Sudan University of Science and Technology

Master of Science in Business Administration

Key Success Factors to Implement Enterprise Resource Planning System

(A Case of GIAD Industrial Group)

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2017 ~ 1438

Dedications

To whom taught me discipline and trustworthiness

To my Father, my Mother….I wish them good health and happiness

To my Wife, my Son…….……in save of Allah

To all my Family…….……..in care of Allah

To my colleagues (MSc Batch 10)…….... I hope Reconciled to them

Acknowledgement

Thank ALLAH for the faith, Prayer and Peace be upon the Prophet of Mercy, Prophet Muhammad peace be upon him.

My thanks and appreciation to DR. SIDDIG BALAL IBRAHIM for his guidance and advice as my thesis advisor.

In addition, I am so thankful to GIAD Industrial Group, ERP Project Team for helping me with the case study interviews and giving a valuable guidance, Subject Matter Expert at each functional fields, and IT developers to give a great opportunity and support to study at Key Factors Facing implementing ERP system. I also would like to thank to DR. HASSAN ALI in Sudan University of science & Technology for their endless support and heartfelt cares. All the End users in GIAD Industrial Group.

Abstract

Enterprise Resource Planning (ERP) is an integrated software solution. The purpose of this research it is provided as a package comprising different modules, such as Accounting, Human Resources, Material Management, Sales and Distribution and Production Planning. This research aimed to determine the problems that affected to implementation ERP system in Giad, in Realization phase, Transition phase and Operation phase. Methodological used through a mix of quantitative and qualitative data in terms of questionnaire and exploratory study with ERP team to specify the main aspects that facing implementation ERP in GIAD. Thus, this study seeks to identify the key success factors that faced to implementation ERP in Realization, Transition and Operation phase. This research is also focuses on the problems facing the different modules in the ERP implementation phases. Number of a survey questionnaire Distributed (74) samples, the response rate (83.8%). Results suggest that this relationship was positive for TMGS, BPRE, TESK and MOPR, but was not supported the PSC and IMRO in Realization phase, positive for TMGS, PSC, BPRE, TESK and MOPR, but was not supported IMRO in Transition phase and positive for IMRO and MOPR, but was not supported TMGS, PSC, BPRE, and TESK in Operation phase.The Theoretical Implications In Realization phase TMGS, BPRE, TESK and MOPR, in transition phase TMGS, PSC, BPRE, TESK and MOPR and in Operation phase only IMRO and MOPR are affect to implement ERP system. The results show the practice implications in perception of the ERP system that avoid to integrated all business processes are work together in one database. Future research work will continue to Study the Key success factors facing implementing ERP system in different organization business, Study the impact of implementing ERP System for organizational structure, Study the influence of ERP implementation for business procedures and Study the influence for the post-implementation ERP system in multi-companies.

مستخلص

نظام تخطيط موارد المؤسسة (ERP) هو حل برمجي متكامل. والغرض من هذا البحث هو توفير عدد من والأنظمة الفرعية المختلفة، مثل المحاسبة والموارد البشرية وإدارة المواد والمبيعات والتوزيع وتخطيط الإنتاج. يهدف هذا البحث إلى تحديد المشاكل التي أثرت على تنفيذ نظام تخطيط موارد المؤسسات في جياد، في مرحلة الإقرار، المرحلة الانتقالية ومرحلة التشغيل. المنهجية المستخدمة عبارة عن مزيج من البيانات الكمية والنوعية من خلال الاستبيان والدراسة الاستكشافية التي تمت مع فريق تخطيط موارد المؤسسة لتحديد الجوانب الرئيسية التي تواجه تنفيذ تخطيط موارد المؤسسة في جياد. كما تسعى هذه الدراسة إلى المساهمة في العوامل الرئيسية لتطبيق المعرفة (ERP) من خلال التحقيق في المشاكل التي تواجه جياد وتوفير دليل مفاهيمي لتنفيذ نظام تخطيط موارد المؤسسة بنجاح. ويركز هذا البحث أيضا على المشاكل التي تواجه والأنظمة الفرعية المختلفة في مراحل تنفيذ نظام التخطيط للموارد المؤسسة. تم توزيع عدد (74) استبانة، وكان معدل الاستجابة (83.8٪). وتشير النتائج إلى أن هذه العلاقة كانت إيجابية بالنسبة لـ (TMGS)، (BPREE)، (TESK)، (MOPR)، وسلبية لـ (PSC)، (IMRO) في مرحلة تحقيق، إيجابية لـ(TMGS)، (PSC)، (BPREE)، (TESK)، (MOPR)، وسلبية لـ(IMRO) في المرحلة الانتقالية وإيجابية لـ (IMRO)، (MOPR)، ولكن لم يتم دعمها من قبل (TMGS)، (PSC)، (BPREE)، (TESK) في مرحلة التشغيل. الآثار النظرية في مرحلة الإنجاز (TMGS)، (BPREE)، (TESK)، (MOPR) في المرحلة الانتقالية (TMGS)، (PSC)، (BPREE)، (TESK)، (MOPR)، فقط(IMRO)، (MOPR) في مرحلة تنفيذ نظام (ERP). وتبين النتائج إلى الآثار المترتبة على الممارسات في نظام (ERP) الذي تنتج من دمج جميع العمليات معا في قاعدة بيانات واحدة. تم تقديم بحوث مستقبلية في دراسة العوامل الرئيسية التي تواجه تنفيذ نظام تخطيط موارد المؤسسة في منظمة ذات أعمال مختلفة، دراسة أثر تنفيذ نظام تخطيط موارد المؤسسة على الهيكل التنظيمي، دراسة تأثير تنفيذ نظام التخطيط للموارد المؤسسة على إجراءات العمل ودراسة أثر تطبيق نظام تخطيط موارد المؤسسة بعد التنفيذ في عدة شركات.

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Abbreviations

Abbreviations	Meaning
ERP	Enterprise Resource Planning
TMGS	Top management commitment and support
PSC	The scope of ERP Project
BPREE	Business process re-engineering
TESK	Project team competence and skills
IMRO	Creation of an implementation road map
MOPR	Monitoring and evaluation of performance

Chapter One - Introduction

Enterprise Resource Planning (ERP) is a software solution that integrates business functions and data into a single system to be shared within a company. The role of Enterprise Resource Planning (ERP) systems in managing business processes has expanded significantly over the past decade from a focus on specific business areas such as manufacturing, procurement, or human resources, to broader use throughout the company.

GIAD Group need to replace the existing software with the Enterprise Resource Planning software, to integrate its business processes, share common data and practices across department. They prepare the blueprint about (Financial Module, Material Management Module, Human Resource Module, Production Planning Module, Sales and Distribution Module). Then they faced many problem to implement ERP system. This research focusses to determine the Key Success Factors for implementation ERP System in Giad.

1.1. Problem Statement

The literature review enabled that many problem in ERP systems and contend that this has caused major problems for end users in many organizations (especially those with limited IT experience, such as small and medium-sized businesses). These problems include concerns about the flexibility of the software and confusion about the effectiveness of the overall aim of the software, namely the integration of data across the organisation (Prometheus, 2014).

Many factors may affect to implementation ERP system in Giad, these factors may affect in realization phase, transition phase and operation phase.

1.2. Research Questions

This study addresses the following research questions

Research Question 1: What Key success Factors affect to ERP implementation processes in realization phase?

Research Question 2: What Key success Factors affect to ERP implementation processes in transition phase?

Research Question 3: What Key success Factors affect to ERP implementation processes in operation phase?

1.3. Research Objectives

The research objectives is to identify the key success factors to implementation ERP in realization, transition and operation phase.

1.4. Significance of the Study

1.5.1 Theoretical Significance

In ERP system generated static reports, and ERP's standard format reports were usually not well matched to Business manager's needs. Moreover, it took more time to develop new reports in ERP than in the legacy system. Since the reports usually needed data from across modules, what we need to implement (Financial module, Material management module, Production module, Sales and distribution module, Human resource module).

By understanding what went wrong in big, in Giad Group and what decisions they must took that ensured the successful of ERP implementation, it is possible to determine the key success factors of ERP implementation.

1.5.2 Practical Significance

With centralized database and built-in data analysis capabilities, they can help an organization achieve better resource management, improved decision making and planning, and performance improvement.

With integrated and standard application architecture, they support business flexibility, reduced IT cost and marginal cost of business units' IT, and increased capability for quick implementation of new applications.

They affect the growth of organizational capabilities by supporting organization structure change, facilitating employee learning, empowering workers, and building common visions.

1.5. Structure of the Study

The research structured in five chapters and five appendixes. The first chapter describes the background information of the study along with overview of problem statement, research questions, objectives and the Significance of the Study. The second chapter consist of a general literature review and the concept, benefits of ERP System, key success factors which include (Top Management Commitment and Support, The Scope of ERP Project, Business Process Re-engineering, Project Team Competence and Skills, Creation of an Implementation Road map, Monitoring and Evaluation of Performance) and ERP Implementation in three phases realization, transition and operation phase. The third chapter outlines the research methodology applied, contain research design, the proposed model, hypotheses development, research methods, the study population and

Sample, sources of collecting data, sources of the survey, measuring the variables of the study, the accuracy and consistency and statistical analysis methods contain descriptive statistics and deductive statistics. The fourth chapter contain information on the data results and analysis. The fifth chapter contain discussion and Implications which include (The Theoretical Implications and The Practical Implications), Limitations, Recommendation and Conclusion. In the appendix section, the first appendix provides information of literature review, the exploratory study questionnaire statements, the exploratory study questionnaires result, evaluated key success factors and the research questionnaires.

Chapter Two - Literature Review and Theoretical Framework

2.1.ERP system

An ERP system is a technology infrastructure that can assist a company in integrating information from all internal departments with suppliers and customers. It links all areas of a company's internal functions and processes with the external ones in order to create a close relationship between customers and suppliers. ERP also allows information to be shared between different partners, supports the effectiveness of the supply chain management, and improves the flow of information. These should enable managers to make better decisions based on more accurate and up-to-date information (Ahmad Shatat, 2015). CSFs for ERP system implementation namely; Stakeholder Consultation, Vendor Selection, Project Management, Stakeholder Management and Communication, Training, Risk Management, and System Re-Engineering and Software Customization. The findings of the study show a positive impact of the ERP system. It made significant changes to the way the company does business (Maguire et al., 2010).The ERP system was introduced by ERP providers, such as SAP (Systems, Applications, & Products in Data Processing), Oracle, PeopleSoft, and others to eradicate legacy system problems, provide single and integrated technological platform, and thereby assist companies in gaining a competitive advantage and thus competing globally. However, implementing ERP system requires changes in the organizational culture as a whole, takes a long time to implement, and consumes a considerable amount of money. Therefore, companies need to know clearly what ERP system is and in what

ways the system could affect the company before thinking of implementing the system (Loonam, McDonagh, 2005).

The Concept of ERP System

The concept of Enterprise Resource Planning (ERP) can be viewed from different perspectives. First ERP is computer software. Second it can be seen as a means of integration of all processes and data of an organization and create a comprehensive integrated structure. Third ERP is a software that requires a reengineering process so the company is able to adapt to the ERP system. The good definition of ERP is more than a software, it is restructuring business processes associated with enterprise system, a packaged software solution with a new automated way of effectively integrating, managing and controlling almost all aspects of business processes, functions and wide-resources from different areas of the business by using a centralized database, ensuring that all information is entered only once to be able to produce and access information many times in real time environment (Mareai, Patil, 2012). In addition, ERP systems are defined as "configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization" (Yousef, 2010).

The benefits of ERP System

Successful Enterprise Resource Planning (ERP) implementation is very important issue in today's global market and depends on paying high attention on critical success factors (CSFs) affecting ERP implementation (Murat, Muharrem,2015).

Operational benefits:

By automating business processes and enabling process changes, they can offer benefits in terms of cost reduction, cycle term reduction, productivity improvement, quality improvement, and improved customer service.

Managerial benefits:

With centralized database and built-in data analysis capabilities, they can help an organization achieve better resource management, improved decision making and planning, and performance improvement.

Strategic benefits:

With large-scale business involvement and internal/external integration capabilities, they can assist in business growth, alliance, innovation, cost, differentiation, and external linkages.

IT infrastructure benefits:

With integrated and standard application architecture, they support business flexibility, reduced IT cost and marginal cost of business units' IT, and increased capability for quick implementation of new applications.

Organizational benefits:

They affect the growth of organizational capabilities by supporting organization structure change, facilitating employee learning, empowering workers, and building common visions.

2.2.The Key Success Factors

The most important factors identified by the literature, are Top Management Support, User Involvement, Clear Goals and Objectives, Strategic IT Planning,

User Training and Education, Vendor Support, Teamwork and Composition, Project Champion, Monitoring and Evaluation of Performance, and Education on new Business Processes. These top 10 critical factors can help companies to achieve successful implementation of ERP system (Ahmad Shatat, 2015). The Key Factors is something that the organization must care about it do well to succeed. In terms of information system projects, Key Factors is what a system must do to accomplish what it was designed to do. The Key Factors in ERP implementation would give some guidelines on what factors that should be given more attention in order to bring the implementation process into success. The Key Factors could either be a risk or opportunities, depends on how the organizations handle them. Most of the literature on ERP system focused on two main domains. The first one evaluates the suitability of ERP systems' software, vendors, and consultants. The second domain looked at the CSFs that affect ERP system's implementation success, such as ERP Teamwork & Composition, Top Management Support, Business Plan & Vision, Effective Communication, Project Management, Project Champion, Appropriate Business, and Legacy Systems. Therefore, companies need to start with necessary changes in their own business processes required in the implementation of ERP processes, and may eventually improve the entire supply chain, thus, gaining a competitive advantage in the marketplace. Critical factors for successful implementation of ERP system include ERP Teamwork and Composition, Top Management Support, Business Plan & Vision, Effective Communication, Project Management, Project Champion, Appropriate Business & Legacy Systems, Change Management

Program & Culture, Business Process Reengineering (BPR) & Minimum Customization, Software Development, Testing & Troubleshooting, and Monitoring & Evaluation of Performance (Nah, Lau, 2001).

After reviewed the literature review we found 34 factors affected to implementing ERP system (Top management commitment and support, Project scope of the ERP, Existing IT compatibility of the SME, A cost/budget issues, Proper ERP package selection, ERP software selection, The roles of consultants and the interaction between owners, Effective project management methodology, Identification of critical mission processes, Business process re-engineering, Project team competence and skills, Creation of an implementation road map, Proper training needs, Training and involvement end-users, Functional Testing, Review on implications on time, Defining KPI's, Clear accountability, Appropriate consultants and software suppliers, Strategic goals of the ERP implementation, Effective change management, Software design and testing, Data accuracy, Cultural and structural changes, Proper documentation and benchmarking, GAP analysis, Monitoring and evaluation of performance, Base point analysis (BPA), IT infrastructure, Consulting services, Conflicts between user departments).

Exploratory study of Key success factors

I used the exploratory study by format of questionnaire, to determine the most key success factors affected to implementation ERP system in Giad, and distributed to three different locations which use the ERP system, the employee

position in these location is (Developer Engineering, Functional Engineering and End user)

A questionnaire is designed around each latent construct of interest. By this questionnaire gain to provide feedback in major areas that reflect factors to achieve the most factors affected to implement ERP system. And distributed to three different locations related, which use the ERP system and the person position is (Developer Engineering, Functional Engineering) Using a measurement scale from ("1" height Priority, "2" medium Priority and "3" low Priority), asked to evaluate each statement.

After collecting the questionnaire and analysed data the conclusions of the exploratory study, and depend of use the three weights above, the statements evaluated are gave six factors (Top management commitment and support, Project scope of the ERP, Business process re-engineering, Project team competence and skills, Creation of an implementation road map, Monitoring and evaluation of performance).

Top Management Commitment and Support

Top management support has been identified as the most important key success factor in ERP system implementation projects. Factors with least inaccuracies were management of expectations, top management support and project champion which gives a right to identify them as well-understood areas. It can be concluded that there is a gap in understanding of implementation process of researchers and business representatives. The top management was guided to

define ones competitive advantage and long-term perspective on business. Management consultant share the opinion that top management is usually more interested in BI systems rather than ERP. (Göteborg, Sweden 2013).

Top management assumed that ERP implementation could provide great solutions without considering the complexity of the ERP system, the possible implementation process complications and the associated risks. This gave the whole project team and users unrealistic expectations. This misconception also led to superficial project planning and an underestimation of budget and resource allocation, and resulted in a failure of ERP implementation from a project management perspective. Top management and the project manager would like to reduce the budget of the ERP project, and thus they set too tight a project schedule. Implementation activities were conducted in a rush in order to meet the project deadline. Top management is expected to provide support in the areas of committing to the ERP project, sufficient financial and human resource, and the resolution of political problems if necessary. Limited financial support contributed to a rushed ERP implementation process. Insufficient commitment could lead to political problems which hindered the implementation process (causing poor BPR, widespread user resistance to change and low user satisfaction). All these could help to minimize the risk of ERP mismatch. Sufficient top management support, whether in commitment to the project, or support in the areas of finance and human resource, should be provided during the whole ERP life cycle (Ada Wong et al., 2004)

The Scope of ERP Project

(Bharathi, Parikh 2012) conducted a similar research but in a particular context of Indian automobile industry. They identified the different stages of ERP implementation as planning, acquisition, implementation, usage and percolation and extension. The study mentioned that for the scope of the ERP are the main critical success factors. (Tambovcevs, 2012) studied the ERP implementation in a Latvian manufacturing company and concluded that one of the main CSF's is the project scope. The study identifies a need for more research to be done in the ERP implementation in construction companies. (Ranganathan and Brown, 2006) reported that ERP systems with greater functional scope or greater physical scope result in positive and higher returns. Because an ERP investment implies a firm's commitment to improve business processes and increase business integration.

Business Process Re-engineering

Team should not only be technologically competent but also understand the company and its business requirements (Remus, 2006). Business process re-engineering (BPR) as the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed(Hammer, Champy 2001). Critical Success Factors in ERP Implementation should be willing to change their businesses to fit the software in order to reduce the degree of customizations (Murray, Coffin, 2001).

Project Team Competence and Skills

The success of projects is related to the knowledge, skills, abilities, and experiences of the project manager as well as the selection of the right team members (Al-Mashari et al., 2006). An ERP project involves all of the functional departments in an enterprise. It demands the effort and cooperation of technical and business experts as well as end-users. The ERP team should involve of the best people in the organization. The sharing of information between the implementation partners is essential and requires partnership trust (Loh, Koh, 2004). Both business experts and technical knowledge are important for success (Nah, 2003). Moreover, the team should be familiar with the business functions and products so that they know what needs to be improved to the current system (Rosario, 2000).

Creation of an Implementation Road map

They identified the different stages of ERP implementation as planning (Bharathi, Parikh 2012), acquisition, implementation, usage and percolation and extension. The study mentioned that for the planning stage, top management commitment, organization's readiness to change, the vision of the company, project planning and the scope of the ERP are the main critical success factors. (Hooshang, et al., 2010). During the acquisition phase, existing IT compatibility of the SME, a thorough cost benefit analysis, the right ERP package selection, the analysis of implementation vendor, the roles of consultants and the interaction between owners of SME's are the most critical success factors. During the

implementation phase, involvement of process owners, project management, identification of critical mission processes, business process reengineering and GAP analysis, creation of an implementation road map, training needs and functional testing are the most important success factors. (Ganesh, et al., 2010). The usage and percolation phase requires periodical and timely communication, percolation of owner's commitment, GAP analysis before and after training, feedback on user satisfaction, review on implications on time and a mandatory ERP environment in the organization are the most important critical success factors during the usage and percolation phase. There is the extension phase after the usage and percolation phase which requires more work and this is a process that should never stop exploration and exploitation of existing processes to make it better with the help of the ERP implementation (Bharathi, Parikh 2012).

Monitoring and Evaluation of Performance

An ERP system is complex and contains lots of checks and balances. A common risk is the data visibility, integrity, and accuracy across the system (Razi, Tarn, 2003). Management must understand that during the implementation system glitches may occur, and will disturb the work. Therefore all efforts must be made to eliminate major system glitches. Subsequently monitoring system performance is needed to identify any alignment problems that may have occurred and were not apparent. (Kuang et al., 2001) argued that milestones and targets were important to keep track of progress. They further added that achievements should be measured against the project goals.

2.3.ERP Implementation

The concept of implementation is ordinarily related to installation of hardware and software. In the world of ERP systems, the implementation is often used as a term to describe a well-defined project spanning from the choice of the systems through the configuration and the training until going live, where the system is becoming operative. Concurrently the business objectives are taken even further, driven by the market dynamics but also by the new internal opportunities (Charles Møller, 2000).

There are different classifications of implementation depending on various factors. Thus, Bradford (2010) defines four implementation methodologies depending on the speed of change: - Phased implementation (also known as incremental or waved implementation) when the system is installed in the small part of organization, for example in the pilot department/geographical area or by functionality - one particular module. Then it is rolled out on the rest of enterprise (Somers & Nelson (2004).

The companies need to start with necessary changes in their own business processes required in the implementation of ERP processes, and may eventually improve the entire supply chain, thus, gaining a competitive advantage in the marketplace. In implementing an ERP solution, an organization can quickly upgrade its business processes to industry standards, taking advantage of the many years of business systems reengineering and integration experience of the major ERP vendors (Myerson, 2002).

Chapter Three - Research Methodology

This chapter discusses the methods that have been used in the collection and analysis of data. It explains the research design, sampling techniques and data collection methods used; and describes how data collected from the research has been analyzed. Both qualitative and quantitative research methods have been used in carrying out this research.

3.1. Research design

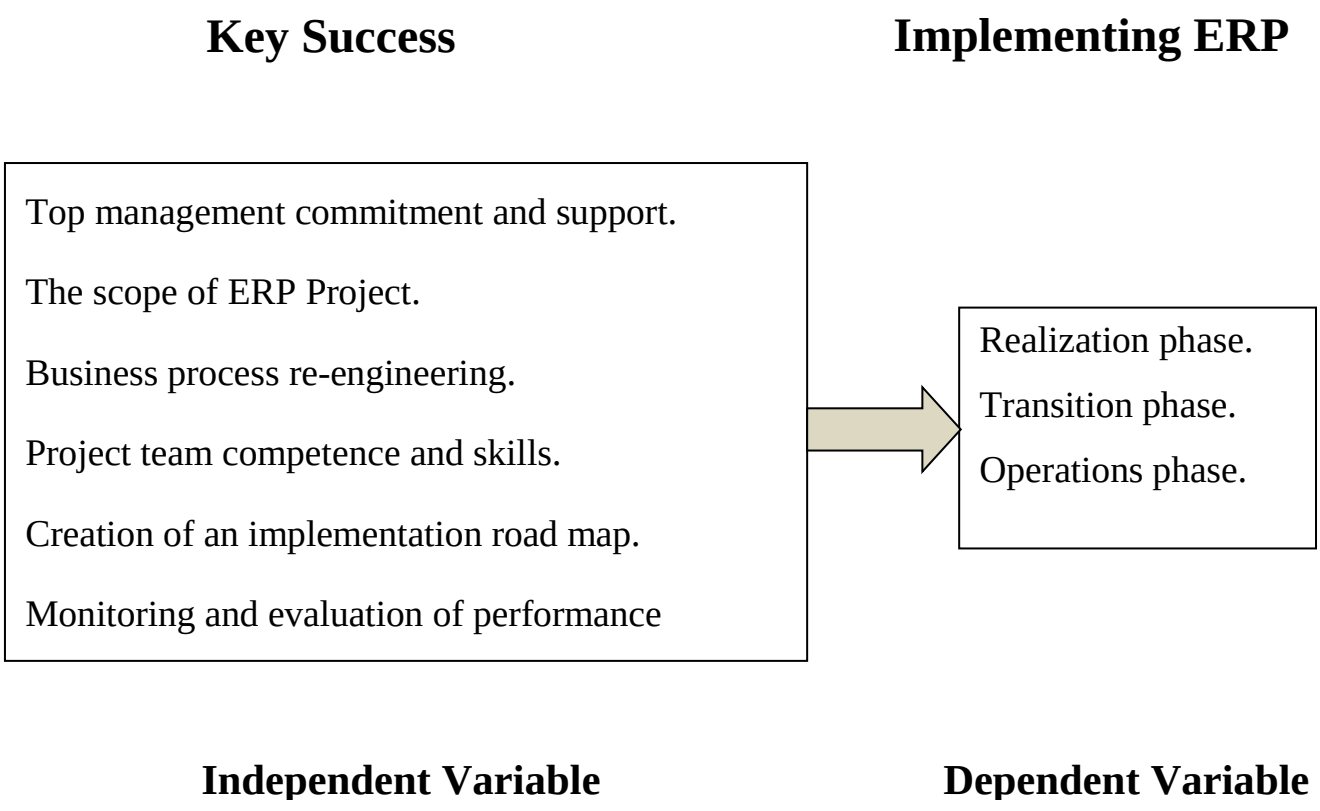
A research design is a plan that guides the investigator in the process of collecting, analysing and interpreting observations. It is a logical model of proof that allows the researcher to draw inferences concerning causal relations among the variables under investigation (Taole, 2008). The research design covers sampling techniques as well as the data collection methods that are used in this research.

The areas of interest include scope of implementation ERP system, rationale, and history of Giad group, types of information resources shared among Giad Group, policies and procedures in each department. Organizational structure of, role and responsibility, expectation of HQ and End user. The list was modified to include emerging issues from the survey were investigated further during the interview process.

3.2. The Proposed Model

Depend on the statements evaluated factors result, the study sets out the following framework to test the relationship between the independent variables (Key Success Factors) and the dependent variable (implementing ERP System). The following Figure shows the relationships between the variables.

Figure 1: The Proposed Model



3.3. Hypotheses Development

3.6.1.There is a Relationship between Key Success Factors and the Implementation ERP system.

H1: There is a relationship between Key Success Factors and implementing ERP Realization phase

H2: There is a relationship between Key Success Factors and implementing ERP Transition phase

H3: There is a relationship between Key Success Factors and implementing ERP Operations phase

3.6.2. There is a Relationship between Key Success Factors and Implementing ERP Realization Phase.

3.6.2.1. Top management commitment and support significantly influences Realization phase.

3.6.2.2. Scope of ERP Project significantly influences Realization phase.

3.6.2.3. Business process re-engineering significantly influences Realization phase.

3.6.2.4. Project team competence and skills significantly influences Realization phase.

3.6.2.5. Creation of an implementation road map significantly influences Realization phase.

3.6.2.6. Monitoring and evaluation of performance significantly influences Realization phase.

3.6.3.There is a Relationship between Key Success Factors and Implementing ERP Transition phase.

3.6.3.1. Top management commitment and support significantly influences Transition phase.

3.6.3.2. Scope of ERP Project significantly influences Transition phase.

3.6.3.3. Business process re-engineering significantly influences Transition phase.

3.6.3.4. Project team competence and skills significantly influences Transition phase.

3.6.3.5. Creation of an implementation road map significantly influences Transition phase.

3.6.3.6. Monitoring and evaluation of performance significantly influences Transition phase

3.6.4.There is a Relationship between Key Success Factors and Implementing ERP Operations phase.

3.6.4.1. Top management commitment and support significantly influences Operation phase.

3.6.4.2. Scope of ERP Project significantly influences Operation phase.

3.6.4.3. Business process re-engineering significantly influences Operation phase.

3.6.4.4. Project team competence and skills significantly influences Operation phase.

3.6.4.5. Creation of an implementation road map significantly influences Operation phase.

3.6.4.6. Monitoring and evaluation of performance significantly influences Transition phase

3.4. Research Methods

In order to determining the specific CSFs, “how” they influence the effectiveness of ERP implementation, and for concluding “why” the factors led to failure and “how” they influenced ERP implementation failure. The research method can help to acquire rich data for exploring how CSFs in different ERP implementation phases affect ERP implementation failure.

The study nature may be exploratory or descriptive, or that it was carried out to test the validity of Assumptions are based Tabaaah exploratory study to test the validity of the assumptions on Over the evolution of the information contained in that area (Boumnijel, 2010).

Descriptive approach as a method The most appropriate as it aims to understand Key Success Factors to implementing ERP System, characteristics and factors affecting it, it also includes a collection Data, classified, interpreted and analysed to try to draw conclusions, control and also. Prediction to study in the future (Sekaran 2006).

Based on a case study methodology (Yin, 2003), a research protocol was established drawing on a literature framework. The protocol was critically evaluated and reviewed by industrial practitioners to ensure that the protocol design is appropriate for answering the research question. The research questions posed in the study are as follows:

(1) What Key success Factors to ERP implementation processes in realization phase?

(2) What Key success Factors to ERP implementation processes in transition phase?

(3) What Key success Factors to ERP implementation processes in operation phase?

3.5. The Study Population

The study population consisted of all users of the systems in GIAD range of (financial, production, human resources, logistics and marketing) consists emphasis was placed on the users of the ERP system, which is one of the threads of modern planning and management of all enterprise resources were targeting users who involved in the implementation of the project to be included as most slide knowledge in this area.

3.6. The Study Sample

The study sample represented in part, or a subset of the study population was chosen as part of the users of the systems in GIAD (financial, production, human resources, logistics and marketing) was relying on the sample method because it is very difficult to survey all the elements of society as the time and cost do not allow so, as the sample study instead of society will lead to more accurate results because of the lack of stress and reduced the number of errors which you can fall in the collection of data from a large number of elements (Sekaran 2006).

3.7. Sources of Collecting Data

Secondary

It includes English referencing, scientific papers and previous research and some sites online as well as journals on the subject of the study.

Primary

We will use a scientific research tools to achieve the objectives of this study and for this we will personal encounters with the ERP system users, and then use the resolution to achieve the objectives of this study, by answering questions such resolution from the standpoint of the study sample of user's vocabulary, and it contains five sections

- The first section demographic data Included evidence for gender, age, qualification, career Level, experience, specialization, level of knowledge in information technology and information about enterprise resource planning system.
- The second section covers basic information with contain:
  - Key Success Factors.
  - Implementation of the ERP system phases.

Has been relying on the LIKERT scale, A "Likert scale" is the sum of responses to several Likert items. These items are usually displayed with a visual aid, such as a series of radio buttons or a horizontal bar representing a simple scale.

Table 1: Likert Scale

Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	2	3	4	5

Source: Sekaran 2006

3.8. Sources of the Survey:

Based on previous studies stated in the questionnaire was designed so as follows:

- **Demographic Data:**

Gender, Age, Qualification, Career Level, Experience, Specialization, Level of knowledge in information technology and Information about enterprise resource planning system.

- **Key Success Factors.**

Table 2: Measure Key Success Factors

No	Statement	Reference
	Top management commitment and support	The critical success factors of the ERP system Project
1	Senior management supports the implementation of the ERP system in the company.	
2	The implementation of the ERP system a priority for senior management	
3	Senior management is working to allocate sufficient resources to implement the ERP system company.	
4	Contact Person works project implementation ERP system to facilitate the obstacles facing the implementation of the project.	

	The scope of ERP Project	
1	Multiple sections that the project will be applicable to them affect the implementation of the ERP system.	Critical success factors in ERP Implementation
2	Multiple processes within departments affect the process of implementation of the enterprise resource planning system within the company.	
3	It is determined by the scope of the implementation of the enterprise resource planning system.	
4	Project flexible enterprise resource planning where to accept the change in the operations of the project.	
	Business process re-engineering	
1	The description of the various sections processes accurately.	A Plan for the Implementation of ERP for state of Texas
2	The relationship between the different sections are clear and understandable.	
3	The data has to be transferred to the enterprise resource planning system company review.	
4	Be sure to move the old system data to the company's enterprise resource planning system.	
	Project team competence and skills	
1	Employees within the company are involved in the provision of knowledge for the implementation of the enterprise resource planning system.	The critical success factors of the ERP system Project.
2	The executing agency for the project has adequate technical knowledge.	
3	The best staff in practice, the members of the team in the implementation of the enterprise resource planning system within the company.	
4	The implementing agency for the project to exchange information with team members	
	Creation of an implementation road map	
1	The goals of the enterprise resource planning system has been clearly	Cri tic al

	identified.	
2	Sequence clear enterprise resource planning system operations.	
3	Operations integrated enterprise resource planning system with each other.	
4	Execution time known enterprise resource planning system for members of the system implementation team within the company.	
	Monitoring and evaluation of performance	
1	The data entered in the system of enterprise resource planning incomplete.	A Plan for the Implementation of ERP for state of Texas
2	Processes that are applied in the enterprise resource planning system that represents all the different sections that have been identified by the company.	
3	There are surveillance and continuous assessment of the operations of various sections of the company	
4	It is a comprehensive framework to monitor and evaluate the efficiency of enterprise resource planning system processes within the company's position.	

Table 3: Measure Implementation of the ERP System Phases

No	Statement	Reference
	Realization Phase	
1	The verification of the completion of various sections of operations to be performed in the company's enterprise resource planning system.	Overcoming Knowledge Management Challenges During ERP Implementation
2	The verification of the correctness and completeness of the data entered into the company's enterprise resource planning system.	
3	The verification of the completion of the necessary steps for the implementation of the enterprise resource planning system.	
4	It is verified get targets provided by different departments of the enterprise resource planning system.	
	Transition Phase	
1	It is determined by the transition from the old system to a strategic	

	enterprise resource planning system.	
2	The size of the different sections in the selection processes impact Navigation Enterprise Resource Planning (ERP) strategy process.	
3	It is to provide the necessary resources to implement the company's enterprise resource planning system	
4	The transition to the new system progressively.	
	Operation Phase	
1	The use of quality standards in all enterprise resource planning system operations.	
2	The staff training on the use of enterprise resource planning system within the company.	
3	It has been revised procedures and operations of different departments of the company.	
4	All the processes and stages of implementation of the enterprise resource planning system within the company documented.	

3.9. Measuring the Variables of the Study

Models of the study consists of two variables (Demographic data, Key Success Factors, Implementation of the ERP system phases) was measured each variable of those variables with a number of statements as described in the table below:

Table 4: Measuring the Variables of the Study

No	Variables	Number of statement
1	Demographic data	8
2	Key Success Factors	6
3	Implementation of the ERP system phases	3
	Total	**17**

Source: Prepared by the researcher (2016)

3.10. The Accuracy and Consistency

Scale accuracy and consistency of the results to the extent it is free from errors indicate and thus ensure coherence and consistency of the results when various elements in it measure.

Based on the research sample size, and the guidelines as suggested by (Hair, Et al., 2013), this sample size satisfies at least 59 observations are needed to achieve a statistical power of 80% for detecting R-square values of at least 0.25 (that is, 10 x 3 structural paths = 30 business customers), and the "10 times rule" (Thompson, Barclay, & Higgins, 1995). The "10 times rule" suggests that sample size should at least equal to "10 times the maximum number of structural paths pointing at a latent variable anywhere in the PLS path model".

3.11. Statistical Analysis Methods

The statistical analysis methods used PLS-SEM program, the PLS-SEM can be designed as a hierarchical components model (HCM) that includes the observable lower-order components (LOCs) and unobservable higher-order components (HOCs) to reduce model complexity and make it more theoretical parsimony, to analyze the study and use of descriptive statistics, deductive statistics to analyze the data.

Descriptive Statistics

The descriptive statistics to convert the raw data into a form that can be used to describe a group of factors or conditions in a certain position. This is done by arranging and manipulate data, and descriptive statistics were used distributions

repeatability, function are also given the use of certain tendency standards central and dispersion which is the arithmetic mean and standard deviation for the analysis of the independent variables of the study and dependent variables.

Deductive Statistics

Some statistics were used deductive, correlation factor to determine the relationship between variables coefficient the study, regression analysis to see how much impact that caused the independent variable on the dependent variables.

Table 5: Composite Reliability

	Composite Reliability	**(AVE)**
TMGS	0.897	0.813
PSC	0.953	0.910
BPREE	0.872	0.773
TESK	0.901	0.820
IMRM	0.809	0.679
MOPR	0.825	0.612
Realization	0.893	0.807
Transition	0.866	0.764
Operations	0.888	0.666

3.12. Summary

Research design, The Proposed Model, Hypotheses Development, Research Methods, The Study Population, The Study Sample, Sources of Collecting Data, Sources of the Survey, Measuring the Variables of the Study, test The Accuracy and Consistency, Statistical Analysis Methods, used a descriptive statistics, deductive statistics to analyze the data.

Chapter Four - Finding

This chapter aims to achieve several goals to identify the initial data and test the quality data, test the validity of hypotheses that have been grown in the early stages of research and achieve those goals have been using a number of statistical methods descriptive and inferential to identify the data has been identify and respond distributions iterative demographic data and calculate the Average Variance Extracted mean deviation standard rate , was to test the quality of the data using factor analysis and used instead of the composite reliability Cronbach's alpha to assess the reliability of internal consistency of the measurement model, and test hypotheses have been used multiple regression coefficient.

Prior to running PLS model estimation in SmartPLS, enter manually type the questionnaire data into Microsoft Excel with the names of those indicators (TMGS, SC, BPREE, TESK, IMRM, MOPR, RE, TR and OP) being placed in the first row of an Excel spreadsheet. Each row represents an individual questionnaire response, with measurement scale from (Strongly Agree, Agree, neutral, disagree and strongly disagree).

Since there are 61 responses, there should be 62 rows in the spreadsheet. The file has to be saved in the specific “CSV (Comma Delimited)” format in Excel because SmartPLS cannot import .xls or .xlsx files directly. To do this, go to the “File” menu in Excel, and choose “CSV (Comma Delimited)” as the file format type to save. See Wong (2013) for step-by-step instructions.

4.1. The Response Rate

In this research, the number of distributed questionnaires in Giad departments, there are 74 samples, Financial Department 17, Material Management 16, Human Resource department 11, Production department 14 and Sales and Distribution 16. The number of received questionnaires 62, the number of non- received 12 and one questionnaire is discarded. The sample response Rate Percentage is 83.8%, the sample analyzed 61 questionnaires Percentage 82.4 %, the table below shows that:

Table 6: The Response Rate

Item	The sample response	Percent
Number of distributed questionnaires	74	100 %
Number of received questionnaires	62	83.8 %
Number of non- received questionnaires	12	16.2 %
Number of valid questionnaires for analysis	61	82.4 %

Source: Prepared by the researcher from the field study data 2016

3.1. Demographic Data Analysis

Demographic data for the study sample include eight variables of a type, age, educational qualification, Career Level, Years of Experience, Specialization, level of knowledge in information technology and knowledge about ERP system.

Of the most important characteristics of the study sample that the percentage of males is higher than the proportion of females reaching male ratio of (85.2 %), while the proportion of females (14.8 %).

For their age most of the study sample aged between the ages of (20 - 30) which accounted for (23 %), the sample between the ages of (31 - 40) which accounted for (59 %), the sample between the ages of (41 - 50) which accounted for (11.5 %), the rest of the sample between the ages of (51) years and above which accounted for (6.6%).

For educational qualifications, we find that the vast majority of the study sample are Secondary they have accounted for 4.9 %, while the graduate they have accounted for 62.3 %, and the rest of the sample are the Postgraduate they have accounted for 32.8 %.

For career Level, we find that the majority of the study sample are the middle management have accounted for 16.4 %, the top management have accounted for 4.9 %, the executive management have accounted for 31.1 % and the rest of the sample are the other career have accounted for 47.5 %.

For the years of experience we find that the majority of the study sample are the experience between 6 - 10 which accounted for 52.5%, the rest of the sample are the experience between 11–15 which have accounted for 21.5%, less than 5 years' experience have accounted for 18%, the experience between 16 - 20 have accounted for 4.9% and more than 21 years' experience have accounted for 3.3%.

For the Specialization of the business functionality, we find that the majority of the study sample are the Finance department which accounted for 13.1%, the production department have accounted 26.2%, the logistics department have accounted for 18%, the human resources department have accounted for 21.3%

and the rest of the sample are the marketing department have accounted for 21.3%.

For which level of knowledge in information technology for each users, we find that the majority of the study sample are the Excellent level which accounted for 36.1 %, the Good level have accounted for 62.3 % and t the rest of the sample are the Middle level have accounted for 1.6 %.

For which level of knowledge about ERP system for each users, we find that the majority of the study sample yes which accounted for 98.4 % and the rest of the sample no which accounted for 1.6 %.

The table below shows the Demographic data analysis:

Table 7: Demographic Data for the Study Sample

Variable	Sample	The Number	Percentage
Type	Male	52	85.2%
	Female	9	14.8%
Total		**61**	**100%**
Age	20 - 30	14	23%
	31 - 40	36	59%
	41 - 50	7	11.5%
	More than 51	4	6.6%
Total		**61**	**100%**
Educational qualification	Secondary	3	4.9%
	graduate	38	62.3%
	Postgraduate	20	32.8%
Total		**61**	**100%**
Career Level	Middle management	10	16.4%
	Top management	3	4.9%
	Executive management	19	31.1%
	others	29	47.5%
Total		**61**	**100%**
Years of Experience	5 and less	11	18%
	6 - 10	32	52.5%

	11 - 15	13	21.5%
	16 - 20	3	4.9%
	More than 21	2	3.3%
Total		**61**	**100%**
Specialization	Finance Department	8	13.1%
	Production Department	16	26.2%
	Logistics Department	11	18%
	HR Department	13	21.3%
	Marketing Department	13	21.3%
Total		**61**	**100%**
level of knowledge in IT	Excellent	22	36.1%
	Good	38	62.3%
	Middle	1	1.6%
Total		**61**	**100%**
knowledge ERP system	Yes	60	98.4%
	No	1	1.6%
Total		**61**	**100%**

Source: Prepared by the researcher from the field study data 2016

4.2.Internal Consistency Reliability

The verification of the reliability of internal consistency traditionally using Cronbach's alpha (Cronbach's alpha), but in the analysis using PLS-SEM program is used instead of the composite reliability Cronbach's alpha (Cronbach's alpha) to assess the reliability of internal consistency of the measurement model.

The PLS model in SmartPLS based on the conceptual framework mentioned earlier. By using the drawn indicators from lower-order components (TMGS, PSC, BPREE, TESK, IMRM and MOPR) are deployed again for the corresponding higher-order component (RE, TR and OP). Once the model is drawn, the indicator data can be imported into the SmartPLS software.

The PLS-SEM algorithm is converged within the guideline suggested by (Hair et al., 2013). The PLS-SEM algorithm should converge in iteration lower

than the maximum number of iterations as set in the algorithm parameter settings; in this PLS Path model estimation, the algorithm successfully converged after Iteration.

Before the properly assess the path coefficients in the structural model, the first examine the indicator reliability, internal consistency reliability, discriminant validity, and convergent validity of the reflective measurement model to ensure they are satisfactory (Wong, 2013).

In this research, reliability composite shown in Table (8) of the composite and the values (respectively) of the composite, indicating high levels of reliability and internal consistency, indicate previous research that there is a need to level 0.60 or higher up to show the reliability composite in order to be satisfactory in the field of exploratory research but not exceeding level (0.95) (Hair et al., 2013).

Table 8: Variable Reliability and Validity

		Composite Reliability	Average Variance Extracted (AVE)
TMGS	A	0.897	0.813
PSC	B	0.953	0.910
BPRE	C	0.872	0.773
TESK	D	0.901	0.820
IMRO	E	0.809	0.679
MOPR	F	0.825	0.612
Realization	GG	0.893	0.807
Transition	KK	0.866	0.764
Operations	LL	0.888	0.666

4.3.Convergent Validity

Convergent validity refers to the model's ability to explain the indicator's variance. The AVE can provide evidence for convergent validity. refers to the need to provide a higher level of (0.5) for (AVE) as evidence of convergent validity. All of these variables exceeded this level and met validity of discriminant and other reliability tests, they are kept in the model. The AVE for the latent variables (Realization, Transition and Operations) is (0.807, 0.764 and 0.666) respectively, well above the required minimum level of 0.50. Therefore, the measures of the three reflective variables can be said to have high levels of convergent validity (Ken Kwong-Kay Wong,2016).

4.4.Discriminant Validity

Fornell-Larcker criterion look to assess the validity of differentiation and can be applied in PLS-SEM. Another method is cross-loading examination, in which the indicator's loading to its latent variable should be higher than that of other variables. Establish the discriminant validity, the square root of average variance extracted (AVE) of each latent variable should be larger than the latent variable correlations (LVC). Table 4 clearly shows that discriminant validity is met for this research because the square root of AVE for TM C&S, SOP, BPREE, TESK, IMRM and M&EP are much larger than the corresponding LVC (Ken Kwong-Kay Wong,2016).

Table 9: Discriminant Validity

Fornell-Larcker Criterion

	Latent Variable Correlations (LVC)							Discriminant Validity met? (Square root of AVE>LVC?)		
	TMGS	**PSC**	**BPRE**	**TESK**	**IMRO**	**MOPR**	**Realization**	**Transition**	**Operations**	
TMGS	**0.901**									Yes
PSC	0.340	**0.954**								Yes
BPRE	-0.169	0.086	**0.880**							Yes
TESK	0.007	0.047	0.448	**0.906**						Yes
IMRO	0.009	-0.222	0.322	0.162	**0.824**					Yes
MOPR	-0.009	0.032	0.407	0.201	0.470	**0.870**				Yes
Realization	0.056	-0.018	0.658	0.230	0.387	0.517	**0.756**			Yes
Transition	0.167	0.300	0.681	0.531	0.271	0.446	0.575	**0.874**		Yes
Operations	-0.097	-0.084	0.171	0.118	0.589	0.447	0.357	0.205	**0.816**	Yes

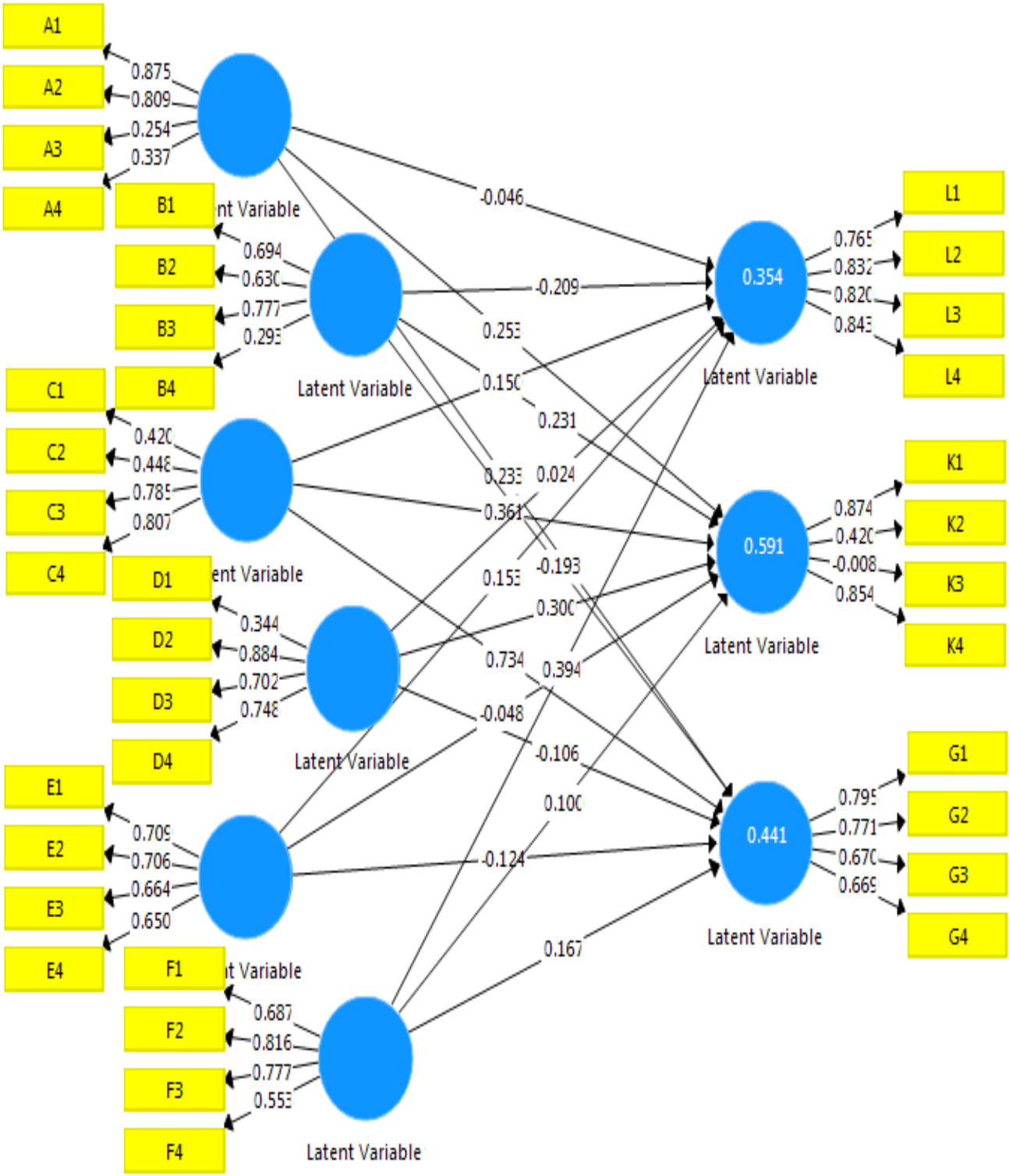
Note: The square root of AVE values is shown on the diagonal and printed in italics; non-diagonal elements are the latent variable correlations (LVC).

Table 10: Outer Loadings - the First Recycling

	TMGS	PSC	BPREE	TEMSK	IMRM	MOPR	RE Phase	TR Phase	OP Phase
A1	**0.875**								
A2	**0.809**								
A3	**0.254**								
A4	**0.337**								
B1		**0.694**							
B2		**0.630**							
B3		**0.777**							
B4		**0.293**							
C1			**0.420**						
C2			**0.448**						
C3			**0.785**						
C4			**0.807**						

D1				**0.344**					
D2				**0.884**					
D3				**0.702**					
D4				**0.748**					
E1								**0.709**	
E2								**0.706**	
E3								**0.664**	
E4								**0.650**	
F1									**0.687**
F2									**0.816**
F3									**0.777**
F4									**0.553**
G1							**0.795**		
G2							**0.771**		
G3							**0.670**		
G4							**0.669**		
K1						**0.874**			
K2						**0.420**			
K3						**-0.008**			
K4						**0.854**			
L1					**0.765**				
L2					**0.832**				
L3					**0.820**				
L4					**0.843**				

Figure 2: Outer Loadings - the First Recycling



4.5. Indicator Reliability

Since reliability is a condition for validity, indicator reliability is first checked to ensure the associated indicators have much in common that is captured by the latent variable. After examining the outer loadings for all latent variables, they are no indicators removed because their outer loadings are more than the 0.4 threshold level (Hair et al., 2013). Fifteen indicators are found to have loadings between 0.4 ~ 0.7 are:

A3: Senior management is working to allocate sufficient resources to implement the ERP system company.

A4: Contact Person works project implementation ERP system to facilitate the obstacles facing the implementation of the project.

B3: It is determined by the scope of the implementation of the enterprise resource planning system.

B4: Project flexible enterprise resource planning where to accept the change in the operations of the project.

C1: The description of the various sections processes accurately.

C2: The relationship between the different sections are clear and understandable.

D1: Employees within the company are involved in the provision of knowledge for the implementation of the enterprise resource planning system.

D3: The best staff in practice, the members of the team in the implementation of the enterprise resource planning system within the company.

E3: Operations integrated enterprise resource planning system with each other.

E4: Execution time known enterprise resource planning system for members of the system implementation team within the company.

F1: The data entered in the system of enterprise resource planning incomplete.

F4: It is a comprehensive framework to monitor and evaluate the efficiency of enterprise resource planning system processes within the company's position.

G3: The verification of the completion of the necessary steps for the implementation of the enterprise resource planning system.

K2: The size of the different sections in the selection processes impact Navigation Enterprise Resource Planning (ERP) strategy process.

K3: It is to provide the necessary resources to implement the company's enterprise resource planning system

A loading relevance test is therefore performed for these fifteen indicators to see if they should be retained in the model. In a loading relevance test, problematic indicators should be deleted only if their removal from the PLS model leads to an increase of AVE and composite reliability of their variables over the 0.5 thresholds.

As the elimination of these fifteen indicators would result in an increase of Average Variance Extracted (AVE) and composite reliability of their respective latent variable, they are removed from the PLS model.

The remaining indicators are retained because their outer loadings are all 0.7 or higher. An indicator’s outer loading should be 0.708 or above since that number squared (0.7082) equals 0.50, meaning the latent variable should be able

to explain at least 50% of each indicator's variance. The PLS algorithm is re-run. The resulting path model estimation is presented in Figure (3) and the outer loadings of various variables are shown in Table (11).

Figure 3: Outer Loadings - The Latter Recycling

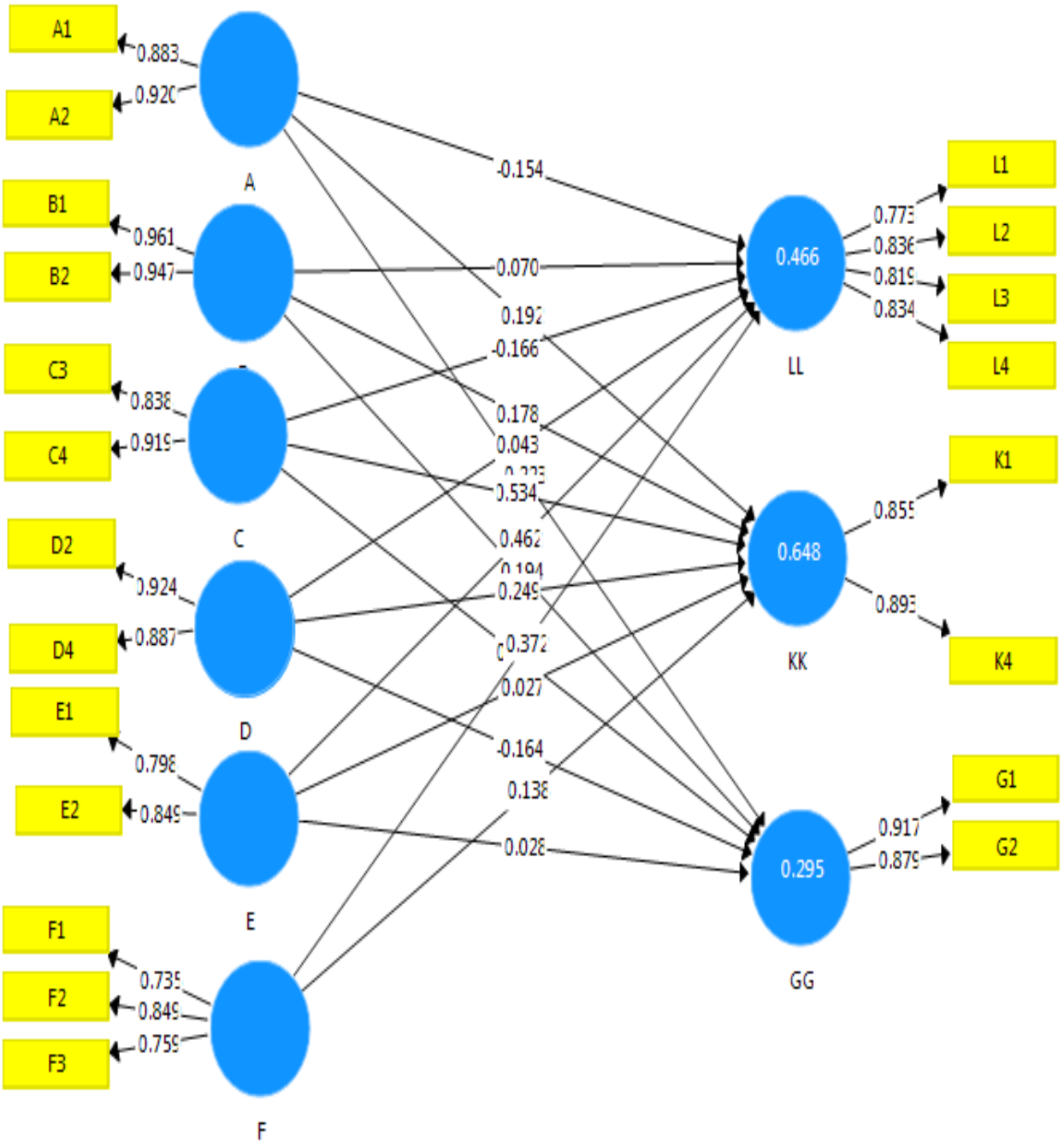


Table 11: Outer Loadings - the Latter Recycling

Variables (Latent Variables) Outer loadings		
No	**Statement**	**Outer Loading**
Key Success Factors		
Top management commitment and support		
A1	Senior management supports the implementation of the ERP system in the company	0.883
A2	The implementation of the ERP system a priority for senior management.	0.920
The scope of ERP Project		
B1	Multiple sections that the project will be applicable to them affect the implementation of the ERP system in the company.	0.961
B2	Multiple processes within departments affect the process of implementation of the ERP system within the company	0.947
Business process re-engineering		
C3	The data has to be transferred to the ERP system company review	0.838
C4	Be sure the old system data transfer to the company ERP system.	0.919
Project team competence and skills		
D2	The executing agency for the project has enough technical knowledge.	0.924
D4	The implementing agency for the project to exchange information with team members.	0.887
Creation of an implementation road map		
E1	The goals of the ERP system has been clearly identified.	0.798
E2	The sequence of ERP system and clear operations.	0.849
Monitoring and evaluation of performance		
F1	The data entered in ERP system are complete.	0.735
F2	Processes that are applied in the ERP system that represents all the different sections that have been identified by the company.	0.849
F3	There are surveillance and continuous assessment of the operations of various sections of the company	0.759

Implementing ERP System		
	Realization phase	
G1	The verification of the completion of various sections of operations to be performed in the company ERP system.	0.917
G2	The verification of the correctness and completeness of the data entered into the company ERP system.	0.879
	Transition phase	
K1	It is determined by the transition from the old system to the ERP system strategy.	0.855
K4	The transition to ERP system progressively.	0.893
	Operations phase	
L1	The use of quality standards in all ERP system operations.	0.773
L2	The staff training on the use of ERP system within the company.	0.836
L3	It has been revised procedures and operations of different departments of the company.	0.819
L4	All the processes and stages of implementation of the ERP system within the company are documented.	0.834

4.6.Evaluation of the Structural Model:

Collinearity Assessment

In addition to checking the measurement model, the structural model has to be properly evaluated before drawing any conclusion. Collinearity is a potential issue in the structural model and that variance inflation factor (VIF) value of 5 or above typically indicates such problem (Hair et al., 2011).

Since SmartPLS does not generate the VIF value, another piece of statistical software such as IBM SPSS has to be utilized. This procedure involves a few easy steps. First, generate the latent variables scores in SmartPLS).

PLS model, (Realization phase 'GG', Transition phase 'KK' and Operations phase 'LL') act as dependent variables because they have arrows (paths) pointing towards them. As such, we need to run two different sets of linear regression to obtain their corresponding VIF values.

(Realization, Transition and Operations) are the dependent variable whereas (TMGS, PSC, BPRE, TESK, IMRO and MOPR) serve as "Independent" variables. The Collinearity diagnostics to obtain the VIF value see Table below.

Table 12: Collinearity Statistics (VIF)

	Realization (VIF) **GG**	Transition (VIF) **KK**	Operations (VIF) **LL**
TMGS	**1.233**	**1.234**	**1.234**
PSC	**1.284**	**1.310**	**1.310**
BPRE	**1.509**	**1.555**	**1.555**
TESK	**1.268**	**1.271**	**1.271**
IMRO	**1.241**	**1.583**	**1.583**
MOPR	**1.463**	**1.479**	**1.479**

The collinearity assessment results are summarized in Table (13). It can be seen that all VIF values are lower than five, suggesting that there is no indicative of collinearity between each set of predictor variables.

Table 13: Collinearity Assessment

	Realization (VIF) GG	Collinearity Problem? (VIF>5?)	Transition (VIF) KK	Collinearity Problem? (VIF>5?)	Operations (VIF) LL	Collinearity Problem? (VIF>5?)
TMGS	**1.233**	No	**1.234**	No	**1.234**	No
PSC	**1.284**	**No**	**1.310**	**No**	**1.310**	**No**
BPRE	**1.509**	**No**	**1.555**	**No**	**1.555**	**No**
TESK	**1.268**	**No**	**1.271**	**No**	**1.271**	**No**
IMRO	**1.241**	**No**	**1.583**	**No**	**1.583**	**No**
MOPR	**1.463**	**No**	**1.479**	**No**	**1.479**	**No**

4.7.Structural Model Analysis

Coefficient of Determination (R2)

The research model and its related hypotheses were assessed with WarpPLS. The models in PLS are estimated by loadings or weights which describe how the observations relate to the unobservables. They are also estimated by the structural relations, whereby values of the unobservables influence values of other unobservables in the model.

A bootstrapping procedure with two hundred resamples was used to generate the t-statistics for the structural paths. Kock (2010) suggests that two hundred resamples is reasonable to obtain adequate standard error estimates.

WarpPLS produces path coefficients with their respective p-values, and R-squared coefficients. In PLS-based SEM analysis, path coefficients are referred to as beta (β) coefficients.

The explanatory power of the structural model is evaluated by examining the squared multiple correlation (R^2) value in the final dependent constructs. The R^2 measures the percentage of variation that is explained by the model. A major part of structural model evaluation is the assessment of coefficient of determination (R^2). In this research, Transition is the main factor of interest. From the PLS diagram are presented in Figure (3), the overall R2 is found to be a strong one. Threshold value of 0.25, 0.5 and 0.7 are often used to describe a weak, moderate, and strong coefficient of determination (Hair at el., 2013).

In this case, it suggests that the two variables Key Success Factors, and implementing ERP System can jointly explain 64.8% of the variance of the endogenous variable Transition. The R^2 value is 0.648; it is shown inside the blue circle of the Transition variable in the PLS diagram are presented in Figure (3). The same model estimation also reveals the R^2 for other latent variable; Operations and Realization are found to jointly explain 29.5% and 46.6% of implementing ERP System variances in this PLS-SEM model.

Path Coefficient

In SmartPLS, the relationships between variables can be determined by examining their path coefficients and related t statistics via the bootstrapping procedure. Select “74” as cases because there are 74 sample in this research. From Table (14), it can be seen that all of the structural model relationships are significant, confirming our various hypotheses about the variable relationships.

The PLS structural model results enable us to conclude that Transition, has the strongest effect on Key Success Factors (0.650).

The PLS diagram are presented in Figure (3) also reveals that the high-order variable, Transition, has strong relationships with its low-order variables, BPRE (0.534), TESK (0.256), TMGS (0.192), PSC (0.178), MOPR (0.138) and IMRO (0.027). This means that the lower-order variables, BPRE, TESK, TMGS, PSC, MOPR and IMRO, are highly correlated for the higher-order variable Key Success Factors to explain more than 50% of each lower-order components (LOC's) variance.

Table 14: Significance Testing Results of the Structural Model

Path Coefficients Hypothesis

	Path:	**Path Coefficients**	***t* Values**	***p* Values**	**Hypothesis**
H1	Key Success Factors →Realization phase	0.560	7.176	0.00	Accepted
H2	Key Success Factors →Transition phase	0.650	10.357	0.00	Accepted
H3	Key Success Factors →Operations phase	0.413	4.803	0.00	Accepted

Table (15) shows the results for variance explained for all the independent variables used in the model. Variance explained for Realization phase, Transition phase and Operations phase for both t Value and p Value were relatively good for some variables, but low in others.

Table 15: Variance Explained the Independent Variables

		t Values	*p Values*	**Hypothesis**
H4	TMGS → Realization phase	0.735	0.464	Accepted
H5	PSC → Realization phase	0.449	0.655	Rejected
H6	BPRE → Realization phase	1.701	0.092	Accepted
H7	TESK → Realization phase.	0.703	0.483	Accepted
H8	IMRO → Realization phase.	0.106	0.915	Rejected
H9	MOPR → Realization phase.	1.296	0.198	Accepted
H10	TMGS → Transition phase	0.838	0.404	Accepted
H11	PSC → Transition phase	0.775	0.440	Accepted
H12	BPRE →Transition phase	1.879	0.063	Accepted
H13	TESK →Transition phase.	1.097	0.275	Accepted
H14	IMRO →Transition phase.	0.038	0.970	Rejected
H15	MOPR →Transition phase.	0.702	0.485	Accepted
H16	TMGS → Operation phase	0.399	0.691	Rejected
H17	PSC → Operation phase	0.367	0.715	Rejected
H18	BPRE →Operation phase	0.284	0.777	Rejected
H19	TESK →Operation phase.	0.074	0.941	Rejected
H20	IMRO →Operation phase.	1.477	0.143	Accepted
H21	MOPR → Operation phase.	0.831	0.408	Accepted

4.8.Summary of Findings – Hypotheses

Table (15) provides a summary of which hypotheses were supported and not supported. Hypotheses 1 (H4 – H9) examined there is a relationship between Key Success Factors and implementing ERP Realization phase. Results suggest that this relationship was positive for TMGS, BPRE, TESK and MOPR, but was not supported the PSC and IMRO.

.Hypotheses 2 (H10 – H15) examined there is a relationship between Key Success Factors and implementing ERP Transition phase. Results suggest that this relationship was positive for TMGS, PSC, BPRE, TESK and MOPR, but was not supported IMRO.

Hypotheses 3 (H16 – H21) examined there is a relationship between Key Success Factors and implementing ERP Operation phase. Results suggest that this relationship was positive for IMRO and MOPR, but was not supported TMGS, PSC, BPRE, and TESK.

Chapter Five - Discussion and Recommendations

This chapter contain five section, first one deals with the most important results that have been reached through the analysis of the study data and discuss these results. Second compare these results with the results of previous studies. Third the implication of theoretical and practical study. Fourth the limitation of the study. Fifth the recommendations for future research and conclusion.

5.1. Research Results

5.2.1. There is a relationship between Key Success Factors and implementing ERP Realization phase. Results suggest that this relationship was positive for TMGS, BPRE, TESK and MOPR, but was not supported the PSC and IMRO.

5.2.2. There is a relationship between Key Success Factors and implementing ERP Transition phase. Results suggest that this relationship was positive for TMGS, PSC, BPRE, TESK and MOPR, but was not supported IMRO.

5.2.3. There is a relationship between Key Success Factors and implementing ERP Operation phase. Results suggest that this relationship was positive for IMRO and MOPR, but was not supported TMGS, PSC, BPRE, and TESK.

5.2. Discussion

5.3.1. Relationship between dimension of Key Success Factors and ERP Realization phase

The research results showed that a correlation between Key Success Factors to implementing ERP system and realization phase, this result confirms the study (Goeun Seo, 2013) top management commitment and support and project scope has strong affect resulted in MIT organization in initiative for ERP implementation and effective vision sharing for business processes reengineering.

And also has strong affect resulted in ENGCO organization in initiative for ERP implementation and clear project goal and objectives. (Impact of parent-subsidiary conflict on ERP implementation, (Jose V. Gavidia, 2016) study noted that a correlation between identify clearly how the new system is going to benefit the subsidiary at all levels, particularly managers and system users and implementing ERP system.

5.3.2. Relationship between dimension of Key Success Factors and ERP Transition phase

The research results showed that the Key Success Factors to implementing ERP system has highly correlated for the transition phase, this result confirms the same result the study (Goeun Seo, 2013) Business process reengineering has weak affect resulted in MIT organization in Significant gaps between MIT and SAP's worldview, Substantial amount of customization and Keep using "shadow systems" . And has limited affect

resulted in ENGCO organization in Effort to adopt global standards from ERP, Substantial amount of customization due to specific requirements for made-to-order production.

Based on the literature review (Al-Sehali, 2000), top management support was one of the most frequently cited critical success factors during ERP implementation. This conclusion was also supported this study. (Impact of parent-subsidiary conflict on ERP implementation, Jose V. Gavidia, 2016) noted that ERP implementation should be a process where all facts, opinions, and visions.

Optimal solutions must be negotiated in an objective, logically driven process of improvement. This focus on objectivity and fact-based logic avoids the distraction caused by personal conflicts in and between parent and subsidiaries.

5.3.3. Relationship between dimension of Key Success Factors and ERP Operation phase

The research results showed that a correlation between Key Success Factors to implementing ERP system and operation phase, this result confirms the same result the study (Goeun Seo, 2013) Team skills has strong affect resulted in MIT organization in Involvement from departments, labs, and centers Concept workshop and user training for understanding ERP. And has weak affect resulted in ENGCO organization in tight project schedule and limited user training before “go-live”.

(Impact of parent-subsidiary conflict on ERP implementation, Jose V. Gavidia, 2016) study showed that ERP implementation projects require strong leadership. Parent-subsidiary conflict can permeate from managers to the entire implementation team and users, conveying a message of disarray and confusion. Parent-subsidiary conflict solving and negotiations should be carried out in the planning stages of the implementation process, reducing visible confrontations later during the implementation process.

Even thought for the users, it should result in an improvement of skills, job enrichment, and a better organization of workflow such that the increased efficiencies become evident.

5.3. Implications

The Theoretical Implications

The study addressed the issue Key Success Factors to implementing ERP system, considering the subject of the newly system that the organizations focusing to use integrated system, the result showing that not all factors are affect to implementing ERP system.

In realization phase only TMGS, BPRE, TESK and MOPR, in transition phase TMGS, PSC, BPRE, TESK and MOPR and in operation phase only IMRO and MOPR are affect to implement ERP system.

The Practical Implications

Our results also have implications for practice. The results show that the perception of the new system that avoid to integrated all business processes are work together in one database, because of that the top manager need to show all reports about procedures in organization for each unit as collective reports.

On the other hand, business unit manager need to control all resource in every section to helps for managing work process in unit.

5.4. Limitations

While the results revealed by our study are interesting, they are also limited to some extent. The study reveals the effect of dispositional Key Success Factors to change for implementing ERP system in one particular organization.

In addition, we did not test any environmental variables within the research model. ERP System complexity, characteristics of the existing system, and the nature of the task may all play important roles in Key Success Factors, but because we investigated only one system these were not controlled for in our proposed model. Moreover, our study captures just a five modules.

This study has the limitations normally associated with any module study, and can be replicated to other locations, industries, and business unit sizes. In

spite of this limitation, the issues revealed by this modules are present in most, if not all, multinational ERP implementations.

In addition, important elements of the implementation vary from module to module, including the functionality of software being implemented, the level of experience of the users and SME in subsidiary of each module, the attitudes of users and SME management, the corporate culture, initial implementation vs upgrade, and so on.

This may limited the generalizability of the results.

5.5. Recommendation

Based on the determinants of this study and the difficulty of the study include all relevant aspects. We recommend that future research is to:

1. Study the Key Success Factors to implementing ERP system in different organization business.
2. Study the impact of implementing ERP System for organizational structure.
3. Study the influence of ERP implementation for business procedures.
4. Study the influence for the post-implementation ERP system in multi-company.

5.6. Conclusion

Based on the case studies' findings, several conclusions were formulated and are presented below. This chapter display the most important results that have been reached through evidence study analysis and discussion those results compared with the previous studies and by explaining the results of the study and discussion has been answered on the research questions about the Key Success Factors to the implementation of the enterprise resource planning system and the impact of each of realization, transition and operation phase, as chapter theoretical and practical study of the effects of the general recommendations of the study and the determinants of the study and recommendations for future studies.

⊗ Appendix

○ Appendix (1) Literature Review

No	Author (Year)	Study Title	Study variables		Methodology	Study results	Determinants of the Study	Recommendations "Future research."
			Independent	Dependent				
1	RAAFAT SAADE , HARSHJOT NIJHER **(2016)**	Critical success factors in ERP implementation	Critical success factors	ERP implementation	qualitative and descriptive	- We focused on the identification of a consolidated CSF set for a successful ERP implementation using case studies in different contexts alone.	- The case studies are not all structured in the same way - Since they are not, different data, sections, content breadth and depth have been reported	- There is a need to not only condense these factors but also be as specific as possible to eliminate overlap, redundancies.
2	YUNG-CHI SHENA, PIH-SHUW CHENB, CHUN-HSIEN WANGA **(2015)**	(ERP) system performance measurement using the quantitative balanced scorecard approach	(ERP) performance measurement	balanced scorecard	Descriptive and analytical	- This study develops an innovative approach by applying the non-additive fuzzy integral to incorporate the BSC dimensions. - Numerous factors that affect ERP performance are embedded in the balanced scorecard.	- In theory, it is difficult to quantify information systems (IS) due to the intangible nature of many of the benefits, such as improved customer satisfaction.	- Compare traditional MADM methods and non-additive fuzzy integral to clarify the impacts to different results led by different basic assumptions.
3	GOEUN SEO **(2013)**	Challenges in Implementing (ERP) system in Large Organizations	Challenges	Implementing ERP	Descriptive and analytical	- Easier access to reliable information by integrating disparate legacy systems and reengineered business processes. - The company in the corporate sector reengineered their business processes	- Research could shift the focus onto what different challenges universities may have in terms of their characteristics, and how to increase the benefits of ERP systems in spite of noted challenges	- Focus onto what different challenges universities may have in terms of their characteristics, and how to increase the benefits of ERP systems in spite of noted challenges
4	GORDON BAXTER **(2010)**	Key issues in ERP system implementation	Key issues	ERP implementation	Exploratory	- Applying traditional methods to an ERP development project does not work. - The earliest stages of the project are most critical.	- There is no silver bullet that can be used to kill off the potential for failure of ERP system development projects.	- If the company decides that the solution is an ERP system, it is important to understand why. - Once the choice of solution has been made, the decision about which ERP software to buy can be considered
5	HOOSHANG M.BEHESHTIA & CYRUS M.BEHESHTI **(2010)**	Improving productivity and firm performance with ERP	Improving productivity	Firm performance with ERP	Exploratory	- Evolved from primarily a manufacturing, materials planning system to an all-around enterprise system that allows for the planning of all resources from materials, equipment, inventory control, employee resources,	- General purpose and industry-oriented systems and state that the general purpose ERP systems are not designed to satisfy the processing requirements of industries with specific needs.	- Considering these measures when evaluating an ERP system will allow management to have a better set of data before a decision is made. - a key factor that should not be overlooked is the ERP ability to improve the operational efficiency.

○ Appendix (2): The Exploratory Study Questionnaire Statements

No	Statements
1	Top management commitment and support.
2	Project scope of the ERP.
3	Existing IT compatibility of the SME.
4	A cost/budget issues.
5	Proper ERP package selection.
6	ERP software selection.
7	The roles of consultants and the interaction between owners.
8	Effective project management methodology.
9	Identification of critical mission processes.
10	Business process re-engineering.
11	Project team competence and skills.
12	Creation of an implementation road map.
13	Proper training needs.
14	Training and involvement end-users.
15	Functional Testing.
16	Open and transparent communication (OTC)
17	Feedback on user satisfaction.
18	Review on implications on time.
19	Defining KPI's.
20	Clear accountability.
21	Appropriate consultants and software suppliers.
22	Strategic goals of the ERP implementation
23	Effective change management.
24	Software design and testing
25	Data accuracy.
26	Cultural and structural changes.
27	Proper documentation and benchmarking.
28	GAP analysis
29	Monitoring and evaluation of performance
30	Detailed Data Migration Plan (DMP)
31	Base point analysis (BPA)
32	IT infrastructure.
33	Consulting services.
34	Conflicts between user departments.

o Appendix (3): The Exploratory Study Questionnaires Result

NO	FACTORS	PRIORITIES		
		1	2	3
1.	Top management commitment and support.	8	0	0
2.	Project scope of the ERP.	7	1	0
3.	Existing IT compatibility of the SME.	4	4	0
4.	A cost/budget issues.	3	3	2
5.	Proper ERP package selection.	3	1	4
6.	ERP software selection.	0	7	1
7.	The roles of consultants and the interaction between owners.	4	4	0
8.	Effective project management methodology.	4	3	1
9.	Identification of critical mission processes.	3	4	1
10.	Business process re-engineering.	7	1	0
11.	Project team competence and skills.	6	1	1
12.	Creation of an implementation road map.	6	1	1
13.	Proper training needs.	2	4	2
14.	Training and involvement end-users.	2	5	1
15.	Functional Testing.	5	3	0
16.	Open and transparent communication (OTC)	4	3	1
17.	Feedback on user satisfaction.	5	3	0
18.	Review on implications on time.	3	4	1
19.	Defining KPI’s.	2	5	1
20.	Clear accountability.	3	4	1
21.	Appropriate consultants and software suppliers.	4	4	0
22.	Strategic goals of the ERP implementation	3	5	0
23.	Effective change management.	5	2	1
24.	Software design and testing	3	4	1
25.	Data accuracy.	1	7	0
26.	Cultural and structural changes.	1	5	2
27.	Proper documentation and benchmarking.	4	4	0
28.	GAP analysis	5	3	0
29.	Monitoring and evaluation of performance	7	1	0
30.	Detailed Data Migration Plan (DMP)	1	7	0
31.	Base point analysis (BPA)	2	6	0
32.	IT infrastructure.	5	2	1
33.	Consulting services.	1	6	1
34.	Conflicts between user departments.	5	3	0

o Appendix (4): Evaluated Key Success Factors

No	Key Success Factors	Weight
1	Top management commitment and support.	8
2	Project scope of the ERP.	7
3	Business process re-engineering.	7
4	Project team competence and skills.	6
5	Creation of an implementation road map.	6
6	Monitoring and evaluation of performance	6

o Appendix (5): The Research Questionnaires

جامعة السودان للعلوم والتكنولوجيا

كلية الدراسات العليا

ماجستير العلوم في إدارة الأعمال

الأخ / العزيز ..... الأخت الفاضلة.....

السلام عليكم ورحمة الله تعالي وبركاته

يسرنا أن نضع بين أيديكم هذه الاستبانة التي صممت لجمع البيانات اللازمة للدراسة التي نقوم بإعدادها استكمالا لمتطلبات الحصول على درجة الماجستير في العلوم في إدارة الأعمال بعنوان:

(التحديات التي يواجها تنفيذ نظام تخطيط موارد المؤسسة) دراسة على عينة مجموعة جياد الصناعية

وتهدف هذه الدراسة إلى التعرف على العوامل التي تؤثر على تنفيذ نظام تخطيط موارد المؤسسة. ونظرا لأهمية رأيكم في هذا المجال نأمل منكم التكرم بالإجابة على أسئلة الاستبانة حيث أن صحة النتائج تعتمد بدرجة كبيرة على صحة إجاباتكم ومشاركتكم ضرورية ورايكم عامل أساسي من عوامل نجاحها.

نحيطكم علما بأن جميع إجاباتكم سوف تحظي بالسرية التامة ولن تستخدم إلا لأغراض البحث العلمي.

شاكرين لكم حسن تعاونكم وتفضلوا بقبول فايق التقدير والاحترام.

إعداد الطالب / عبد الجبار الصادق عبد الله الفكي

إشراف الدكتور / صديق بلل إبراهيم

أولا: البيانات الديمغرافية

ضع علامة (✓) أمام العبارة المناسبة

1. النوع: ذكر ☐ أنثي ☐
2. العمر: من 20 إلى 30 ☐ من 30 إلى 40 ☐ من 41 إلى 50 ☐ 51 فأكثر ☐
3. المؤهل العلمي: ثانوي ☐ جامعي ☐ ق الجامعي ☐
4. المستوي الوظيفي: إدارة عليا ☐ إدارة وسطي ☐ إدارة إشرافيه ☐ أخري ☐
5. سنوات الخبرة: 5 سنة فأقل ☐ من 6 إلى 10 ☐ من 11 إلى 15 ☐ من 16 إلى 20 ☐ 21 سنه فأكثر ☐
6. التخصص: الإنتاج ☐ الإمداد ☐ الموارد البشرية ☐ التسويق ☐ المالية ☐
7. مستوي معرفتك بتقنية المعلومات: ممتاز ☐ جيد ☐ وسط ☐
8. هل لديك معلومة عن نظام تخطيط موارد المؤسسة (ERP) نعم ☐ لا ☐

ثانياً: البيانات الأساسية

ضع علامة (✓) داخل المربع المناسب

الرقم		أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
العوامل المقاومة						
دعم والتزام الإدارة العليا						
1	تدعم الإدارة العليا تنفيذ نظام تخطيط موارد المؤسسة في الشركة.					
2	يشكل تنفيذ نظام تخطيط موارد المؤسسة أولوية للإدارة العليا					
3	تعمل الإدارة العليا على تخصيص موارد كافية لتنفيذ نظام تخطيط موارد المؤسسة بالشركة.					
4	يعمل المسؤول من مشروع تنفيذ نظام تخطيط موارد المؤسسة على تسهيل العقبات التي تواجه تنفيذ المشروع.					
نطاق مشروع نظام تخطيط موارد المؤسسة						
1	تعدد الأقسام التي سيتم تطبيق المشروع عليها يؤثر في تنفيذ نظام تخطيط موارد المؤسسة بالشركة.					
2	تعدد العمليات داخل الأقسام تؤثر في عملية تنفيذ نظام تخطيط موارد المؤسسة داخل الشركة.					
3	يتم تحديد نطاق تنفيذ نظام تخطيط موارد المؤسسة.					
4	مشروع تخطيط موارد المؤسسة مرن حيث يتقبل التغيير في عمليات المشروع.					
عملية إعادة هندسة العمليات						
1	يتم وصف عمليات الأقسام المختلفة بشكل دقيق.					
2	العلاقة بين الأقسام المختلفة واضحة ومفهومة.					
3	تمت مراجعة البيانات التي سيتم نقلها لنظام تخطيط موارد المؤسسة بالشركة.					
4	يتم التأكد من نقل بيانات النظام القديم إلى نظام تخطيط موارد المؤسسة بالشركة.					
مهارات فريق المشروع						
1	الموظفين داخل الشركة يشاركون في تقديم المعرفة لتنفيذ نظام تخطيط موارد المؤسسة.					

2	الجهة المنفذة للمشروع لديها المعرفة التقنية الكافية.					
3	أفضل الموظفين من الناحية العملية أعضاء في فريق تنفيذ نظام تخطيط موارد المؤسسة داخل الشركة.					
4	تقوم الجهة المنفذة للمشروع بتبادل المعلومات مع أعضاء الفريق.					
طريقة التنفيذ						
1	أهداف نظام تخطيط موارد المؤسسة تم تحديدها بشكل واضح.					
2	تسلسل عمليات نظام تخطيط موارد المؤسسة واضحة.					
3	عمليات نظام تخطيط موارد المؤسسة متكاملة مع بعضها البعض.					
4	زمن تنفيذ نظام تخطيط موارد المؤسسة معلوم لأعضاء فريق تنفيذ النظام داخل الشركة.					
رصد وتقييم الأداء						
1	البيانات المدخلة في نظام تخطيط موارد المؤسسة مكتملة.					
2	العمليات التي تطبق في نظام تخطيط موارد المؤسسة تمثل جميع عمليات الأقسام المختلفة التي تم تحديدها من قبل الشركة.					
3	هناك عمليات مراقبة وتقييم مستمر لعمليات الأقسام المختلفة بالشركة					
4	تم وضع إطار شامل لمراقبة وتقييم كفاءة عمليات نظام تخطيط موارد المؤسسة داخل الشركة.					
تنفيذ نظام تخطيط موارد المؤسسة						
مرحلة التحقق						
1	يتم التحقق من اكتمال عمليات الأقسام المختلفة المراد تنفيذها في نظام تخطيط موارد المؤسسة بالشركة.					
2	يتم التحقق من صحة واكتمال البيانات المدخلة في نظام تخطيط موارد المؤسسة بالشركة.					
3	يتم التحقق من اكتمال الخطوات اللازمة لتنفيذ نظام تخطيط موارد المؤسسة.					
4	يتم التحقق من الحصول على أهداف الأقسام المختلفة التي يوفرها من نظام تخطيط موارد المؤسسة.					
مرحلة الانتقال						
1	يتم تحديد استراتيجية الانتقال من النظام القديم إلى نظام تخطيط موارد المؤسسة.					
2	حجم عمليات الأقسام المختلفة أثر في عملية اختيار استراتيجية الانتقال نظام تخطيط موارد المؤسسة.					
3	يتم توفير الموارد اللازمة لتنفيذ نظام تخطيط موارد المؤسسة بالشركة					
4	تم الانتقال للنظام الجديد بصورة متدرجة.					
مرحلة العمليات						
1	يتم استخدام معايير الجودة في جميع عمليات نظام تخطيط موارد المؤسسة.					
2	يتم تدريب الموظفين على استخدام نظام تخطيط موارد المؤسسة داخل الشركة.					
3	تمت مراجعة إجراءات وعمليات الأقسام المختلفة بالشركة.					
4	يتم توثيق جميع عمليات ومراحل تنفيذ نظام تخطيط موارد المؤسسة داخل الشركة.					

أسماء المحكمين:

د. بدر القاسم بله.

د. حسن علي.

أ. عبد السلام آدم حامد.

Frequency Tables:

Final Results - Path Coefficients

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
TMGS → Realization phase	0.213	0.208	0.134	1.583	0.116
TMGS → Transition phase	0.191	0.204	0.091	2.098	0.038
TMGS → Operations phase	-0.159	-0.124	0.151	1.053	0.295
PSC→ Realization phase	-0.139	-0.127	0.122	1.138	0.258
PSC→ Transition phase	0.179	0.177	0.089	2.006	0.048
PSC→ Operations phase	0.093	0.077	0.114	0.821	0.414
BPREE→ Realization phase	0.632	0.615	0.127	4.990	0.000
BPREE→ Transition phase	0.505	0.528	0.106	4.777	0.000
BPREE→ Operations phase	-0.159	-0.125	0.215	0.739	0.462
TESK→ Realization phase	-0.110	-0.084	0.090	1.216	0.227
TESK→ Transition phase	0.256	0.260	0.101	2.541	0.013
TESK→ Operations phase	0.050	0.023	0.133	0.372	0.710
IMRO→ Realization phase	0.042	0.044	0.103	0.407	0.685
IMRO→ Transition phase	0.023	0.024	0.082	0.278	0.782
IMRO→ Operations phase	0.539	0.511	0.139	3.890	0.000
MOPR → Realization phase	0.268	0.257	0.105	2.564	0.012
MOPR → Transition phase	0.175	0.161	0.104	1.682	0.096
MOPR → Operations phase	0.244	0.252	0.144	1.689	0.094

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
TMGS → Realization phase	0.213	0.208	-0.026	0.435
TMGS → Transition phase	0.191	0.204	-0.011	0.342
TMGS → Operations phase	-0.159	-0.124	-0.423	0.189
PSC → Realization phase	-0.139	-0.127	-0.415	0.096
PSC → Transition phase	0.179	0.177	0.021	0.375
PSC → Operations phase	0.093	0.077	-0.146	0.257
BPREE → Realization phase	0.632	0.615	0.377	0.817
BPREE → Transition phase	0.505	0.528	0.317	0.731
BPREE → Operations phase	-0.159	-0.125	-0.470	0.330
TESK → Realization phase	-0.110	-0.084	-0.246	0.130
TESK→ Transition phase	0.256	0.260	0.064	0.443
TESK → Operations phase	0.050	0.023	-0.276	0.288
IMRO → Realization phase	0.042	0.044	-0.163	0.236
IMRO → Transition phase	0.023	0.024	-0.122	0.157
IMRO → Operations phase	0.539	0.511	0.195	0.734
MOPR. → Realization phase	0.268	0.257	0.057	0.440
MOPR→ Transition phase	0.175	0.161	-0.043	0.336
MOPR→ Operations phase	0.244	0.252	-0.089	0.433

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
TMGS → Realization phase	0.213	0.208	-0.005	-0.026	0.435
TMGS → Transition phase	0.191	0.204	0.012	-0.026	0.333
TMGS → Operations phase	-0.159	-0.124	0.035	-0.462	0.189
PSC → Realization phase	-0.139	-0.127	0.012	-0.474	0.054
PSC → Transition phase	0.179	0.177	-0.002	0.021	0.375
PSC → Operations phase	0.093	0.077	-0.016	-0.146	0.257
BPREE → Realization phase	0.632	0.615	-0.017	0.377	0.817
BPREE → Transition phase	0.505	0.528	0.024	0.251	0.646
BPREE → Operations phase	-0.159	-0.125	0.033	-0.470	0.327
TESK → Realization phase	-0.110	-0.084	0.026	-0.337	0.045
TESK→ Transition phase	0.256	0.260	0.004	0.064	0.443
TESK → Operations phase	0.050	0.023	-0.026	-0.137	0.355
IMRO → Realization phase	0.042	0.044	0.002	-0.163	0.236
IMRO → Transition phase	0.023	0.024	0.001	-0.117	0.157
IMRO → Operations phase	0.539	0.511	-0.028	0.229	0.736
MOPR→ Realization phase	0.268	0.257	-0.011	0.057	0.440
MOPR→ Transition phase	0.175	0.161	-0.014	-0.036	0.353
MOPR→ Operations phase	0.244	0.252	0.008	-0.129	0.423

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
A1 ← TMGS	0.877	0.842	0.019	0.962
A2 ← TMGS	0.925	0.890	0.448	0.974
B1 ← PSC	0.961	0.959	0.905	0.991
B2 ← PSC	0.947	0.949	0.886	0.988
C3 ← BPREE	0.851	0.848	0.744	0.914
C4 ← BPREE	0.909	0.910	0.870	0.940
D2 ← TESK	0.921	0.909	0.738	0.964
D4 ← TESK	0.891	0.888	0.708	0.969
E1 ← IMRO	0.809	0.797	0.597	0.909
E2 ← IMRO	0.839	0.838	0.697	0.914
F2 ← MOPR	0.893	0.893	0.830	0.934
F3 ← MOPR	0.847	0.839	0.698	0.915
G1 ← Realization phase	0.795	0.783	0.323	0.918
G2 ← Realization phase	0.722	0.708	0.093	0.892
G4 ← Realization phase	0.747	0.741	0.535	0.970
K1 ← Transition phase	0.855	0.854	0.746	0.909
K4 ← Transition phase	0.892	0.892	0.821	0.937
L1 ← Operations phase	0.779	0.744	0.461	0.887
L2 ← Operations phase	0.838	0.802	0.504	0.915
L3 ← Operations phase	0.817	0.821	0.725	0.889
L4 ← Operations phase	0.829	0.830	0.705	0.914

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
A1 ← TMGS	0.877	0.842	-0.035	-0.494	0.956
A2 ← TMGS	0.925	0.890	-0.035	0.850	0.997
B1 ← PSC	0.961	0.959	-0.002	0.895	0.987
B2 ← PSC	0.947	0.949	0.002	0.775	0.981
C3 ← BPREE	0.851	0.848	-0.003	0.764	0.917
C4 ← BPREE	0.909	0.910	0.001	0.864	0.939
D2 ← TESK	0.921	0.909	-0.012	0.729	0.963
D4 ← TESK	0.891	0.888	-0.003	0.666	0.957
E1 ← IMRO	0.809	0.797	-0.013	0.597	0.909
E2 ← IMRO	0.839	0.838	-0.001	0.670	0.900
F2 ← MOPR	0.893	0.893	0.001	0.827	0.925
F3 ← MOPR	0.847	0.839	-0.007	0.685	0.914
G1 ← Realization phase	0.795	0.783	-0.013	0.139	0.898
G2 ← Realization phase	0.722	0.708	-0.015	-0.064	0.876
G4 ← Realization phase	0.747	0.741	-0.006	0.631	0.980
K1 ← Transition phase	0.855	0.854	-0.002	0.730	0.906
K4 ← Transition phase	0.892	0.892	0.000	0.812	0.933
L1 ← Operations phase	0.779	0.744	-0.035	0.575	0.906
L2 ← Operations phase	0.838	0.802	-0.036	0.594	0.926
L3 ← Operations phase	0.817	0.821	0.005	0.706	0.882
L4 ← Operations phase	0.829	0.830	0.001	0.705	0.897

Outer Weights

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
A1 ← TMGS	0.489	0.475	0.289	1.690	0.094
A2 ← TMGS	0.618	0.591	0.165	3.748	0.000
B1 ← PSC	0.564	0.548	0.057	9.838	0.000
B2 ← PSC	0.484	0.499	0.056	8.671	0.000
C3 ← BPREE	0.502	0.501	0.040	12.695	0.000
C4 ← BPREE	0.630	0.631	0.051	12.428	0.000
D2 ← TESK	0.594	0.580	0.107	5.567	0.000
D4 ← TESK	0.509	0.523	0.103	4.959	0.000
E1 ← IMRO	0.583	0.579	0.078	7.518	0.000
E2 ← IMRO	0.629	0.637	0.080	7.843	0.000
F2 ← MOPR	0.621	0.626	0.059	10.582	0.000
F3 ← MOPR	0.526	0.522	0.051	10.337	0.000
G1 ← Realization phase	0.420	0.417	0.073	5.771	0.000
G2 ← Realization phase	0.349	0.334	0.112	3.123	0.002
G4 ← Realization phase	0.553	0.541	0.127	4.358	0.000
K1 ← Transition phase	0.533	0.531	0.049	10.934	0.000
K4 ← Transition phase	0.610	0.611	0.049	12.549	0.000
L1 ← Operations phase	0.304	0.284	0.058	5.238	0.000
L2 ← Operations phase	0.280	0.274	0.061	4.621	0.000
L3 ← Operations phase	0.352	0.359	0.071	4.979	0.000
L4 ← Operations phase	0.292	0.314	0.060	4.896	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
A1 ← TMGS	0.489	0.475	-0.566	0.714
A2 ← TMGS	0.618	0.591	0.354	0.925
B1 ← PSC	0.564	0.548	0.449	0.690
B2 ← PSC	0.484	0.499	0.375	0.577
C3 ← BPREE	0.502	0.501	0.405	0.569
C4 ← BPREE	0.630	0.631	0.543	0.735
D2 ← TESK	0.594	0.580	0.309	0.776
D4 ← TESK	0.509	0.523	0.328	0.759
E1 ← IMRO	0.583	0.579	0.385	0.724
E2 ← IMRO	0.629	0.637	0.511	0.826
F2 ← MOPR	0.621	0.626	0.500	0.738
F3 ← MOPR	0.526	0.522	0.423	0.618
G1 ← Realization phase	0.420	0.417	0.233	0.513
G2 ← Realization phase	0.349	0.334	-0.043	0.463
G4 ← Realization phase	0.553	0.541	0.355	0.867
K1 ← Transition phase	0.533	0.531	0.430	0.630
K4 ← Transition phase	0.610	0.611	0.530	0.708
L1 ← Operations phase	0.304	0.284	0.127	0.362
L2 ← Operations phase	0.280	0.274	0.145	0.343
L3 ← Operations phase	0.352	0.359	0.262	0.510
L4 ← Operations phase	0.292	0.314	0.211	0.449

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
A1 ← TMGS	0.489	0.475	-0.014	-1.145	0.672
A2 ← TMGS	0.618	0.591	-0.027	0.451	1.068
B1 ← PSC	0.564	0.548	-0.016	0.491	0.710
B2 ← PSC	0.484	0.499	0.016	0.261	0.564
C3 ← BPREE	0.502	0.501	-0.001	0.396	0.562
C4 ← BPREE	0.630	0.631	0.001	0.543	0.735
D2 ← TESK	0.594	0.580	-0.014	0.355	0.793
D4 ← TESK	0.509	0.523	0.014	0.314	0.753
E1 ← IMRO	0.583	0.579	-0.004	0.428	0.738
E2 ← IMRO	0.629	0.637	0.008	0.515	0.830
F2 ← MOPR	0.621	0.626	0.005	0.500	0.738
F3 ← MOPR	0.526	0.522	-0.003	0.446	0.619
G1 ← Realization phase	0.420	0.417	-0.004	0.233	0.513
G2 ← Realization phase	0.349	0.334	-0.015	-0.184	0.421
G4 ← Realization phase	0.553	0.541	-0.012	0.427	0.991
K1 ← Transition phase	0.533	0.531	-0.002	0.430	0.630
K4 ← Transition phase	0.610	0.611	0.001	0.534	0.731
L1 ← Operations phase	0.304	0.284	-0.020	0.233	0.382
L2 ← Operations phase	0.280	0.274	-0.006	0.128	0.332
L3 ← Operations phase	0.352	0.359	0.008	0.268	0.512
L4 ← Operations phase	0.292	0.314	0.022	0.198	0.390

Quality Criteria - R Square

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Realization phase	0.560	0.598	0.078	7.176	0.000
Transition phase	0.650	0.692	0.063	10.357	0.000
Operations phase	0.413	0.489	0.086	4.803	0.000
Confidence Intervals					
	Original Sample (O)	Sample Mean (M)	2.5%	97.5%	
Realization phase	0.560	0.598	0.439	0.740	
Transition phase	0.650	0.692	0.567	0.795	
Operations phase	0.413	0.489	0.343	0.670	
Confidence Intervals Bias Corrected					
	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
Realization phase	0.560	0.598	0.038	0.385	0.664
Transition phase	0.650	0.692	0.042	0.498	0.723
Operations phase	0.413	0.489	0.077	0.311	0.501

R Square Adjusted

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Realization phase	0.511	0.553	0.087	5.895	0.000
Transition phase	0.611	0.658	0.070	8.764	0.000
Operations phase	0.347	0.432	0.095	3.638	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
Realization phase	0.511	0.553	0.377	0.711
Transition phase	0.611	0.658	0.519	0.772
Operations phase	0.347	0.432	0.270	0.633

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
Realization phase	0.511	0.553	0.042	0.317	0.626
Transition phase	0.611	0.658	0.047	0.443	0.692
Operations phase	0.347	0.432	0.085	0.234	0.445

F Square

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
TMGS → Realization phase	0.083	0.118	0.114	0.735	0.464
TMGS → Transition phase	0.085	0.130	0.101	0.838	0.404
TMGS → Operations	0.035	0.063	0.087	0.399	0.691
PSC→ Realization phase	0.034	0.057	0.075	0.449	0.655
PSC→ Transition phase	0.071	0.096	0.091	0.775	0.440
PSC→ Operations	0.011	0.027	0.031	0.367	0.715
BPREE→ Realization phase	0.567	0.605	0.333	1.701	0.092
BPREE→ Transition phase	0.454	0.553	0.242	1.879	0.063
BPREE→ Operations	0.027	0.081	0.094	0.284	0.777
TESK→ Realization phase	0.022	0.028	0.031	0.703	0.483
TESK→ Transition phase	0.149	0.190	0.135	1.097	0.275
TESK→ Operations	0.003	0.026	0.045	0.074	0.941
IMRO→ Realization phase	0.003	0.020	0.026	0.106	0.915
IMRO→ Transition phase	0.001	0.016	0.026	0.038	0.970
IMRO→ Operations	0.335	0.370	0.227	1.477	0.143
MOPR → Realization phase	0.114	0.125	0.088	1.296	0.198
MOPR → Transition phase	0.061	0.083	0.087	0.702	0.485
MOPR → Operations	0.070	0.111	0.085	0.831	0.408

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
TMGS → Realization phase	0.083	0.118	0.001	0.394
TMGS → Transition phase	0.085	0.130	0.000	0.360
TMGS → Operations	0.035	0.063	0.000	0.295
PSC → Realization phase	0.034	0.057	0.000	0.208
PSC → Transition phase	0.071	0.096	0.003	0.315
PSC → Operations	0.011	0.027	0.000	0.099
BPREE → Realization phase	0.567	0.605	0.130	1.296
BPREE → Transition phase	0.454	0.553	0.176	0.995
BPREE → Operations	0.027	0.081	0.000	0.321
TESK → Realization phase	0.022	0.028	0.000	0.106
TESK→ Transition phase	0.149	0.190	0.009	0.474
TESK → Operations	0.003	0.026	0.000	0.153
IMRO → Realization phase	0.003	0.020	0.000	0.074
IMRO → Transition phase	0.001	0.016	0.000	0.092
IMRO → Operations	0.335	0.370	0.037	0.877
MOPR→ Realization phase	0.114	0.125	0.005	0.325
MOPR→ Transition phase	0.061	0.083	0.002	0.274
MOPR→ Operations	0.070	0.111	0.003	0.261

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
TMGS → Realization phase	0.083	0.208	0.125	-0.244	0.209
TMGS → Transition phase	0.085	0.204	0.119	-0.026	0.171
TMGS → Operations	0.035	-0.124	-0.159	-0.096	0.236
PSC → Realization phase	0.034	-0.127	-0.161	-0.034	0.180
PSC → Transition phase	0.071	0.177	0.107	-0.039	0.099
PSC → Operations	0.011	0.077	0.065	-0.311	0.160
BPREE → Realization phase	0.567	0.615	0.049	0.199	0.729
BPREE → Transition phase	0.454	0.528	0.074	0.251	0.580
BPREE → Operations	0.027	-0.125	-0.152	-0.254	0.375
TESK → Realization phase	0.022	-0.084	-0.105	-0.033	0.146
TESK→ Transition phase	0.149	0.260	0.111	-0.066	0.234
TESK → Operations	0.003	0.023	0.020	-0.323	0.222
IMRO → Realization phase	0.003	0.044	0.041	-0.177	0.151
IMRO → Transition phase	0.001	0.024	0.023	-0.212	0.140
IMRO → Operations	0.335	0.511	0.176	0.103	0.425
MOPR→ Realization phase	0.114	0.257	0.143	0.010	0.200
MOPR→ Transition phase	0.061	0.161	0.100	-0.123	0.145
MOPR→ Operations	0.070	0.252	0.181	-0.266	0.183

Average Variance Extracted (AVE)

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
TMGS	0.812	0.788	0.094	8.653	0.000
PSC	0.910	0.910	0.044	20.724	0.000
BPREE	0.775	0.775	0.044	17.493	0.000
TESK	0.821	0.811	0.056	14.544	0.000
IMRO	0.679	0.673	0.073	9.305	0.000
MOPR	0.757	0.753	0.050	15.065	0.000
Realization phase	0.571	0.576	0.077	7.432	0.000
Transition phase	0.764	0.763	0.041	18.852	0.000
Operations phase	0.666	0.648	0.074	8.986	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
TMGS	0.812	0.788	0.402	0.876
PSC	0.910	0.910	0.802	0.977
BPREE	0.775	0.775	0.691	0.853
TESK	0.821	0.811	0.694	0.907
IMRO	0.679	0.673	0.528	0.814
MOPR	0.757	0.753	0.632	0.835
Realization phase	0.571	0.576	0.358	0.689
Transition phase	0.764	0.763	0.687	0.828
Operations phase	0.666	0.648	0.496	0.766

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
TMGS	0.812	0.788	-0.024	0.722	0.894
PSC	0.910	0.910	0.001	0.799	0.964
BPREE	0.775	0.775	0.000	0.678	0.847
TESK	0.821	0.811	-0.010	0.711	0.917
IMRO	0.679	0.673	-0.006	0.533	0.814
MOPR	0.757	0.753	-0.004	0.615	0.827
Realization phase	0.571	0.576	0.005	0.338	0.668
Transition phase	0.764	0.763	0.000	0.687	0.823
Operations phase	0.666	0.648	-0.018	0.542	0.773

Composite Reliability

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
TMGS	0.896	0.870	0.115	7.782	0.000
PSC	0.953	0.953	0.025	38.335	0.000
BPREE	0.873	0.872	0.029	30.484	0.000
TESK	0.901	0.894	0.036	25.269	0.000
IMRO	0.809	0.801	0.054	15.094	0.000
MOPR	0.862	0.858	0.034	25.525	0.000
Realization phase	0.799	0.789	0.086	9.293	0.000
Transition phase	0.866	0.865	0.026	32.752	0.000
Operations phase	0.888	0.875	0.044	20.278	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
TMGS	0.896	0.870	0.427	0.934
PSC	0.953	0.953	0.890	0.989
BPREE	0.873	0.872	0.817	0.921
TESK	0.901	0.894	0.814	0.951
IMRO	0.809	0.801	0.683	0.897
MOPR	0.862	0.858	0.773	0.910
Realization phase	0.799	0.789	0.498	0.868
Transition phase	0.866	0.865	0.815	0.906
Operations phase	0.888	0.875	0.791	0.929

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
TMGS	0.896	0.870	-0.026	0.840	0.944
PSC	0.953	0.953	0.000	0.888	0.982
BPREE	0.873	0.872	-0.001	0.808	0.917
TESK	0.901	0.894	-0.008	0.830	0.957
IMRO	0.809	0.801	-0.008	0.692	0.898
MOPR	0.862	0.858	-0.004	0.759	0.905
Realization phase	0.799	0.789	-0.011	0.498	0.866
Transition phase	0.866	0.865	-0.001	0.815	0.903
Operations phase	0.888	0.875	-0.013	0.833	0.932

Rho_A

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
TMGS	0.801	0.682	1.345	0.595	0.553
PSC	0.917	0.939	0.120	7.657	0.000
BPREE	0.738	0.746	0.071	10.346	0.000
TESK	0.796	0.873	0.309	2.571	0.012
IMRO	0.531	0.521	0.172	3.092	0.003
MOPR	0.694	0.700	0.095	7.288	0.000
Realization phase	0.640	0.639	0.135	4.751	0.000
Transition phase	0.700	0.711	0.070	9.946	0.000
Operations phase	0.837	0.840	0.051	16.522	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
TMGS	0.801	0.682	-2.501	1.381
PSC	0.917	0.939	0.768	1.087
BPREE	0.738	0.746	0.589	0.862
TESK	0.796	0.873	0.665	1.275
IMRO	0.531	0.521	0.125	0.776
MOPR	0.694	0.700	0.456	0.839
Realization phase	0.640	0.639	0.387	0.783
Transition phase	0.700	0.711	0.561	0.831
Operations phase	0.837	0.840	0.742	0.917

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
TMGS	0.801	0.682	-0.119	-2.501	1.326
PSC	0.917	0.939	0.022	0.710	0.977
BPREE	0.738	0.746	0.008	0.469	0.847
TESK	0.796	0.873	0.077	0.634	0.880
IMRO	0.531	0.521	-0.009	0.065	0.773
MOPR	0.694	0.700	0.006	0.386	0.797
Realization phase	0.640	0.639	-0.001	0.350	0.766
Transition phase	0.700	0.711	0.010	0.549	0.808
Operations phase	0.837	0.840	0.003	0.711	0.911

Cronbach's Alpha

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
TMGS	0.772	0.765	0.058	13.365	0.000
PSC	0.901	0.900	0.056	16.155	0.000
BPREE	0.713	0.710	0.073	9.821	0.000
TESK	0.783	0.770	0.077	10.106	0.000
IMRO	0.529	0.502	0.167	3.172	0.002
MOPR	0.681	0.671	0.091	7.518	0.000
Realization phase	0.639	0.641	0.085	7.492	0.000
Transition phase	0.692	0.690	0.069	10.088	0.000
Operations phase	0.833	0.815	0.061	13.578	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
TMGS	0.772	0.765	0.645	0.858
PSC	0.901	0.900	0.753	0.977
BPREE	0.713	0.710	0.560	0.829
TESK	0.783	0.770	0.625	0.897
IMRO	0.529	0.502	0.113	0.772
MOPR	0.681	0.671	0.427	0.805
Realization phase	0.639	0.641	0.437	0.769
Transition phase	0.692	0.690	0.546	0.794
Operations phase	0.833	0.815	0.686	0.899

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
TMGS	0.772	0.765	-0.007	0.649	0.864
PSC	0.901	0.900	-0.001	0.751	0.971
BPREE	0.713	0.710	-0.003	0.534	0.822
TESK	0.783	0.770	-0.013	0.625	0.897
IMRO	0.529	0.502	-0.027	0.127	0.773
MOPR	0.681	0.671	-0.010	0.384	0.791
Realization phase	0.639	0.641	0.002	0.330	0.743
Transition phase	0.692	0.690	-0.002	0.546	0.794
Operations phase	0.833	0.815	-0.018	0.730	0.902

Heterotrait-Monotrait Ratio (HTMT)

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
PSC → TMGS	0.399	0.407	0.147	2.716	0.008
BPREE → TMGS	0.226	0.283	0.130	1.739	0.085
BPREE → PSC	0.103	0.186	0.103	1.000	0.320
TESK → TMGS	0.038	0.157	0.078	0.486	0.628
TESK → PSC	0.134	0.198	0.088	1.530	0.129
TESK → BPREE	0.592	0.602	0.159	3.724	0.000
IMRO → TMGS	0.040	0.280	0.161	0.249	0.804
IMRO → PSC	0.333	0.451	0.341	0.979	0.330
IMRO → BPREE	0.528	0.580	0.225	2.344	0.021
IMRO → TESK	0.256	0.404	0.246	1.038	0.302
MOPR → TMGS	0.172	0.237	0.077	2.226	0.028
MOPR → PSC	0.182	0.253	0.117	1.551	0.124

MOPR → BPREE	0.572	0.564	0.132	4.336	0.000
MOPR → TESK	0.271	0.295	0.146	1.861	0.066
MOPR → IMRO	0.791	0.875	0.329	2.405	0.018
Realization phase → TMGS	0.108	0.278	0.124	0.874	0.384
Realization phase → PSC	0.122	0.233	0.120	1.016	0.312
Realization phase → BPREE	0.933	0.917	0.157	5.936	0.000
Realization phase → TESK	0.286	0.371	0.149	1.927	0.057
Realization phase → IMRO	0.621	0.707	0.326	1.908	0.059
Realization phase → MOPR	0.721	0.706	0.119	6.066	0.000
Transition → TMGS	0.232	0.268	0.116	2.001	0.048
Transition → PSC	0.366	0.382	0.113	3.230	0.002
Transition → BPREE	0.937	0.952	0.083	11.308	0.000
Transition → TESK	0.721	0.725	0.136	5.299	0.000
Transition → IMRO	0.457	0.517	0.207	2.202	0.030
Transition → MOPR	0.649	0.635	0.121	5.346	0.000
Transition → Realization phase	0.814	0.821	0.118	6.922	0.000
Operations → TMGS	0.181	0.262	0.090	2.000	0.048
Operations → PSC	0.099	0.198	0.077	1.282	0.203
Operations → BPREE	0.257	0.328	0.170	1.513	0.133
Operations → TESK	0.241	0.316	0.085	2.825	0.006
Operations → IMRO	0.874	0.966	0.420	2.080	0.040
Operations → MOPR	0.589	0.607	0.108	5.455	0.000
Operations → Realization phase	0.488	0.545	0.254	1.922	0.057
Operations → Transition phase	0.299	0.379	0.127	2.361	0.020

Confidence Intervals

	Original Sample (O)	**Sample Mean (M)**	**2.5%**	**97.5%**
PSC → TMGS	0.399	0.407	0.128	0.686
BPREE → TMGS	0.226	0.283	0.093	0.560
BPREE → PSC	0.103	0.186	0.043	0.423
TESK → TMGS	0.038	0.157	0.049	0.319

TESK → PSC	0.134	0.198	0.038	0.341
TESK → BPREE	0.592	0.602	0.308	0.869
IMRO → TMGS	0.040	0.280	0.044	0.583
IMRO → PSC	0.333	0.451	0.146	0.911
IMRO → BPREE	0.528	0.580	0.247	1.051
IMRO → TESK	0.256	0.404	0.121	0.812
MOPR → TMGS	0.172	0.237	0.092	0.398
MOPR → PSC	0.182	0.253	0.088	0.517
MOPR → BPREE	0.572	0.564	0.334	0.793
MOPR → TESK	0.271	0.295	0.081	0.548
MOPR → IMRO	0.791	0.875	0.518	1.504
Realization phase → TMGS	0.108	0.278	0.074	0.577
Realization phase → PSC	0.122	0.233	0.058	0.476
Realization phase → BPREE	0.933	0.917	0.598	1.185
Realization phase → TESK	0.286	0.371	0.081	0.641
Realization phase → IMRO	0.621	0.707	0.332	1.394
Realization phase → MOPR	0.721	0.706	0.474	0.952
Transition → TMGS	0.232	0.268	0.101	0.523
Transition → PSC	0.366	0.382	0.214	0.608
Transition → BPREE	0.937	0.952	0.821	1.088
Transition → TESK	0.721	0.725	0.458	0.927
Transition → IMRO	0.457	0.517	0.196	0.956
Transition → MOPR	0.649	0.635	0.372	0.853
Transition → Realization phase	0.814	0.821	0.564	1.010
Operations → TMGS	0.181	0.262	0.127	0.483
Operations → PSC	0.099	0.198	0.075	0.356
Operations → BPREE	0.257	0.328	0.133	0.709
Operations → TESK	0.241	0.316	0.176	0.479
Operations → IMRO	0.874	0.966	0.620	1.518
Operations → MOPR	0.589	0.607	0.453	0.811
Operations → Realization phase	0.488	0.545	0.201	0.986
Operations → Transition phase	0.299	0.379	0.176	0.637

Confidence Intervals Bias Corrected

	Original Sample (O)	Sample Mean (M)	Bias	2.5%	97.5%
PSC → TMGS	0.399	0.407	0.008	0.125	0.643
BPREE → TMGS	0.226	0.283	0.057	0.065	0.477
BPREE → PSC	0.103	0.186	0.084	0.038	0.221
TESK → TMGS	0.038	0.157	0.119	0.024	0.024
TESK → PSC	0.134	0.198	0.064	0.033	0.251
TESK → BPREE	0.592	0.602	0.010	0.279	0.864
IMRO → TMGS	0.040	0.280	0.240	0.032	0.032
IMRO → PSC	0.333	0.451	0.117	0.109	0.669
IMRO → BPREE	0.528	0.580	0.052	0.205	0.987
IMRO → TESK	0.256	0.404	0.149	0.092	0.418
MOPR → TMGS	0.172	0.237	0.064	0.065	0.258
MOPR → PSC	0.182	0.253	0.071	0.075	0.309
MOPR → BPREE	0.572	0.564	-0.008	0.337	0.804
MOPR → TESK	0.271	0.295	0.023	0.081	0.548
MOPR → IMRO	0.791	0.875	0.084	0.431	1.376
Realization phase → TMGS	0.108	0.278	0.170	0.045	0.175
Realization phase → PSC	0.122	0.233	0.111	0.028	0.209
Realization phase → BPREE	0.933	0.917	-0.017	0.598	1.185
Realization phase → TESK	0.286	0.371	0.084	0.053	0.512
Realization phase → IMRO	0.621	0.707	0.086	0.314	1.061
Realization phase → MOPR	0.721	0.706	-0.014	0.552	0.980
Transition → TMGS	0.232	0.268	0.036	0.098	0.497
Transition → PSC	0.366	0.382	0.016	0.211	0.591
Transition → BPREE	0.937	0.952	0.015	0.736	1.079
Transition → TESK	0.721	0.725	0.004	0.396	0.925
Transition → IMRO	0.457	0.517	0.060	0.148	0.901
Transition → MOPR	0.649	0.635	-0.014	0.403	0.862
Transition → Realization phase	0.814	0.821	0.007	0.545	1.008
Operations → TMGS	0.181	0.262	0.081	0.126	0.217
Operations → PSC	0.099	0.198	0.100	0.047	0.133

Operations → BPREE	0.257	0.328	0.070	0.124	0.671
Operations → TESK	0.241	0.316	0.075	0.126	0.340
Operations → IMRO	0.874	0.966	0.092	0.572	1.428
Operations → MOPR	0.589	0.607	0.018	0.391	0.788
Operations → Realization phase	0.488	0.545	0.057	0.213	0.988
Operations → Transition phase	0.299	0.379	0.080	0.136	0.497

SRMR

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Saturated Model	0.101	0.069	0.009	11.743	0.000
Estimated Model	0.103	0.072	0.011	9.643	0.000

Confidence Intervals

	Original Sample (O)	**Sample Mean (M)**	**2.5%**	**97.5%**
Saturated Model	0.101	0.069	0.055	0.087
Estimated Model	0.103	0.072	0.055	0.098

D_ULS

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Saturated Model	2.346	1.127	0.282	8.322	0.000
Estimated Model	2.430	1.240	0.374	6.501	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
Saturated Model	2.346	1.127	0.691	1.742
Estimated Model	2.430	1.240	0.698	2.219

D_G

Mean, STDEV, T-Values, P-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Saturated Model	2.026	2.105	0.512	3.955	0.000
Estimated Model	2.061	2.184	0.530	3.893	0.000

Confidence Intervals

	Original Sample (O)	Sample Mean (M)	2.5%	97.5%
Saturated Model	2.026	2.105	1.202	3.124
Estimated Model	2.061	2.184	1.292	3.292

Base Data - Setting

Data file Settings	
Data file	ABDO [61 records]
Missing value marker	none
Data Setup Settings	
Algorithm to handle missing data	Mean Replacement
Weighting Vector	-
PLS Algorithm Settings	
Data metric	Mean 0, Var 1
Initial Weights	1.0
Max. number of iterations	300
Stop criterion	7
Use Lohmoeller settings?	No
Weighting scheme	Path
Bootstrapping Settings	
Complexity	Complete Bootstrapping
Confidence interval method	Bias-Corrected and Accelerated (BCa) Bootstrap
Parallel processing	Yes
Samples	100
Sign changes	No Sign Changes
Significance level	0.05
Test type	Two Tailed
Construct Outer Weighting Mode Settings	
TMGS	Automatic
PSC	Automatic
BPREE	Automatic
TESK	Automatic
IMRO	Automatic
MOPR	Automatic
Realization phase phase	Automatic
Transition phase	Automatic
Operations phase	Automatic

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