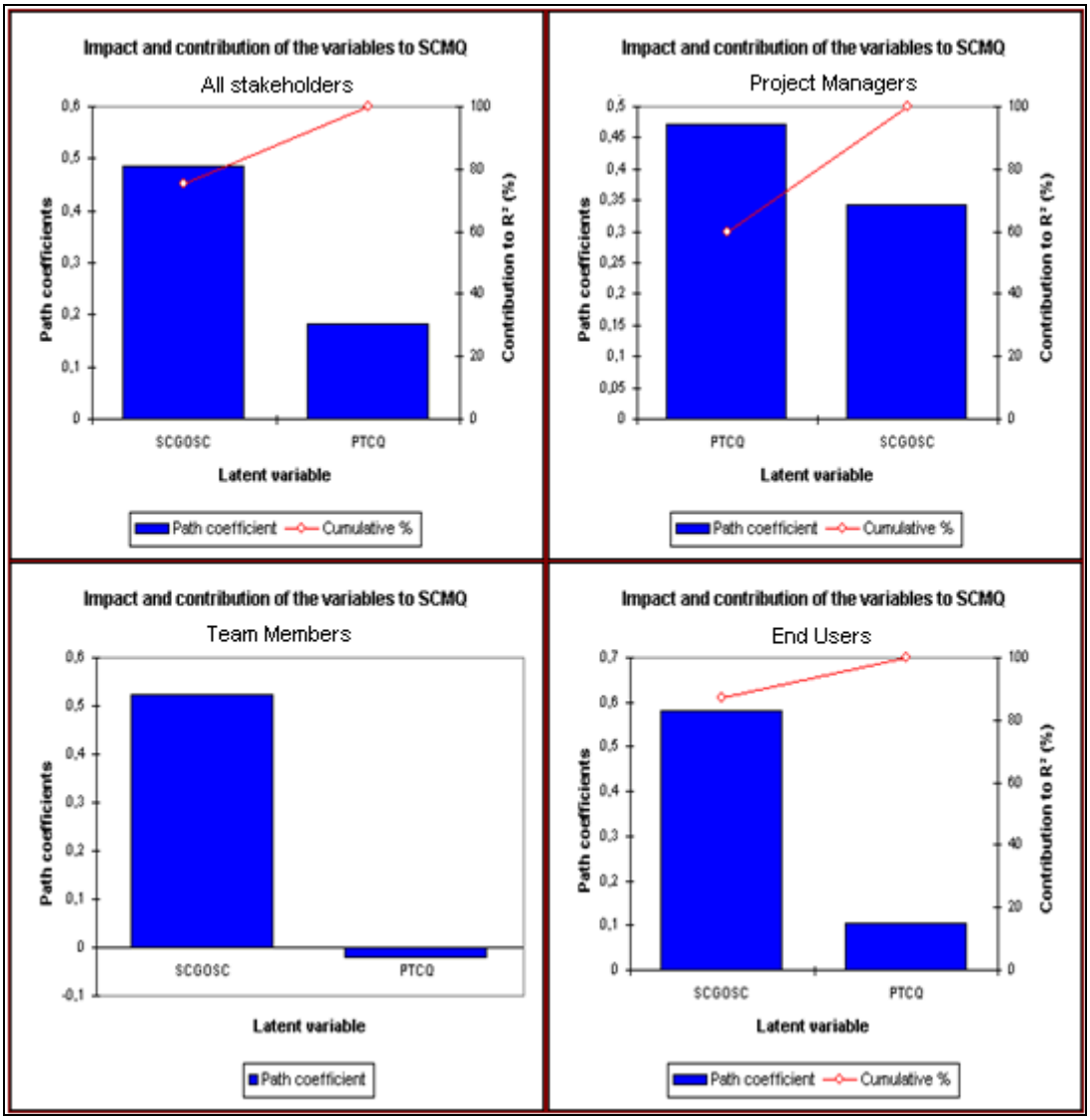


Figure 13. Path coefficient-Contribution to R2 graphics for the Hypothesis 12

Table 26. Comparative Test Results for the Hypothesis 13

H13: Setting Clear Goals, Objectives and Success Criteria's (SCGOSC) and Project Team Composition and Quality (PTCQ) have a positive impact on User Training (UT).				
Stakeholder Type	*All Stakeholders*	*Project Manager*	*Team Member*	*End User*
Significance	0,000	0,000	0,000	0,003
R^2	0,654	0,524	0,640	0,377
SCGOSC- path coef.	0,122	0,494	-0,371	0,598
PTCQ- path coef.	0,712	0,308	1,041	0,021

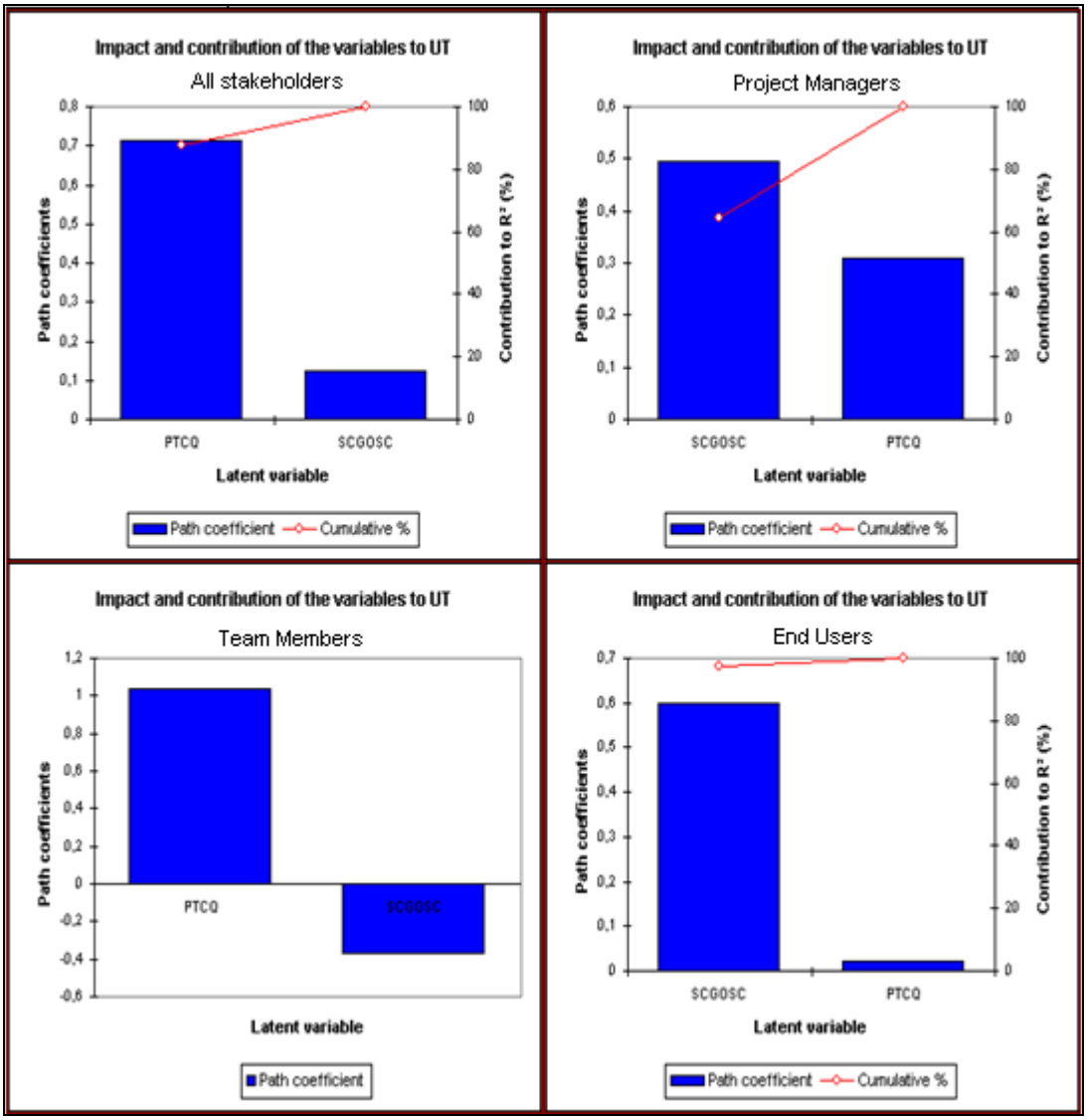


Figure 14. Path coefficient-Contribution to R2 graphics for the Hypothesis 13

Table 27. Comparative Test Results for the Hypothesis 14

H14: Communications Management Quality (CMQ), Scope and Change Management Quality (SCMQ) and User Training (UT) have a positive impact on ERP project success (SUCC).				
Stakeholder Type	*All Stakeholders*	*Project Manager*	*Team Member*	*End User*
Significance	0,003	0,002	0,006	0,007
R^2	0,441	0,467	0,397	0,387
UT- path coef.	0,635	0,833	0,115	0,224
SCMQ- path coef.	0,101	0,062	0,237	0,205
CMQ- path coef.	-0,037	-0,282	0,400	0,343

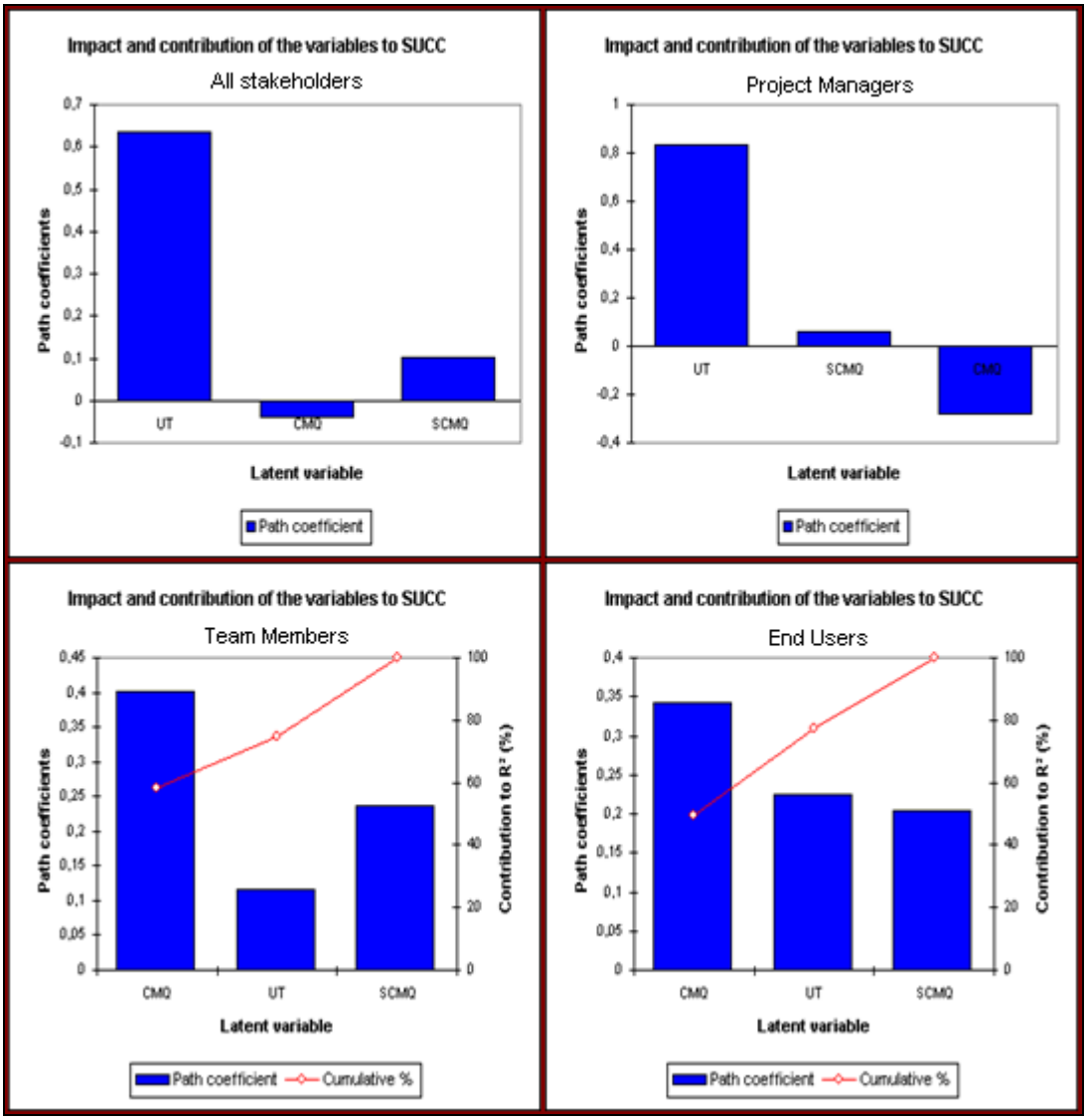


Figure 15. Path coefficient-Contribution to R2 graphics for the Hypothesis 14

REFERENCES

Akkermans, H., & Van Helden, K. (2002). Vicious and virtuous cycles in ERP implementation: a case study of interrelations between critical success factors. *European Journal of Information Systems, 11*(1), 35-46.

Al-Mashari, M. (2006). Innovation through Information Technology (IT) enabled Business Process Management (BPM): A review of key issues. *International Journal Of Innovation And Learning, 3*(4), 403-415.

Al-Mashari, M., Al-Mudimigh, A., & Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. *European Journal Of Operational Research, 146*(2), 352-364. Elsevier.

Al-Mudimigh, A., Zairi, M., & Al-Mashari, M. (2001). ERP Software implementation: An integrative framework. *European Journal of Information Systems, 10*(4), 216-226.

Amberg, M., & Fischl, F. (2005). Background of Critical Success Factor Research. *Evolution, 17*(2), 12. Retrieved from http://www.international-outsourcing.de/CSF-tool/docs/WorkingPaper_BackgroundCSF_Ambergetal._FINAL.pdf

Amoako-Gyampah, K. (2004). ERP implementation factors: A comparison of managerial and end-user perspectives. *Business Process Management Journal, 10*(2), 171-183.

Ang, J. S. K., Sum, C. C., & Chung, W. F. (1995). Critical Success Factors in Implementing MRP and Government Assistance: A Singapore Context, 29(2), 63-70.

Anthony, R. N. (1965). Planning and Control Systems: a framework for analysis. *Harvard University, Graduate School of Business Administration, Boston.*

Aparicio G., Caballero A., & Hernandez A. (2009).Objective and subjective indexes regarding university quality teaching: a method of aggregation of indexes.

Appleton, E. L. (1997). How to survive ERP. *Datamation, 43*(3), 50-53.

Aslan, B. (2008). *Cost-benefit Analysis of Information Technology Investment*. M. A. Thesis in Management Information Systems, Boğaziçi University (supervised by Meltem Özturan).

Avison, D., & Fitzgerald, G. (2003a). *Information systems development: Methodologies, techniques and tools (3rd ed.)*. Maidenhead, England: McGraw-Hill.

Avison, D., & Fitzgerald, G. (2003b). Where now for development methodologies? *Communications of the ACM, 46*(1), 79-82.

Baccarini, D. (1999). The logical framework method for defining project success. *Project Management Journal, 30*(4), 25-32.

Ballantine, J., Bonner, M., Levy, M., Martin, A., Munro, I., Powell, P., Garrity, E., et al. (1998). *Developing a 3-D Model of Information Systems Success*. Idea Group Publishing.

Bancroft, N. H. (1996). *Implementing SAP R/3: How to Introduce a Large Organization,* Greenwich, CT: Manning Publications.

Beath, C. M. (1991). Supporting the Information Technology Champion. *MIS Quarterly, 15*(3), 355-372. JSTOR.

Bhatti, T. (2005). Critical Success factors for the implementation of Enterprise Resource Planning (ERP): Empirical validation. *The Second International Conference on Innovation in Information Technology (IIT'05),* 1-10.

Bingi, P., Sharma, M. K., & Godla, J. (1999). Critical Issues Affecting an ERP Implementation. *Information Systems Management, 16*(3), 7-14. Taylor & Francis Ltd.

Bittner, K., & Spence, I. (2003). *Use Case Modeling.* Addison Wesley.

Boonstra, A. (2006). Interpreting an ERP-implementation project from a stakeholder perspective. *International Journal of Project Management, 24*(1), 38-52.

Boonstra, A., & De Vries, J. (2008). Managing stakeholders around inter-organizational systems: A diagnostic approach. *The Journal of Strategic Information Systems, 17*(3), 190-201.

Bowen, T. (1998). *Committing to consultants: outside help requires internal commitment and management skills*. Info World.

Brakely, H. H. (1999). What makes ERP effective? *Manufacturing Systems*, *17*(3), 120.

Buchanan, D. (1993). The organizational politics of technological change. In Medyckyj-Scott, D. And Hearnshaw, H. M. (Eds.), *Human Factors in Geographical Information Systems,* 211-22, Belhaven Press, London.

Buckhout, S., Frey, E., & Nemec Jr, J. (1999). Making ERP succeed: turning fear into promise. *IEEE Engineering Management Review, 15*(3), 60-72.

Caruso, D. (2007). Six ways to ensure an ERP implementation delivers value. *Manufacturing Business Technology, 25*(8), 27.

Chetcuti, H. (2008). ERP Implementation: A multi-stakeholder analysis of critical success factors. *Information Systems Management,* 1-6. Proceedings of the University of Malta Workshop in ICT (WICT 09).

Chin, W., & Newsted, P. (1999). Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares. In R. Hoyle (Ed.), Statistical Strategies for Small Sample Research (pp. 307-341). Sage.

Chin, W. (1998). The partial least squares approach to structural equation modeling. *Marcoulides, G.A. (Ed.), Modern Methods for Business Research,* Lawrence Erlbaum, Mahwah, NJ, 295-336.

Cleland, D., & King, W. (1983). *Systems Analysis and Project Management*. McGraw-Hill, New York, NY.

Cliffe, S. (1999). ERP implementation. *Harvard Business Review,* January-February, 16-17.

Crowley, A. (1999). Training treadmill-A rigorous plan of end-user education is critical to whipping ERP systems into shape. *PC Week Online, 4.*

Daniel, D. R. (1961). Management information crisis. *Harvard Business Review, 39*(5), 297. Wiley Online Library.

Davenport, T. H., & Brooks, J. (2004). Enterprise systems and the supply chain. Journal of Enterprise Information Management, 17(1), 8-19.

Davenport, T. H. (1998a). Putting the enterprise into the enterprise system. *Harvard Business Review, 76*(4), 121-131.

Davenport, T. H. (1998b). Living with ERP, *CIO Magazine*, *12*(5), 30-31.

Davis, G., & Olson, M. (1985). *Management Information Systems: Conceptual Foundation, Structure and Development, 12*. New York, NY: McGraw-Hill.

Dawson, J., Owens, J. (2008). Critical Success Factors in the Chartering Phase: A Case Study of an ERP Implementation. *International Journal of Enterprise Information Systems, 4*(3), 9-24.

DeLone, W., & McLean, E. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, *3*(1), 60-95.

DeLone, W., & McLean, E. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, *19*(4), 9-30.

Dennis, A., & Wixom, B. H. (2003). *Systems analysis and design (2nd ed.)*. New York: John Wiley.

Dillon, C. (1999). Stretching towards enterprise flexibility with ERP. *APICS - The Performance Advantage*, (October), 38-43.

Esteves, J., & Pastor, J. (2000). Towards the unification of critical success factors for ERP implementations. *Proceedings of the 10th Annual Business Information Technology BIT Conference*, 9.

Esteves, J., & Pastor, J. (2001). Analysis of critical success factors relevance along SAP implementation phases. *Proceedings of the 7th Americas Conference on Information Systems (AMCIS) (Vol. 2001)*, Boston, Massachusetts, USA.

Esteves, J., & Pastor, J. (2006). Organizational and technological critical success factors behavior along the ERP implementation phases, *I. Seruca et al. (eds.), Enterprise Information Systems VI*, 63–71. Springer.

Esteves, J., Pastor, J., & Casanovas, J. (2002). Measuring sustained management support in ERP implementation projects: a GQM approach. Proceedings of the 2002 Eighth Americas Conference on Information Systems, 1381–1389.

Falkowski, G., Pedigo, P., Smith, B., & Swanson, D. (1998). A recipe for ERP success. *Beyond Computing*, 44-45.

Fang, L., & Patrecia, S. (2005). Critical Success Factors in ERP Implementation. Unpublished paper, IT and Business Renewal, Jönköping International Business School, Jönköping University, Sweden.

Finney, S., & Corbett, M. (2007). ERP implementation: a compilation and analysis of critical success factors. Business Process Management Journal, 13(3), 329-347.

Finney, S. (2011). Stakeholder Perspective on Internal Marketing Communication: An ERP Implementation Case Study. *Business Process Management Journal, 17*(2), 311-331.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18*(1), 39-50. American Marketing Association.

Fornell, C., Tellis, F. G., Zinkhan, B. J. (1982). Validity Assessment: A Structural Equations Approach using Partial Least Squares, AMA Chicago, 405-409.

Foster, S., Hawking, P., & Zhu, C. (2007). The Human Side of ERP Implementations: Can Change Management Really Make a Difference? IFIP International Federation for Information Processing, 254, 239-249.

Freeman, R. (1984). *Strategic Management: A Stakeholder Approach,* Pittman, Boston, MA.

Freeze, R., & Raschke, R. (2007). An Assessment of Formative and Reflective Constructs in IS Research. *Proceedings of the 15th European Conference on Information Systems (ECIS2007),* 1481-1492, St. Gallen, Switzerland.

Gable, G., Sedera, D., Chan T. (2003). Enterprise systems success: a measurement model. *Proceedings Twenty-Fourth International Conference on Information Systems*, 576-591, Seattle, USA.

Goodpasture, V. (1995). Easton steps up to the plate. *Manufacturing Systems, 13*(9), 58-64.

Gupta, M., & Kohli, A. (2006). Enterprise resource planning systems and its implications for operations function. *Technovation, 26*(5-6), 687-696.

Haberberg, A., & Rieple, A. (2001). The strategic management of organizations. *Management* (pp. 1-87). FT Prentice Hall.

He, Y. (2007). *A comparative study of critical success factors for ERP system implementation in China and Finland.* Master of Science Thesis in Accounting, Swedish School of Economics and Business Administration, Sweden.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. (Jörg Henseler, Christian M Ringle, & Rudolf R Sinkovics, Eds.) *Advances in International Marketing, 20*(2009), 277-319.

Hoffer, J. A., George, J. F., & Valacich, J. (2002). *Modern Systems Analysis and Design (2rd ed.).*New Jersey: Prentice Hall.

Hoffman, T. (2007). Global ERP. *Computerworld,* 36-38.

Holland, C., & Light, B. (1999). A critical success factors model for ERP implementation. *IEEE Software*, May/June, 30-35.

Holland, C., Light, B., & Kawalek, P. (1999a). Beyond Enterprise Resource Planning Projects: Innovative Strategies for Competitive Advantage. *Proceedings of the 7th European Conference on Information Systems*, 1, 288-301.

Holland, C., Kelly, S., Light, B., & Willis, K. (1999b). Best of breed IT strategy: an alternative to ERP systems. In *Proceedings of the Seventh European Conference on Information Systems.* Copenhagen, Denmark: Copenhagen Business School.

Hossain, L., & Shakir, M. (2001). SIF for understanding the ERP selection in New Zealand. *Journal of Decision Systems-Special Issue on ERP and their Impact on Decision Making,* 10. Paris: HEREMES Science Publications.

Ifinedo, P. (2007). Investigating the relationships among ERP systems success dimensions: a structural equation model. *Information Systems Journal, VIII* (2), 399-405.

Ifinedo, P., & Nahar, N. (2006a). Quality, Impact and Success of ERP Systems: A Study Involving Some Firms in the Nordic-Baltic Region. *Journal of Information Technology Impact, 6*(1), 19-46.

Ifinedo, P., & Nahar, N. (2006b). Prioritization of Enterprise Resource Planning (ERP) Systems Success Measures: Viewpoints of Two Organizational Stakeholder Groups. *Management*, 1554–1560. ACM.

Ifinedo, P., & Nahar, N. (2007). ERP systems success: an empirical analysis of how two organizational stakeholder groups prioritize and evaluate relevant measures. *Enterprise Information Systems, 1*(1), 25-48.

Ives, B., & Jarvenpass, S. (1993). Competing with information: Emerging Knowledge Networks with Information Technology. In The Knowledge Economy: The Nature of Information in the 21st Century, *Annual Review of the Institute for Information Studies*, Wye Center, USA, 1993, pp. 53-87.

Jiang. (1996). "Managing entry-level IS professionals: using career oriented constructs", *Journal of Computer Information Systems,* 36*(3),* 105-110, 1996.

Johnson, J. (1995). *Chaos: The dollar drain of IT project failures. Application Development Trends*, 41-47.

Kalaycı, Ş. (2008). *SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri (3.Baskı).* Asil Yayınevi, Ankara.

Kendall, K. E., & Kendall, J. E. (2005). *Systems analysis and design* (6th ed.). Upper Saddle River, NJ: Prentice Hall.

Khandelwal, V., & Ferguson, J. 1999. Critical Success Factors (CSFs) and the Growth of IT. Selected Geographic Regions. *Proceedings of 32nd Hawaii International Conference on Systems Sciences (HICSS-32)*, USA.

Khosrow-Pour, M. (2007). *Innovative Technologies for Information Resources Management* (p. 440).

Klaus, H., Rosemann, M., & Gable, G. (2000). What is ERP?. *Information Systems Frontiers*, *2*(2), 141-162.

Kossek, E. (1989). The acceptance of human resource innovation by multiple constituencies. *Personnel Psychology*, *42*(2), 263-281.

Kronbichler, S., Ostermann, H., & Staudinger, R. (2009). A Review of Critical Success Factors for ERP-Projects. *The Open Information Systems Journal, 3*(1), 14-25.

Kumar, K., & Hillegersberg, J. (2000). ERP experiences and evolution. *Communications of the ACM*, *43*(4), 23-26.

Kumar, V., Maheshwari, B., & Kumar, U. (2003). An investigation of critical management issues in ERP implementation: empirical evidence from Canadian organizations. *Technovation, 23*(10), 793-807.

Lamont, M. (1999). Feature article Critical human factors in emerging library technology centers. *Library Hi Tech*, *17*(4), 390-395.

Laukkanen, S., Sarpola, S., & Hallikainen, P. (2005). *ERP System Adoption - Does the Size Matter? System Sciences 2005 HICSS 05 Proceedings of the 38th Annual Hawaii International Conference on* (p. 226b - 226b). IEEE.

Legris, P., & Collerette, P. (2006). A Roadmap for IT Project Implementation: Integrating Stakeholders and Change Management Issues. *Project Management Journal*, *37*(5), 64-75.

Loizos, C. (1998). ERP: Is it the ultimate software solution, *Industry Week*, 7(33).

Lovaglio P., & Vittadini G. (2008). Balanced Scorecard Health system: a latent variable approach. *Statistica Applicata-Italian journal of applied statistics ISSN: 1125-1964, 20* (3), pp. 273-292

Lyytinen, K., Mathiassen, L., & Ropponen, J. (1998). Attention shaping and software risk: A categorical analysis of four classical risk management approaches. *Information Systems Research, 9*(3), 233-255.

Mabert, V., Soni, A., & Venkataramanan, M. (2001). Enterprise resource planning: common myths versus evolving reality. Business Horizons, 44(3), 69-76. JAI PRESS INC. Retrieved from http://linkinghub.elsevier.com/retrieve/pii/S0007681301800379

Magnusson, J., Nilsson, A., & Carlsson, F. (2004). Forecasting ERP implementation success towards a grounded framework. In Leino, *Proceedings of the 12th European Conference on Information Systems (ECIS 2004).*

Marakas, G. (2006). *System analysis and design: An active approach (2nd ed.)*. New York: McGraw-Hill Irwin.

Markus, M., & Tanis, C. (2000). The enterprise systems experience-from adoption to success. *Framing the domains of IT research Glimpsing the future through the past, 173*, 173-207.

Muscatello, J. R., Small, M. H., & Chen, I. J. (2003). Implementing enterprise resource planning (ERP) systems in small and midsize manufacturing firms. *International Journal of Operations and Production Management*, *23*(8), 850-871.

Muscatello, J., & Chen, I. (2008). Enterprise resource Planning (ERP) Implementations: Theory and Practice. *International Journal, 4*(1), 63-83.

Myers, B. L., Kappelman, L. A., & Prybutok, V. R. (1997). A Comprehensive Model for Assessing the Quality and Productivity of the Information Systems Function: Toward a Contingency Theory for Information Systems Assessment. *Information Resources Management Journal, 10*(1), 6-25.

Myerson, J. (2002). *Enterprise systems integration.* Boca Raton, Fla.: Auerbach Publications.

Nah, F.F. & Delgado, S. (2006). Critical success factors for enterprise resource planning implementation and upgrade. *Journal of Computer Information Systems,* 46(5), 99-113.

Nah, F. F.-H., Lau, J. L.-S., & Kuang, J. (2001). Critical factors for successful implementation of enterprise systems. *Business Process Management Journal, 7*(3), 285-296. MCB UP Ltd.

Nah, F. H., Zuckweiler, K., & Lau, J. S. (2003). ERP Implementation: Chief Information Officers Perceptions of Critical Success Factors. *International Journal of Human-Computer Interaction, 16*(1), 5-22. Lawrence Erlbaum Associates.

Nelson, K. (2005). Exploring Emotions during ERP Adoption: A Stakeholder Analysis. *Proceedings of the 38th Annual Hawaii International Conference on System Sciences, 00*(C), 226c-226c. IEEE.

Olson, D. L., Chae, B., & Sheu, C. (2005). Issues in multinational ERP implementations. *International Journal of Services and Operations Management, 1*(1), 7-21.

Parr, A., Shanks, G., & Darke, P. (1999). Identification of necessary factors for successful implementation of ERP systems. In DeGross, J. I., Introna, L. D., Myers, M. D., & Ngwenyama, O. (Eds.), *New Information Technologies in Organizational Processes* (p. 99-119). Boston, MA: Kluwer Academic Publishers.

Parr, A., & Shanks, G. (2000). *A model of ERP project implementation. Journal of Information Technology, 15*(4), 289–303. Palgrave Macmillan.

Pinkerton, W. (2003). *Project Management: Achieving Project Bottom-Line Success*. McGraw-Hill.

Pitt, L., Watson, R., & Kavan, C. (1995). Service Quality: A Measure of Information Systems Effectiveness. *MIS Quarterly, 19*(2), 173.

Piturro, M. (1999). How Midsize Companies Are Buying ERP. *Journal of Accountancy, 188*(3), 41-48.

Rabl, T. (2010). Age, discrimination, and achievement motives: A study of German employees. *Personnel Review, 39*(4), 448-467.

Ranzhe, J., & Xun, Q. (2007). A Study on Critical Success Factors in ERP Systems Implementation. *Proceedings of International Conference on Information Systems*, Montréal Québec, Canada.

Ringle, C.M. (2006). Segmentation for path models and unobserved heterogeneity: The finite mixture partial least squares approach. Research Paperson Marketing and Retailing 35, University of Hamburg, Hamburg.

Rockart, F. (1979). Chief executives define their own data needs. *Harvard Business Review, 57*, 81-93.

Rockart, F., & Hofman, J. D. (1992). Systems delivery: evolving new strategies. *Sloan Management Review, 33*(4), 21-31.

Rosario, J. G. (2000). *On the Leading Edge: Critical Success Factors in ERP Implementation Projects* (Vol. 27).

Satzinger, J. W., Jackson, R. B., & Burd, S. D. (2000). *Systems Analysis & Design in a Changing World*. Course Technology.

Satzinger, J., Jackson, R., & Burd, S. (2004). *Systems Analysis and Design Using (3rd ed.).* Thomson Learning.

Schein, E. (1992). *The Role of the CEO in the Management of Change: The Case of Information Technology*, MIT Press, Cambridge, MA.

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-of-Fit Measures. *Psychological Research, 8*(2), 23-74.

Seddon, P., & Kiew, M. (1994). A partial test and development of the DeLone and McLean model of IS success. *Proceedings of the International Conference on Information Systems, 4*(1), 99-110). Association for Information Systems.

Sedera, D., Gable, G., & Chan, T. (2004). Measuring Enterprise Systems Success: The Importance of a Multiple Stakeholder Perspective. *Proceedings of the 15th ECIS*, 476–485.

Shanks, G., Parr, A., Hu, B., Corbitt, B., Thanasankit, T., & Seddon, P. (2000). Differences in Critical Success Factors in ERP Systems Implementation in Australia and China: A Cultural Analysis. *Proceedings of the Conference in Information Systems*, (H. R. Hansen, M. Bichler, & H. Mahrer, Eds.), Vienna, Vienna University of Economics and Business, 1, 537-545.

Shelly, G., & Rosenblatt, H. J. (2009). *Systems Analysis and Design (8th ed.).* Prentice Hall.

Singletary, L., Pawlowski, S., & Watson, E. (2003). What is Applications Integration? Understanding the Perspectives of Managers, IT Professionals, and End Users. *Proceedings of the 9th Americas Conference on Information Systems (AMCIS)*, 486–493, Tampa, Florida.

Slevin, D., & Pinto, J. (1986). The project implementation profile: New tool for project managers. *Project Management Journal, 17*(4), 57-70.

Slevin, D., & Pinto, J. (1987). Balancing Strategy and Tactics in Project Implementation. *Sloan Management Review, 29*(1), 33-41.

Soja, P. (2006). Success factors in ERP systems implementations: Lessons from practice. *Journal of Enterprise Information Management, 19*(4), 418 - 433.

Somers, T. M., & Nelson, K. (2001). The impact of critical success factors across the stages of enterprise resource planning implementations. *Proceedings of the 34th Annual Hawaii International Conference on System Sciences, 00*(c), 10. IEEE Comput. Soc.

Somers, T., & Nelson, K. (2004). A taxonomy of players and activities across the ERP project life cycle, *Information and Management, 3*(257-278), CD P.

Stair, R., & Reynolds, G. (2006). *Principles of information systems: A managerial approach (7nd ed.).* Boston: Thomson Course Technology.

Stefanou, C. (1999). Supply chain management (SCM) and organizational key factors for successful implementation of enterprise resource planning (ERP) systems. *Proceedings of the Americas Conference on* (Vol. 800, pp. 800-802). Retrieved from http://ais.bepress.com/cgi/viewcontent.cgi?article=1633&context=amcis1999

Stein, T. (1999). Making ERP add up companies that implemented enterprise resource planning systems with little regard to the return on investment are starting to look for quantifiable results, *Information Week,* 24, 59.

Stewart, G., Milford, M., Jewels, T., Hunter, T., & Hunter, B. (2000). *Organizational Readiness for ERP Implementation. Information Systems Journal,* 966-971.

Sumner, M. (1999). Critical success factors in enterprise wide information management systems projects. In M. Sumner (Ed.), *Proceedings of the 1999 ACM SIGCPR conference on Computer personnel research SIGCPR 99,* 297-303. ACM Press.

Tenenhaus, M., Esposito Vinzi, V., Chatelin, Y., & Lauro, C. (2005). PLS path modeling. *Computational Statistics & Data Analysis, 48*(1), 159–205

Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal Of Operational Research, 146*(2), 241-257. Elsevier.

Ward, J., & Peppard, J. (1999). Mind the Gap': diagnosing the relationship between the IT organization and the rest of the business. *The Journal of Strategic Information Systems, 8*(1), 29-60. Elsevier.

Wee, S. (2000). Juggling Toward ERP Success: Keep Key Success Factors High. *ERP News*, 1-5.

Westhuizen, D., & Fitzgerald, E. P. (2005). Defining and measuring project success. *European Conference on IS Management Leadership and Governance*, 1-17.

Whitten, J., Bentley, L., & Dittman, K. (2004). *Systems analysis and design methods (6nd ed.).* Boston: McGraw-Hill Irwin.

Wilder, C., & Davis, B. (1998). False Starts Strong Finishes. *Information Week, (711),* 41-53.

Wilkes, R., & Dickson, G. (1987). Assessment of the information systems organizations: an empirical investigation of assessor perspectives. *Proceedings of the 8th International Conference on Information Systems*, 428–441, Pittsburgh, PA.

Willcocks, L. P., & Sykes, R. (2000). The Role of the CIO and it Function in ERP. *Communications of the ACM, 43*(4), 32-39.

Woo, H. (2007). Critical success factors for implementing ERP: the case of a Chinese electronics manufacturer. *Journal of Manufacturing Technology Management, 18*(4), 431-442.

Wu, J. (2008). Critical Success Factors for ERP System Implementation. *Research and Practical Issues of Enterprise Information Systems, 2*(1), 739-745.

Yeoh, W., Koronios, A., & Gao, J. (2006). Critical Success Factors for the Implementation of Business Intelligence System in Engineering Asset Management Organizations, *Proceedings of the 1st World Congress on Engineering Asset Management (WCEAM),* 1-17, Gold Coast, Australia.

Yingjie, J. (2005). *Critical Success Factors in ERP Implementation in Finland*. Master of Science Thesis in Accounting, The Swedish School of Economics and Business Administration, Sweden.

Ylitalo, J. (2009). *Controlling for Common Method Variance with Partial Least Squares Path modeling: A Monte Carlo Study*. Independent Research Project in Applied Mathematics, Helsinki University of Technology Faculty of Information and Natural Sciences Department of Mathematics and Systems Analysis.

Yusuf, Y., Gunasekaran, A., & Wu, C. (2006). Implementation of Enterprise Resource Planning in China. *Technovation, 26*(12), 1324-1336.

Zhang, L., Lee, Matthew, K.O., Zhang, Z., & Banerjee, P. (2002). Critical success factors of enterprise resource planning systems implementation success in China. *Proceedings of the 36th Hawaii International Conference on System Sciences (HICSS-36)*, Big Island, Hawaii, USA.