SYSTEMATIC APPROACH TO MEASURE COMPUTER BASED INFORMATION SYSTEM ACCEPTANCE IN DECISION MAKING FOR ORGANIZATIONS IN JORDAN

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Abstrak

Penggunaan sistem maklumat berasaskan komputer (CBIS) sebenarnya membantu pembuat keputusan dan memberi kuasa kepada mereka untuk menjalankan keputusan yang diperlukan di tempat kerja mereka. Penerimaan yang kurang menggalakkan terhadap penggunaan sistem maklumat berasaskan komputer dalam organisasi swasta di Jordan, bagaimanapun, membawa kepada pembuatan keputusan yang tidak sesuai di pelbagai peringkat dalam organisasi, yang akhirnya membawa kepada kerugian kos dan masa kepada organisasi. Kajian ini yang berdasarkan Teori Bersepadu Penerimaan dan Penggunaan Teknologi (UTAUT), mempunyai objektif untuk: (1) mengukur tahap penerimaan CBIS dalam membuat keputusan untuk organisasi di Jordan, (2) mengenal pasti atribut (faktor yang relevan) membuat keputusan yang menjejaskan pembuatan keputusan, dan (3) membangunkan model konsep penerimaan dan penggunaan CBIS untuk membuat keputusan dalam organisasi di Jordan. Satu set soal selidik yang terdiri daripada pembolehubah seperti masa, kos, faedah, sumber, risiko, jangka prestasi, jangka usaha, pengaruh sosial, keadaan memudahkan, niat tingkah laku untuk menggunakan CBIS, penggunaan sebenar CBIS, dan proses membuat keputusan CBIS digunakan untuk mengumpul data bagi kajian ini. Populasi adalah organisasi swasta yang berdaftar di Jordan. Sejumlah 642 soal selidik telah diedarkan di mana sebanyak 360 telah diterima kembali dengan kadar maklum balas 56.07%. Teknik Pemodelan persamaan Struktur (SEM) telah digunakan. Semua pembolehubah didapati signifikan kecuali keadaan memudahkan. Kajian ini mencadangkan organisasi supaya mengambil langkah usaha yang mantap untuk melatih pekerja termasuk berkaitan dengan penerimaan dan penggunaan CBIS dalam membuat keputusan.

Kata kunci: Membuat keputusan, Proses membuat keputusan, *Unified theory of acceptance and use of technology.*

Abstract

The use of computer-based information system (CBIS) helps to facilitate decision makers and empowers them to make decisions in their workplace. A lower acceptance regarding the use of CBIS in private organizations in Jordan, however, leads to unsuitable decision making at various organizational level, which eventually incurred cost and time to organizations. This research, which is based on the Unified Theory of Acceptance and Use of Technology (UTAUT), has the following objectives: (1) to measure the acceptance level of CBIS in decision making in organizations in Jordan, (2) to identify the decision making attributes (relevant factors) that affect decision making, (3) to develop a conceptual model of acceptance and use of the CBIS in decision making in organizations in Jordan. A questionnaire consisting of the variables such as time, cost, benefits, resources, risk, performance expectancy, effort expectancy, social influence, facilitating conditions, behavior intention to use CBIS, actual use of CBIS, and decision making process of CBIS, were used to collect the data for this study. The population of the study was private organizations registered in Jordan. A total of 642 questionnaires were distributed with the usable questionnaires of 360 returned, with a response rate of 56.07%. The Structural Equation Modeling (SEM) technique was used to analyze the data. All the proposed variables were significant except facilitating conditions. This study suggests organizations to take concrete steps to train their employees regarding the use, adoption and ultimately acceptance of CBIS in decision making.

Keywords: Decision making, Decision making process, Unified theory of acceptance and use of technology.

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Declaration Associated with this Thesis

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AL-Shakkah, M. & Rozaini, W. (2011b). Computer based information system functions for decision makers in organizations. *International Journal of Computer Science and Information Security. 9*(10), 22- 29.

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Glossary of Terms

Acceptance of Information Technology (IT): The certain willingness within a user group to utilize IT for the tasks it is designed to support.

Computer Based Information System (CBIS): The integration of the hardware, software, data, models, procedures, user interface and end users. In order to, process data into information.

Questionnaire: A composition of written set of questions for respondents to collect their answers, usually used within closed defined alternatives.

Methods: Procedures and techniques used to collect and analyzed data so as to answer research questions or test hypotheses.

Methodology: The strategy or plan of action, processor design which was the reason of using specific methods and combining the use of these methods with outcome of research.

Independent Variable: A variable which influences the dependent variable and explains its variance.

Exogenous Latent Construct: A latent (multi item equivalents) an independent variable which is not affected by other construct in the model. Construct that acts only as a predictor or "cause" for other constructs in the model.

Endogenous Latent Construct: A latent (multi item equivalents) dependent variable which is affected by other constructs in the model. A Construct which is dependent or outcome variable in at least one causal relationship.

Theoretical Framework: A conceptual model, it explains the researcher theory, and make meaning of relationships between several factors which was identified to be important to the problem.

Multicollinearity: The high correlated within the independent variable more than 0.90, this somehow referrer to the nearest one variable to represent another variable or what known as multicollinearity.

SEM: Structural equation modeling which is a multivariate technique combining aspects of multiple regression (examining dependence relationships), and factor analysis (representing unmeasured concepts with multiple variables) to estimate a series of interrelated dependence relationships simultaneously. Also, SEM is interchangeably covariance-based SEM (CB-SEM).

CMIN/DF: Relative chi-square, also called normal chi-square, is the chi-square fit index divided by degrees of freedom, in an attempt to make it less dependent on sample size. AMOS lists relative chi-square as CMIN/DF (chi square/degree of freedom ratio).

RMSEA: Root mean square error of approximation, there is good model fit if RMSEA less than or equal to .05. There is adequate fit if RMSEA is less than or equal to .08. More recently, Hu and Bentler (1999) have suggested RMSEA <= .06 as the cutoff for a good model fit. RMSEA is a popular measure of fit.

CFI: Comparative fix index, close to 1 indicates a very good fit, > 0.9 or close to 0.95 indicates good fit, by convention; CFI should be equal to or greater than .90 to accept the model, CFI is recommended for routine use.

NFI: Normed fit index, also known as the Bentler-Bonett normed fit index, DELTA1, 1 = perfect fit. NFI values above .95 are good, between .90 and .95 acceptable, and below .90 indicates a need to re-specify the model. NFI greater than or equal to 0.9 indicates acceptable model fit.

NNFI (TLI): Non-normed fit index, also called the Bentler-Bonett non-normed fit index, the Tucker-Lewis index, TLI, RHO2, NNFI is similar to NFI, but penalizes for model complexity. NNFI is not guaranteed to vary from 0 to 1. It is one of the fit indexes less affected by sample size. NNFI close to 1 indicates a good fit. TLI greater than or equal to 0.9 indicates acceptable model fit. By convention, NNFI values below .90 indicate a need to re-specify the model.

RFI: Relative fit index, RHO1, is not guaranteed to vary from 0 to 1. RFI close to 1 indicates a good fit.

GFI: Goodness of fit index, a statistic measuring the absolute fit (unadjusted for degrees of freedom) of the combined measurement and structural model to the data. GFI should by equal to or greater than .90 to indicate good fit. GFI is less than or equal to 1. A value of 1 indicates a perfect fit. GFI tends to be larger as sample size increases.

AGFI: Adjusted Goodness of Fit Index, statistic measuring the fit (adjusted for degrees of freedom) of the combined measurement and structural model to the data.

AGFI adjusts the GFI for degree of freedom, resulting in lower values for models with more parameters. AGFI should also be at least .90, close to 1 indicates good fit. AGFI may underestimate fit for small sample sizes. AGFI's use has been declining and it is no longer considered a preferred measure of goodness of fit. AGFI > 0.9 indicates good fit.

RMR: Root Mean Square Residual, statistic assessing the residual variance of the observed variables and how the residual variance of one variable correlates with the residual variance of the other items. the smaller the RMR, the better the model. An RMR of zero indicates a perfect fit. The closer the RMR to 0 for a model being tested, the better the model fit. RMR smaller than 0.05 indicates good fit.

SRMR: Square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model. SRMR < = .05 means good fit, the smaller the SRMR, the better the model fit. SRMR = 0 indicates perfect fit. A value less than .08 is considered good fit. SRMR tends to be lower simply due to larger sample size or more parameters in the model.

AMOS: A SEM software, developed by Dr. Arbuckle, Published by Small Warters and marketed by SPSS as a statistically equivalent tool to LISREL. Details are available at http://www.spss.com/amos/.

First Generation Statistical Techniques: A general term relating to correlation based analyses methods. These methods include linear regression, ANOVA, MANOVA, etc. These techniques require researchers to analyze the item loadings on the latent variables separately from the linkage of the independent variables to the dependent variable.

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Second Generation Data Analysis Techniques: Techniques enabling researchers to answer a set of interrelated research questions. In a single, systematic, and comprehensive analysis. By using modeling the relationships among multiple independent and dependent constructs simultaneously. Such as SEM technique**.**

List of Abbreviations

CBIS	Computer Based Information System
DM	Decision Making
DMP	Decision Making Process
ICT	Information and Communication Technology
IS	Information System
IT	Information Technology
TAM	Technology Acceptance Model
TAM2	Revised Technology Acceptance Model
TAM3	Revised Technology Acceptance Model 2
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behavior
DTPB	Decomposed Theory of Planned Behavior
MM	Motivation Model
IDT	Innovation Diffusion Theory
MPCU	Model of PC Utilization
SCT	Social Cognitive Theory
UTAUT	Unified Theory of Acceptance and Use of Technology
PE	Performance Expectancy
EE	Effort Expectancy
SI	Social Influence
FC	Facilitating Conditions.
BI	Behavioral Intention
AUS	Actual Use
TPS	Transaction Processing System
MIS	Management Information System
AIS	Accounting Information System
DSS	Decision Support System
GDSS	Group Decision Support System
EIS	Executive Information System
IOIS	Intelligence Organizational Information System

EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
MSA	Measure of Sampling Adequacy
KMO	Kaiser-Meyer-Olkin
SEM	Structural Equation Modeling
AMOS	Analysis of Moment Structure

CHAPTER ONE
INTRODUCTION

1.1 Introduction

This chapter outlines the sections through the first chapter of this study. It gives the reader description about the background of the research problem, research objectives, research questions, significance of the study, and organization of chapters.

1.2 Background of the Study

People in the different walks of life have to make decisions almost every day. Such decisions are made for various reasons and at all levels including but not limited to personal, social, economic and political issues. It is thus essential to look into the issue of decision making especially with the latest advancement in technology that has had an impact on the traditional handling of decision making in past decades. Decision processing, in particular, has taken new dimensions worth of study. With the advent of computers, many aspects of life have been deeply revolutionized. In particular, the nature of decision processing has changed, especially when these computers are combined with the repository (database servers) of current, available and needed data. All of this support in making decisions by means of automated systems is now known as computer-based information system (CBIS).

This study is concerned with CBIS by making use of technology adoption (refusal/resistance) and acceptance decisions. This study investigates the acceptance of CBIS in private Jordanian organizations. It is evident from the past studies that adoption and acceptance of CBIS has become an area of academic and practical interest since last few decades. In order to support business decisions in various fields of business such as management, marketing and accounting, ICT organizations in technologically advanced and developed countries and Arab countries are embracing CBIS to make efficient use of technology in order to save their time and cost as well as to increase their profits.

A study conducted in Germany by Vlahos et al. (2004) encouraged managers to use the CBIS systems in decision making in organizations because of the benefits that could be gained by the decision makers through their usage of the CBIS to come with better decisions. Similarly, Persson et al. (2009) promoted the adoption and use of CBIS after thorough understanding to provide support for the decision making in construction companies in Sweden.

In the perspective of Arab countries, a study by Nabali (1991) investigated the application and adoption of Computer-Based Information Systems (CBIS) in the context of hospital information system in the Arab Gulf states. She viewed CBIS as a special case of innovation adoption to manage administrative matters of hospital in an efficient and effective manner. CBIS can substantially contribute in the national development. The role of CBIS has been considered as quite crucial for the policy makers in socioeconomic development of Arab Gulf countries (AGC) (Al-Abdul Gader, 1999). The adoption and significance of management information system (MIS) in the decision making process during crises has been highlighted in the

Directorate General of Border Guard (DGBG) in Saudi Arabia in a study by Al-Zhrani (2010).

1.3 Computer-Based Information System (CBIS) in Jordan

As observed in the case of Arab countries, in the same manner, the increasing interest in the adoption and acceptance of CBIS can be found in private Jordanian organizations. Ismail (2011) emphasized the significance of adoption of marketing information system (MKIS) to support decision making in Royal Jordanian Airlines (RJA). A positive impact of software, information networks and the quality of information on the process of managerial decision-making was found in tourism sector in Jordon by a study conducted by Al-Omari et al. (2012)**.** Al- Dalabeeh and Al- Zeaud (2012) stressed on the significance of adoption of Accounting Information System (AIS) to meet the requirements of modern management of pharmaceutical companies in Jordan. Their study revealed AIS can enable the firms to measure the costs of various activities across various business centers that can be very helpful in business planning and making decisions related to business profitability.

However, along with the growing interest in adoption of CBIS, a few bottlenecks have been found in which hamper the wide and speedy acceptance of CBIS in developing countries such as Jordan. Some of those bottlenecks include: language and cultural barriers, fear or attitudes of using computers, lack of coordination, poor or unavailability of data and lack of support from higher management.

1.4 Problem Statement

Information and Communication Technology (ICT) is an important sector for socioeconomic development of Jordan. There is no denial to the fact that adoption of Computer-Based Information System (CBIS) can render beneficial support to organization in decision making. There is no doubt that decisions affect all people`s lives. Seeking for the best way in the decision making process, gave an insight to the researcher to focus on the issue. We often hear that a decision was not correct in a certain situation, and that if the right decision had been made a lot of money, efforts, and time could have been saved. Organizations are widespread in all communities and the success or failure of organizations affects all levels of people. Thus, the decision making process will definitely produce better decisions for these organizations. For this reason, one wonders why a better way of decision making process is not explored. Therefore, the central focus of this research study is to help decision makers to understand the decision making process and support them to make better decisions in organizations.

The problem statement of this research is three-fold being concerned with the system or the computer-based information system (CBIS), decision making, and the technology acceptance model.

A large number of decision makers lack the knowledge of using the automated CBIS and this makes it hard and problematic for these users, who are willing to learn, to make better decisions through the use of CBIS (Laudon & Laudon, 2005).

The problem of decisions in organizations can be ascribed to users who are not adopting and accepting automated (CBIS) in Jordan for different reasons. Those reasons include: language and cultural barriers, individual ownership of data, lack of cooperation, fear or attitudes of using computers, status, lack of coordination, poor or unavailability of data, and lack of support from higher management (Al-Mahid & Abu-Taieh, 2006).

Computer based information system (CBIS) has been used as a holistic development, and supporting procedure in the decision making process. CBIS actually helps and empowers users to carry out tasks correctly. Past studies have revealed the significance of application and adoption of CBIS in the perspective of Arab countries such as in Bahrain, Kuwait, Oman, Qatar, United Arab Emirates (Al-Abdul Gader, 1999; Nabali, 1991), Saudi Arabia (Al-Abdul Gader, 1999; Nabali, 1991; Al-Gahtani et al.,2007; Al-Zahrani & Goodwin, 2012) and Jordon (Al-Mahid & Abu-Taieh, 2006; Ismail, 2011; Al-Omari et al., 2012; Al- Dalabeeh & Al- Zeaud, 2012).

In order to adopt CBIS, we need to explore an appropriate technology acceptance model which best aligns with the scope of our study. For the last twenty years, a model known as the Technology Acceptance Model (TAM) has been widely used, but it was later realized that TAM cannot be used in certain situations such as voluntary situation. Hence; the need for a unified model has been indispensible. This model was built by Venkatesh, Morris, Davis and Fred in the Unified Theory of Acceptance and Use of Technology (UTAUT), which was developed from previous eight famous models containing TAM (Venkatesh et al., 2003).Al-Gahtani et al. (2007) extended the unified theory of acceptance and use of technology (UTAUT), a model of the user acceptance of IT, conducted a survey on knowledge workers using desktop computer applications on a voluntary basis in Saudi Arabia, examined the relative power of a modified version of UTAUT in determining ‘intention to use’ and ‘usage behavior’. In a study about internet banking, Abu-Shanab and Pearson, (2009) adapted UTAUT for Jordanian banks. An important contribution of their study was the establishment of a well-tested Arabic instrument in the field of technology acceptance as language can significantly impact the results of the instrument. Al-Zahrani and Goodwin (2012) emphasized the adoption and acceptance of UTAUT in electronic Government Services (e- Government) in Saudi Arabia.

Based on the need and significance of CBIS in general and UTAUT in particular for supporting decision making in organizations, two preliminary studies were conducted to have an insight about issues and challenges the study could encounter. The factors of decision making were classified into two groups. The main group was: time, cost, benefit, risk, and resources, while the other group was feasibility, ethics, intangible, and financial impact. Structural interviews (standardized) were conducted by the researcher in five Jordanian organizations for the decision makers who are managers at different managerial levels, to identify the use of CBIS of his research in Jordan. In addition, the concern was to find facts about CBIS in decision making in organizations in Jordan, and to test factors in the proposed model. Based on the interviews, it was observed that only 33% of the respondents had adopted CBIS for their business operations. Thus, the hesitation or inability to use CBIS in decision making was evident from the results of interviews. In addition, past literature has emphasized on the significance of a few factors from UTAUT which can facilitate the use, adoption and acceptance of CBIS in decision making process. Those factors include Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC) (Venkatesh et al., 2003). Those factors can be quite instrumental in combating with the problems related to adoption and acceptance of CBIS in Jordan such as fear of using computers, lack of inter-departmental cooperation and coordination, and lack of support by Executives in organizations.

In the light of the above, the researcher felt the dire need to further investigate about the adoption and acceptance of CBIS in decision making in Jordanian organizations. Therefore, this study will look into how CBIS will be used in the decision making process through an acceptance technology model, since models support solve many of the decision makers' issues. For this research, a proposed model for the decision making with the CBIS system which will adapt the Unified Theory of Acceptance and Use of Technology (UTAUT) model will be the major focus of study.

1.5 Research Objectives

The main objective of this study is to identify the acceptance of CBIS in decision making in organizations in Jordan. More specifically, the objectives to be accomplished in the study will be:

1. To identify the decision making attributes (relevant factors) that affect decision making;
2. To develop a conceptual model of acceptance and use of the (CBIS) in decision making in organizations;
3. To measure the level of acceptance of CBIS in decision making for users in organizations.

1.6 Research Questions

The main research question of this study is: Can acceptance and use of CBIS be used to study the decision making process (DMP) in organizations? More specific questions to be investigated in the study are:

1. What is the adoption and acceptance level of the CBIS in the decision making process in organizations?
2. What are the factors that are still relevant for the decision making process based on empirical studies carried out between the years 1990-2010?
3. Do the perceived expectancy, effort expectancy, social influence, and facilitating conditions predict the behavior intention to use the CBIS in this study?
4. Do (gender, age, experience, and voluntariness) moderate the relationship between the (performance expectancy, effort expectancy, social influence, and facilitating conditions) and the behavior intention to use the CBIS in this study?

1.7 Scope and Limitations

The scope of this study encompasses of the information and communication technology (ICT) sector for organizations in Jordan and the registered private organizations under the Information and Technology Association Jordan (INT@J) as in Appendix A. This study is concerned with the computer based information systems (CBIS) in decision making through organizations and it focuses on the adoption, acceptance of CBIS by the decision makers.

1.8 Significance of the Study

The importance of this study springs from the concept of “decision making” as the need arises to promote understanding of the decision making process through looking at the relevant factors. Further, there is a dire need to follow a systematic way in the decision making process. More specifically, technology models using the CBIS in decision making in organizations are required to cut cost and save time.

This study will hopefully have the following contributions in the field through proposing a model of acceptance and use through the CBIS in decision making in organizations. More specifically, significance includes:

1. Highlighting the importance of the UTAUT model as a unified technology model to promote its use (Venkatesh et al., 2003), to solve the problem of this research and to encourage other future researches.
2. Emphasizing the need to experiment with a systematic model for making decisions as pointed out by many researchers in the field. Also this study revealed the need to a systematic way in the decision making process in this research and other future researches; since this is fundamental in problem solving in the field of mathematics for solution in any problem and in addition, it is a principle of scientific research.
3. Classifying the decision making factors through a study conducted to assess the change to the factors over the years from 1990-2010.

1.9 Definition of Terms

Computer-Based Information System (CBIS) refers to the information system that uses computers in processing raw data as well as information. According to Murray (1985), it is the number of components which integrate with each other: hardware, software, data, models, procedures, and end users. Walker (1988) defined it as: information systems in which computers are used to store and process data. According to Mentzas (1994) and Mahar (2003) the use of CBIS initiated merely as a transaction processing system (TPS) in its conception in order to support the sudden and unexpected needs; hence it was required in many fields such as in MIS, DSS, GDSS, ES, OIS, EIS and IOIS. Cha et al., (2004) while discussing CBIS, put more emphasis on user interface. Dhillon (2005) used the term CBIS and IS interchangeably. Other researchers decided that the CBIS systems are required to support decisions (Turban et al.,2007, 2011); Liang, (2008); (Mentis et al., 2009), &(Al-Ahmad Malkawi et al.,2010) compared the traditional-IS with the automated IS (CBIS) system.

On the basis of aforementioned definitions, this study defines CBIS as components which integrate with each other such as: hardware, software, data, models, procedures, user interface and end users which work in synergy to process raw data into useful information, using different strategies, structures, systems, staffs and skills.

According to Turban et al. (2007, 2011) decision making (DM) is the action of selecting among alternatives. Murray (1985) divided DM into 3 levels: operational, tactical and strategic. Walker (1988) defined it as: “the determinations of possible courses of action and the selection of one of them" (p.395). As decisions are made in different situations at different levels of management and users in the organizations to support better decisions, the need for automated process of decision is increasing day by day. Besides, it is recommended to follow a systematic decision making process (Turban et al., 2007, 2011) which is defined as the choice from among alternatives (Fitzgerald, 2002; Turban et al., 2007, 2011). Hassard et al (2009) differentiated between the decision making process as being either Rationalistic Decision-Making (RDM): which generate series of alternatives, then evaluation to maximize profits and minimize cost and time or Naturalistic Decision Making (NDM): which emphasize series of pressure which enable people to get realistic solutions in a complex but dynamic solutions.

1.10 Structure of the Chapters

The computer based information system (CBIS) in decision making in organizations is the major focus of the study. In view of this, the entire work has been organized into six chapters which are as follows:

Chapter One includes the introduction, whereby the background of issues understudy and use & acceptance of CBIS in Arab Countries are discussed, followed by discussion related to problem statement. Moreover, research objectives and questions are developed, and the contributions of this study to theory and practice are explained.

Chapter Two provides a review of the relevant literature, and establishes the theoretical foundations of this study. It begins by discussing the importance of decision making in the light of literature followed by concept of CBIS, its types and its usage in decision making process in Arab countries. Then the discussion entails the technology acceptance models and UTAUT as mentioned in past studies. The chapter concludes with the discussion concerning adoption and acceptance of CBIS in Arab countries in general and Jordan in particular.

Chapter Three describes the research methodology used in this study. It starts with a discussion entailing research process. It implements a quantitative research approach as its major research method. In this chapter, research design applied in this study is explained in greater detail.

Chapter Four presents the preliminary works to study the important decision making factors, and to conduct interviews from managers in Jordan to obtain more in depth insight about the potential issues understudy.

Chapter Five discusses the results and findings obtained from structure equation modeling (SEM) analysis in detail.

Chapter Six presents the discussion and conclusion contribution and implications of this study.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

In this chapter, the major emphasis is on decision making (DM), computer based information system (CBIS) and the technology acceptance models as discussed in the literature. Furthermore, this chapter also sheds light on the underlying theories related to the study. Moreover, this chapter discusses in detail about the significance of UTAUT along with its comparison with other technology acceptance models. In addition, this chapter elaborates the adoption and acceptance of CBIS in the context of Arab countries in general and Jordan in particular. Finally, the chapter concludes with presentation of summary.

2.2 Decision Making

Decision making is the choice among alternatives (Fitzgerald, 2002; Turban et al., 2007, 2011). In short, the focus and interest of this research will be directed to the process of decision making trying to explain, what is required in this process and how it could help in making better decisions for the users as decision makers in organizations.

An example of a bad decision is an incident which occurred in Walt Disney Corporation in 1995 which resulted in a loss of $140 million. A similar bad decision was made in the merge of Hewlett-Packard and Compaq which caused the stakeholders a loss of US $24 billion. Bad decisions are made due to lack of essential information, which emphasizes the need to process the decision in a wise way by taking advantage of the latest or available automated technologies (Luecke, 2006).

Luecke (2006) suggested instructions and steps that improve the quality of decisions to result in better decisions. These instructions and steps are designed through learning and experience, and one of the methods used for that purpose is the decision tree. What affects the decision is the attributes or factors which are considered in the decision making process. These nine factors are:

1. Cost of the alternatives and its suitability to the budget.
2. Time for implementing the alternative and the effect of delay.
3. Risk related to this alternative.
4. Benefits or profits from implementing this alternative.
5. Resources for each alternative that should be kept in mind concerning whether the required resources are available or not.
6. Financial impact to see the effect of costs with relation to time.
7. Intangibles for other unrecognized or sudden variables.
8. Ethics: to see if this is legal or not; and
9. Feasibility: to see if the alternative will be implemented realistically.

For the previous decision making factors, a preliminary qualitative empirical study was carried out on all the available resources to study the decision making factors and how they change with time. From 1990 to 2010 which showed the importance for these factors and the result was categorizing them into two groups: the main group consists of five factors: time, cost, risk, benefits, and resources (Gonzalez, 2005; Luecke, 2006 ; Wilson & Arvai, 2006; Lee & Huang, 2011), while the second group comprises four: financial impact, feasibility, intangibles, and ethics (Jurkiewicz & Giacalone, 2004; Luecke, 2006; Tseng & Lee, 2009; Kim et al, 2011). The details of this work will be discussed in Chapter 4.

According to Fitzgerald (2002) decision making can be viewed as a process which involves the choice among alternatives. His study primarily focused on three factors namely, time, resources, and risk. Three types of decision making were differentiated as follows: day to day (open); tacit decision for few weeks; and strategic decision which are aimed for longer periods of time extending to five years.

Bhushan and Rai (2004) asserted that strategic decision making takes the form of eight phases in which a decision maker has to establish and understand the problem, define the goal and decision plan or process toward the goal, identify criteria to evaluate alternative approaches, identify team and module rules, evaluate various alternatives , come up with possible solutions to the problem, rank the alternatives based on risks and nature using various financial decision-making tools, and deploy the best alternatives as available for execution. One of the methods for decision making is the analytic hierarchy process (AHP) which represents a systematic approach.

The effective decision making should follow these steps: (1) define the objective, (2) collect relevant information, (3) generate feasible options, (4) make the decision, and (5) implement and evaluate. However, for the attributes of decision making, more interest was placed on risk. “What makes decisions really difficult is the factor high risk” (Adiar 2007, p. 32).

The use of computerized systems which assist decision making in many ways has been on the increase and nowadays such need for automated systems rather than the manual ones has become even greater. Some of the benefits of using automated systems in the decision making process include speed in computations, advanced communication, increased efficiency, better data management including immense data warehouse, better quality, and agility support as well as outstanding cognitive limits in information processing and sorting, using the web and unlimited support. In particular, focus was directed to two factors: time and cost (Turban et al., 2007, 2011).

Hassard, Blandford, and Cox (2009) described two ways of explaining the decision making process such as: Rationalistic Decision-Making (RDM) and Naturalistic Decision-Making (NDM). While Rationalistic Decision-Making (RDM) generates series of alternatives which utilize obvious criteria of evaluation to maximize profits and minimize cost and time, Naturalistic Decision-Making (NDM) emphasizes the series of pressure which enables people to get realistic solutions in a complex and dynamic solutions.

Lurie and Swaminathan (2009) held that advances in the information technology (IT) have made it possible for the decision makers to update information through feedback systems, which brings back a lot of benefits for the decision makers as reducing time and cost. The researchers are interested in these relevant factors: cost, time, feedback as they relate to enhancement of the decision making process.

Standing et al. (2010) argued that the following factors i.e. benefits, cost, and risk are so important that they should be heeded by the decision makers. They suggested that if such factors are added to the data when processed with one of the suitable fuzzy systems, they will help decision makers in solving problems. On the other hand, Stair & Reynolds (2006, 2010) argued that the important decision making factors are: Cost, time, and risk.

Gonzalez-Benito et al. (2010) argued that the use of needed forecasting techniques supported retailers for their decision making. Of particular importance for them were the following factors: data, processing data (information), techniques, analytical management tool, and decision support models which will support decision makers to obtain best solutions in their decision making process.

2.3 The Decision Making Process

Marakas (1999) asserted that the decision making process must be executed in sequential steps which he suggested should include the following:(1) a stimulus which should come in the beginning to stimulate the decision maker to define the problem, (2) the decision maker who is defined as a part of the process to give attention to the importance of the decision maker, (3) problem definition, (4) alternative selection, and (5) implementation.

Five more steps for the decision making process were suggested by Post and Anderson (2003) as: (1) collecting data, (2) identifying the problem, (3) making choices, (4) persuading the others to accept the decision, and (5) implementing the solution.

In a similar view, Luecke (2006) asserted that the five steps of decision making process are: (1) establish a context for success, (2) frame the issue properly, (3) generate alternatives, (4) evaluate the alternatives, and (5) choose the best alternative.

The steps of decision making process are also explained in Vlahos et al. (2004) as follows: (1) identify the problem or issue, (2) generate alternatives, (3) rank the alternatives and select one of them, (4) implement the selected alternative, and (5) evaluate the outcomes.

Turban et al. (2007, 2011) studied the old decision making methods and found that the old method of decision making was understood as the art of the managers and it required talents, experience and intuitions, rather than a systematic (ordered in steps) method. Conversely, the modern method has four steps in decision making stated as: (1) define the problem (difficulty or opportunity), (2) construct a model that describes the real-world problem, (3) identify the possible solutions to model the problem and evaluate the solutions, and (4) compare, choose and recommend potential solutions to a problem. It has to be ensured that sufficient alternative solutions are considered.

In addition, Turban et al. (2007, 2011) stated that several decisions are made in different situations by different levels of management and users in the organizations. These decisions are made by individuals or groups to save cost and time, as well as to support better decisions, as the need for an automated process of decision making increases day by day. Moreover, it is recommended to follow a systematic decision making process. Decision makers should not blindly apply any tool or technology but they should first check if this tool is suitable or not for the organization, its users, and the problem identified by the organization. In another paper, Arnott and Pervan (2008) argued that DSS (one type of CBIS) is an area of information system (IS) discipline that essentially supports and improves the manager's decision making process.

Ben-Zvi (2010) argued that Decision Support Systems (DSS) tools (e.g. business simulation games) used by students in the decision making process have several advantages which include but not limited to the use of simulation technique, encouraged design and implementation of DSS, thoughtful consideration of DSS which can quantitatively improve the organization performance, and undermine perceived measures for enhancing decisions in multifaceted ways. The following Table 2.1 shows the factors that impact decision making process as discussed in the previous studies.

Table 2.1: Factors Influencing Decision Making Process

Factors	Previous studies
Time	Fitzgerald (2002); Luecke (2006); Lurie & Swaminathan (2009); Stair & Reynolds (2006, 2010); Turban et al.(2007, 2011)
Cost	Luecke (2006); Lurie & Swaminathan (2009); Stair & Reynolds (2006, 2010); Standing et al. (2010) ;Turban et al.(2007, 2011)
Risk (High-risk)	Fitzgerald (2002); Luecke(2006); Adiar (2007); Stair & Reynolds (2006, 2010); Standing et al. (2010)
Benefits	Bhushan & Rai (2004); Luecke (2006); Standing et al. (2010)
Resources	Fitzgerald (2002) ; Luecke (2006)
Decision making Process (DMP)	Marakas (1999); Post & Anderson (2003); Bhushan & Rai (2004); Vlahos et al. (2004); Luecke (2006); Adiar (2007); Lurie & Swaminathan (2009); Gonzalez-Benito et al. (2010); Turban et al. (2007, 2011)

In summary, the process of decision making should go through gradual steps. Of these, choice or selection represents the core of the process. Factors like time and cost are also important for decision making. The extensive review of the literature as discussed above, elaborated to identify the factor associated with decision making such as; time, cost, risk (high-risk), benefits, and resources. These decision making factors are incorporated in the conceptual model (will be mentioned in detail in the following chapter) of this study, in order to examine their impact on the decision making process which is focal point of the presented study.

2.4 Computer-Based Information System (CBIS)

CBIS representing information system that uses computers to process data into information has become quite important and direly needed in order to enhance efficiency and effectiveness of decision makers. Most types of work require lots of people, time and effort to accomplish. All jobs that were done manually a century ago have now become easier to do as a lot of time and cost are now saved with the development of technology. Similarly, data information especially reports and studies in the form of papers used to take lots of time to scan through to find the necessary information. In view of that, studying a problem and finding a suitable solution, especially for an urgent issue could take a very long time. Later, organizing and indexing were introduced to help in referring to these reports easily. With the advancement in technology, huge information could be organized very well and easily referred to whenever required. The information system can be categorized into two groups: (1) manual systems which are the old style that deals with papers and reports, and (2) automated systems which is the scope area of interest in this study.

Furthermore, the computer based information system (CBIS) refers to the information systems that use computers in processing raw data as well as information.Mentzas (1994) classified CBIS as: (1) information reporting such as management information system, (2) communication and negotiation such as group decision support system, and (3) decision making such as decision support system and expert system, which support selection from the available alternatives. Researchers looked for the components of CBIS from different perspectives as summarized by the author in Table 2.2.

Table 2.2: *CBIS Components*

CBIS Components	**Researchers**
Hardware	Murray (1985); Walker(1988); Fuller & Manning (1994); Mahar (2003); Mentzas (1994); Cha et al. (2004); Stair & Reynolds (2006, 2010)
Software	Murray (1985); Walker(1988); Fuller & Manning (1994); Cha et al. (2004); Stair & Reynolds (2006, 2010)
Data storages	Murray (1985); Walker(1988); Fuller & Manning (1994); Mahar (2003); Cha et al. (2004); Stair & Reynolds (2006, 2010)
Models	Murray (1985); Mentzas(1994)
Procedure	Murray (1985); Fuller & Manning (1994); Mahar (2003); Cha et al. (2004); Stair & Reynolds (2006, 2010)
Users	Murray (1985); Walker(1988); Fuller & Manning (1994); Mahar (2003); Cha et al. (2004); Stair & Reynolds (2006, 2010)
Knowledge	Mentzas (1994)
Cooperation	Mentzas (1994)
User Interface	Cha et al. (2004)
Support Man-Machine Interaction	Mentzas (1994)
Telecommunications	Stair & Reynolds (2006, 2010)

According to Murray (1985), the users of computer-based information systems (CBIS) must have common knowledge of such systems. Computers have become readily available and it has become quite easier to get the required information. The components of CBIS viewed are: hardware, software, data, models, procedures, and users. This will be realized by providing them with the usable, timely, and needed information, after processing the data, also the characteristics of CBIS may be different in different times, but the goal of CBIS is the same to get useful information to help in processing decisions.

According to Nelson and Cheney (1987), insufficient computer related knowledge is the main cause of failure to integrate CBIS in the organizations. Thus, it is of critical importance that the end users must be equipped with sufficient education and training in order to maximize the benefits of CBIS. Hence, they presented a quick and powerful solution by means of training the end users of CBIS.

Mentzas (1994) mentioned that a specific types of CBIS (e.g. DSS; GDSS, ES) are powerful tools in certain aspects of the decision making process in the modern organizations. Thus, Mentzas (1994) supported the viewpoint of Eom et al. (1990) who suggested that the GDSS is an essential tool to resolve conflicts and also perceived that CBIS has evolved from processing data such as TPS, information such as MIS and decision making such as GDSS, DSS. Hence, CBIS and its components are necessary in supporting decision making. Also, Mentzas (1994) made comparison between the ten types of CBIS (MIS, EIS, ESS, DSS, GDSS, EMS, ODSS, ES, OIS and IOIS) in order to find the most powerful CBIS. The types and their respective roles can be seen in Table 2.3 as follows:

Table 2.3: *CBIS Types with their Related Roles*

Types of CBIS	Roles of CBIS Types
Management Information System (MIS)	Analysis of information, generation of requested reports, solving of structured problems.
Executive Information System (EIS)	Evaluation of information in timely information analysis for top-level managerial levels in an intelligent manner.
Executive Support Systems (ESS)	Extension of EIS capabilities to include support for electronic communications and organizing facilities.
Decision Support System (DSS)	Use of data, models and decision aids in the analysis of semi-structured problems for individuals.
Group Decision Support System (GDSS)	Extension of DSS with negotiation and communication facilities for group.
Electronic Meeting Systems (EMS)	Provision of information systems infrastructure to support group work and the activities of participants in meetings
Organizational Decision Support Systems (ODSS)	Support of organizational tasks or decision-making activities that affect several organizational units
Expert systems (ES)	Capturing and organizing corporate knowledge about an application domain and translating it into expert advice.
Office Information System (OIS)	Support of the office worker in the effective and timely management of office objects. The goal-oriented and ill-defined office processes and the control of information flow in the office.
Intelligence Organizational Information System (IOIS)	Assistance (and independent action) in all phases of decision making and support in multi participant organizations.

Source: Mentzas (1994)

After analyzing the various types of CBIS and their respective roles, Mentzas (1994) promoted the use of IOIS, and considered it as a perfect solution for supporting decisions in organizations; since it has the integration support which is not available in the other nine types mentioned in Table 2.3.

Fuller and Manning (1994) noted that the components of information processing systems are: hardware, software, data, people, and procedures. These components are organized for specific purposes; Furthermore, the researchers mentioned five types of CBIS, from the oldest to the newest, or from more structured to less structure as: (1) transaction processing systems (TPS), (2) management information systems (MIS), (3) decision support systems (DSS), (4) expert systems (ES) as major type of artificial intelligence (AI), and (5) executive information systems (EIS). Transforming process for data can be classified into three steps as converting data into information (refining), then converting information into decision (interpreting), and installing decisions and changes in the organization (implementing) with some tools as word processing report.

Vlahos and Ferrat (1995) found that computer-based information systems (CBIS), were more valuable for manager`s mental model for guiding planning, controlling, and operating decisions, than forming or revising the manager`s mental model of the corporation. The researchers also noticed that the tools in several studies have shown the most used computer softwares which were spreadsheets, word-processing and data base management. The amount of use was from 1.8H per week to 14H or more per week. The lowest use was in Saudi Arabia, while the highest use rate was in Taiwan.

Goodwin (1997) asserted that the CBIS systems have five subsystems comprising data processing (DP), office automation (OA), expert system (ES), decision support system (DSS), and management information system (MIS). Whereas, the researcher promoted for the MIS type to solve the problem in decisions of organizations.

Wong and Du (2003) considered the computer-based information systems (CBIS) as vital tools for managers in making decisions. They also, encouraged CBIS courses to be given to the undergraduate students in business administration (BA) as in the US system through the second year to help them in future. In addition, some of the benefits of CBIS include learning the system design and analysis and improving the problem solving skills.

According to Mahar (2003), the computer-based information system is one in which a computer plays the basic role. She classified five components for the CBIS systems namely: hardware which refers to the machines part with input, storages and output parts, software which is a computer programs that helps in processing data to useful information, data in which facts are used by programs to produce useful information, procedures which are the rules for the operations of a computer system, and People or users for the CBIS where they are also called end-users.

According to Cha et al. (2004), they found that Computer-based information systems (CBIS) consists of: users; data; procedures; software; hardware, and user interface. All of these components work with each other in way to enhance and support the work of the CBIS systems. The researchers pointed out to the increasing importance of the user interface for the designers of the CBIS systems, since it is the connection between, the end-users and the system. The researchers classified the CBIS into three kinds or levels: operational level, management level, and strategic level. Whereas, from the types of the CBIS, only four major types were mentioned: transaction processing system (TPS), management information systems (MIS), decision support systems (DSS) and executive support systems (ESS).

In many mid-large organizations, critical business decisions are made every day by CIO and other IT executives involving millions of dollars. Often these decisions are influenced solely by the revenue. Other factors and limitations such as reasons of failure, time required in decision making process as well as the use of proper technology or process, are often not taken into consideration. Specifically, results presented of a survey made by 52 senior IT executives discussed three major questions: information required for successful decision making; information used to manage the decisions, and the tools that the decision makers use to process the decisions. A lot of time was spent to gather information to make decisions, since the IT executives believed that using integration and automated systems would be too costly. This reemphasizes the persistent problem and calls for the need to use the CBIS system in decision making in organizations.

1. IT executives need information to show them the reality about how their performance grows.
2. They use information from different sources including different reports and emails rather than accessing the data.
3. They spend more than 10 hours per week on gathering information for decision making. However, this is not required when the CBIS is used for the benefits obtained in cost reduction and time saving. As for the tools, dashboard is used here since it has some benefits in terms of time, information and data (CXO, 2003).

Vlahos et al. (2004) found that the computer-based information systems (CBIS) were used by German managers. Besides, results from their survey have shown that those managers were heavily CBIS users with more than 10 H of use per week. The researchers encouraged using the CBIS because of its benefits as: it helps in planning, assisting in decision making budgeting, forecasting, and solving problems. As researchers wanted to know how German managers use the CBIS, they built a survey questionnaire to collect data. Likert scale with 7-point scale was used; whereas, the Cornbach Alpha was 0.77. Their study provides a new updated knowledge on CBIS use by, together with looking into the perceived value and satisfaction obtained from CBIS, in helping managers and normal users and supporting them to carry out better decision making.

According to Laudon and Laudon (2005), many decision makers have lack of knowledge in using the automated systems (CBIS). The scholars gave an example where a corporate chief executive has to learn how to use a computer while his senior managers have limited computer knowledge and so they prefer only extremely easy to use systems. This scenario shows that people want to learn how to use the CBIS to process better decision but they do not know how.

Dhillon (2005) used the term CBIS and IS interchangeably. He also argued for the success of computer-based information systems (CBIS) so as to gain benefits by using information systems (IS) and information technology (IT) in organizations. There is a need to deal with the important needed information with CBIS to support decision makers.

Turban et al. (2007, 2011) decided that the CBIS are required to support decisions in organizations for many reasons such as works in organizations to rapidly change because of the economy needs to follow the case with the automated systems, to support the decision making process and to have accurate information as required, the management mandates the computerized decision support, high- quality of decision is required; the company prefers improved communication and customer and employee satisfaction, timely information is necessary, the company seeks cost reduction, the company wants improved productivity, and the information system department of the company is usually too busy to address all the management's inquiries.

According to Martinsons and Davison (2007), many types of computer-based information systems (CBIS) developed to support decision making which are: decision support systems (DSS), group decision support systems (GDSS) and executive information systems (EIS). In their study, they used IS interchangeably with CBIS, and discussed the difference between USA and other Asian countries holding that success depends on how well IT (CBIS) application is adapted to the decision style of their users.

Liang (2008) argued that the recommendation systems are computer-based information systems (CBIS) to support decisions. He focused on decision support systems (DSSs), and how they evolved from aiding decision makers to perform analysis to provide automated intelligent support. In the same view, Mentis et al. (2009) argued that Group Decision Support System (GDSS) is one type of the (CBIS) developed to facilitate and bring easy and quick solution for unstructured problems. Also, decision making process should be carried out in a systematic way (steps). The GIBIS system as a tool for the GDSS is a complex groupware for decision making process which give good support collaboration for the decision makers.

Persson et al. (2009) promoted the adoption and use of the ICT sector support to give support for the decision making processing by discussing the ICT environment in industrial house construction for six Swedish companies. The interest here was in processing data in a systematic way as organizing the resources for collecting, storage, process, and display information. In these six companies, different ICT support decision tools (ERP, CAD, Excel, and VB-Scripts seawares) were used. Organizations which did not use ERP system had problems in information management. Again, using ICT models with automated systems (tools) will be a good way to systemize information to reduce cost and save time for the decision makers.

Dlodlo et al. (2009) argued that the combinations of two types of CBIS as (DSS with ES) will be a guidance in the process of grading wool for the decision makers in this field. They also added that the DSS has the following advantages. DSS supports decision making activities for the area businesses and organizations, designed to help decision-makers to get useful information after processing raw data. DSS which is an interactive CBIS was developed to support solving unstructured problems to improve decision-making. Moreover, DSS uses intelligent agents to collect data related to online as auctions which improve decision-making and lastly DSS utilizes statistical analyses that provide the specific and relevant information. In addition, combining DSS with ES will complement the two systems and help decision makers in the decision making process. This will be carried out through a systematic way and will not replace humans as decision makers by the machine or any complex systems.

Liu et al. (2009) argued that it is good to integrate the decision support systems (DSS) which is one type of the CBIS as IDSS as a development system. They discussed more than 100 papers and software systems, and recommended that IDSS will be a better support for decision makers in the decision making process. By looking at literature review, integration of DSS as a tool for users` decision makers was Online Analytical Processing (OLAP) as a powerful tool that helps decision makers in processing decisions.

Fogarty and Armstrong (2009) investigated Australian organizations through carrying out an empirical study to identify factors that contribute to computer-based information systems (CBIS) success; they looked at the CBIS as the black box and pointed out its crucial importance to the small business sector. Structural equation modeling was used with Amos software to test a model, through testing the hypotheses. Along with the instrument, a seven point Likert scale was used. In order to measure constructs relevant to their study, they developed the Implementation Survey for CBIS (IS-CBIS). The scales and their internal consistency reliability estimates (Cronbach's alpha). They concluded that since CBIS is one of the most difficult stages in the growth of small business as computerization entails disruption and expense. Accordingly, more information is needed about the key factors to ensure success. In particular, background enabling conditions should be sought so that more small businesses are able to make a smooth transition to computer based information systems.

According to Carlson et al. (2009), Management Support Systems (MSS) which is another face for CBIS support different managerial roles i.e. the development of MSS that supports managerial cognition, decision, and action. While CBIS types include: Decision Support Systems (DSS), Group Support Systems (GSS), Executive Information Systems (EIS), Knowledge Management Systems (KMS), and Business Intelligence (BI) systems developed to support the decision making process for managers. On the other hand, MSS have other features such as modeling capabilities, electronic communications, and organizing tools. The researchers here refer to the MSS system as ICT-enabled IS in order to support managers to process decisions.

Al-Ahmad Malkawi et al. (2010) compared the traditional-IS with automated-IS (CBIS), where they referred to the CBIS system as information system auditing that gives support to the decision makers in their businesses. Computer-based information system is expected to help businesses achieve their goals and objectives, and to lend support for making good decisions by decision makers. They refer to the components of CBIS as: hardware, software, database, networks, procedures, and people.

In the same view, Kim et al. (2010) argued that automated system of Customer Relationship Management (CRM) will help not only in the decision making process, but also in reducing costs, and time. In addition, CRM known as software which helps in integration of resources, also helps in sharing knowledge between customers, supports daily decisions, and improves the users` performance.

According to Stair & Reynolds (2010) there is a need for “high quality, up-to-date, and well maintained computer-based information systems (CBIS) since they are the heart of today`s most successful corporations" (p. 3). In addition, they gather the components for CBIS system as a single set of hardware, software, database, telecommunications, people and procedures. They also identified the major role software tool of CBIS system which consists of input, processing output, and feedback. The aim is to collect and process data to provide users as decision makers with needed information to help them in the decision making process. One of the examples they gave was SAP software.

Patel and Zaveri (2010) also suggested that CBIS can be used to help in industrial process-plants which are important for the economy. A proposed model for determining the financial losses resulting from cyber-attacks on CBIS systems was used. The CBIS system here was Supervisory Control and Data Acquisition (SCADA) system. Managers using the SCADA system were helped with estimation about their financial damages. Patel and Zaveri (2010) focused on the risk, cost, resources, and benefits as factors from the decision making to interest with using the CBIS (SCADA) by decision makers.

Al-Zhrani (2010) conducted a study to assess the importance of management information system (MIS) in the decision making process during crisis using a sample data from administrative officers in the Directorate General of Border Guard (DGBG) in Saudi Arabia. He further examined the limitations such as poor planning, coordination and control activities that hamper the use of MIS in such problematic situations. Al- Zahrani's results show that MIS was satisfactorily used in decision-making during crises and he recommended that it should be used more intensively in decision making and that the MIS units should be maintained to ensure a free flow of information and adequate use of MIS in decision-making as shown in a study which was carried out to investigate and identify the importance role of MIS indecision-making process during crises. The aim was also to examine obstacles that limit the role of MIS in decision-making during crises. The study revealed that MIS was adequately used. In addition, the study gave a recommendation that the MIS (one type of CBIS) should be used more heavily in the decision process during crises. The study highlighted the important role of MIS indecision-making process during crises at the Directorate General of Border Guard in Saud Arabia. In conclusion, the study revealed that MIS was adequately used indecision-making during crises. Despite obstacles that limit the role of MIS in decision-making it was further recommended that the MIS units should be maintained to ensure a free flow of information and adequate use of MIS in decision-making.

In a study by Nabali (1991) the presence and adoption of Computer-Based Information Systems (CBIS) was investigated in the context of hospital information system in the Arab Gulf states. The findings revealed that: hospitals owned by Ministries of Health are lower adopters of CBIS that managers of departments that use CBIS have more favorable attitudes towards user involvement; that departments in smaller hospitals are more likely to use CBIS; and that managers of user departments tend to be older. In her study personal factors included: age, education, occupation, and other personality characteristics, while Organizational factors included: centralization, formalization, functional differentiation, and complexity. Her findings also indicate that users of CBIS have had more exposure to computers (including computer-related education).

Ismail (2011) conducted an empirical study about marketing information system (MKIS) decision making on Royal Jordanian Airlines (RJA). He defined the MKIS as a continuing and interacting structure consisting of people, equipment and procedures designed to gather, sort, analyze, evaluate and distribute needed, timely and accurate information to marketing decision makers; it begins and ends with information users- marketing managers, internal external partners, and others who need marketing information. The issue that decision making always involves risk was given as part of the problem. The study categorized MKIS in four components: internal records (data bases), marketing intelligence, marketing research, and analyzing marketing information (decision support system), and this component DSS which is one type of CBIS. The study concluded that the ultimate purpose of MKIS is to facilitate mangers' mission to make decision at all levels of operations based upon the information flow. Information is the essential ingredient of management and decision making for both external and internal factors. In addition, the decision maker must try to find out the various alternatives available in order to get the most satisfactory result of a decision. Identification of various alternatives not only serves the purpose of selecting the satisfactory one, but also avoids any bottleneck situation by using, probabilistic analysis, decision trees, and cost/volume/profit analysis. The Royal Jordanian Airlines utilized and depended more on decision support system (DSS) in decisions making and this variable took the first priority, while the second priority was for the intelligence marketing as a main source of information. The study concludes that there is a significant relationship between DSS variables and taking the right decision. With little effect for data base (internal records), the study also concluded that there is no significant relationship between marketing research and the right decision making.

Al-Omari et al. (2012) found a positive impact of software, information networks and the quality of information on the process of managerial decision-making**.** Another finding was a lack of high response from the personnel who do not receive periodic training in order to develop their abilities. The software used does not cover all activities carried out by the company, and that the information offered by technology cannot be considered sufficient and does not cover all the company's departments. Information technology was used here in the as a type of CBIS that is designed to serve managers in the organization, and to help in the decision-making process and increasing competitiveness. Their study is especially important for the tourism sector in Jordan in light of the scarcity of resources particularly at a time when Jordan faces huge challenges due to political and security circumstances that call for more efficient and effective management to cope with theses crises so that the tourist agencies are compelled to pay more attention to information technology or CBIS to reach outcomes that are more beneficial in decision making to reduce the disadvantages of the current situation.

To sum up the above literature the following Table 2.4 illustrates a holistic view of types of CBIS along with the various tools (software) used and suggested by the past studies.

Table 2.4: CBIS Types and Softwares in the previous Studies

Types of CBIS	**Studies of CBIS**
General Acronym of CBIS or Transaction Processing System (TPS)	Murray (1985); Nelson & Cheney (1987), Nabali (1991); Al-Abdul Gader (1999); Fuller & Manning (1994); Vlahos & Ferrat (1995); Goodwin (1997); Wong & Du (2003); Mahar (2003); Cha et al. (2004); Vlahos et al. (2004); Laudon & Laudon (2005); Dhillon (2005); Al-Mahid & Abu-Taieh (2006) ; Persson et al. (2009); Fogarty & Armstrong (2009); Al-Ahmad Malkawi et al. (2010); Stair & Reynolds (2010); Al-Zhrani (2010); Ismail (2011); Turban et al. (2007, 2011); Al-Omari et al. (2012); Al-Zahrani & Goodwin (2012); Al- Dalabeeh & Al-Zeaud (2012)
Management Information System (MIS)	Mentzas (1994); Murray (1985); Nelson & Cheney (1987); Eom et al. (1990); Nabali (1991); Al-Abdul Gader (1999); Goodwin (1997); Cha et al. (2004); Vlahos et al. (2004); Al-Gahtani (2003) ; Laudon & Laudon (2005); Dhillon (2005); Al-Gahtani et al. (2007); Al-Zhrani (2010); Turban et al. (2007, 2011); Barakat et al. (2011); Ismail (2011)
Accounting Information System (AIS)	Al- Dalabeeh & Al- Zeaud (2012)
Executive Information System (EIS)	Mentzas (1994); Fuller & Manning (1994); Cha et al. (2004); Vlahos et al. (2004); Laudon & Laudon (2005);Dhillon (2005); Martinsons & Davison (2007); Persson et al. (2009); Carlson et al. (2009);Turban et al. (2007, 2011)
Executive Support Systems (ESS)	Mentzas (1994); Turban et al. (2007, 2011)
Decision Support System (DSS)	Mentzas (1994); Eom et al. (1990); Goodwin (1997); Cha et al. (2004); Vlahos et al. (2004); Laudon & Laudon (2005); Martinsons & Davison (2007); Liang (2008); Dlodlo et al. (2009); Liu et al. (2009); Carlson et al. (2009); Ben-Zvi (2010); Ismail (2011); Turban et al. (2007, 2011); Ismail (2011)
Group Decision Support System (GDSS)	Mentzas (1994); Eom et al. (1990); Vlahos et al. (2004); Martinsons & Davison (2007); Mentis et al. (2009); Carlson et al. (2009); Turban et al. (2007, 2011)

Electronic Meeting Systems (EMS)	Mentzas (1994)
Organizational Decision Support Systems (ODSS)	Mentzas (1994)
Expert systems (ES)	Mentzas (1994); Fuller & Manning (1994); Goodwin (1997); Vlahos et al. (2004); Laudon & Laudon (2005); Dlodlo et al. (2009); Lee et al. (2010); Turban et al. (2007, 2011)
Office Information System (OIS)	Mentzas (1994); Vlahos et al. (2004); Laudon & Laudon (2005); Dhillon (2005)
Intelligence Organizational Information System (IOIS)	Mentzas (1994)
Knowledge Management System (KMS)	Huang et al. (2008); Carlson et al. (2009)
Software used: LOTUS 123; word processing; spreadsheet; SAP; ERP; CRM; BI ; BSC; Dashboard; CAD; Excel; VB-Scripts seawares; OLAP; BI; CRM; SCADA; DEMATEL; GIBIS; CASE	Nelson & Cheney (1987); Fuller & Manning (1994); Vlahos & Ferrat (1995); Chau (1996); Seymour et al. (2007); Dasgupta et al. (2007); Mentis et al. (2009); Persson et al. (2009) ; Persson et al. (2009); Liu et al. (2009); Carlson et al. (2009); Kim et al. (2010); Stair & Reynolds (2010); Patel & Zaveri (2010); Lee et al. (2010); Turban et al. (2007, 2011)

Barakat et al., (2011) argued that the rapid advancements in information technology and the global economic crisis have affected the MIS job market. Recruiters are no longer looking for Grade Point Average as a hiring criterion and that new skill sets have been adapted by human resource departments with respect to hiring new MIS graduates. Their study highlighted the most important skills needed for entry level positions as perceived by MIS students. The top five skills required in the Middle East job market were: good communication skills, team player and cooperative skills, overall personality and demeanor, leadership skills and being trustworthy.

These skills are important to work in an organization that aspires to use and implement CBIS.

Al-Mahid and Abu-Taieh (2006) used CBIS interchangeably with IS and gave reasons for the failure of information systems in developing countries such as Jordan. They cited fifteen possible reasons for this failure; it was shortened and highlighted to: (1) language and cultural barriers, (2) individual ownership of data, (3) lack of cooperation, (4) fear or attitudes of using computers, (5) status, (6) lack of coordination, (7) poor or unavailability of data, and (8) lack of support from higher management. They also suggested some possible solutions as: (1) educating the users and IT personnel in how to use computers in a good way, (2) communication in different levels in private and governmental sectors, (3) provide PC`s to be available to all users, (4) connectivity to the Internet, (5) promote accepting and using IT as one area for development.

Al- Dalabeeh and Al- Zeaud (2012) identified the characteristics and the availability of properties, technical and organizational requirements for the accounting information systems necessary to meet the requirements of modern management of pharmaceutical companies in Jordan. The study recommended the need for conviction of directors of companies to develop a budget for the re-design of their (IT) systems and work to develop most systems in the companies to be able to re-design, whenever there is a need, in addition to increase investment in automated systems because of their role in obtaining the necessary information fast and accurate. Their study exposed to the problem of measuring the costs of public shareholding industrial companies in Jordan, through accounting information systems. The results of their study aimed at investigating the effect of the accounting information systems in Jordan indicate that: There is a positive impact of accounting information systems with respect to measurement of costs of business operations such as cost of materials used, ordering and re-ordering, production costs for individual centers in the Jordanian companies. Thus accounting information systems give highly useful input to decision makers who can effectively plan for company's profits.

In light of the previous discussion, the study considers the components of CBIS from different points of view with emphasis on the integration of all to be presented as: hardware, software, people, data storage, model, procedures, and user interface which was ignored by majority of previous studies (Cha et al., 2004). Besides, they consider how CBIS helps in decision making or solving problems by using CBIS in the decision making process in organizations, which evolved from TPS, MIS, DSS, GDSS, ES, ERP and SCADA. The aforementioned literature related to the CBIS is closely linked with the present study, which focuses on the acceptance of the CBIS to support decision making process. In this regard literature review has helped a great deal in identifying not only the various types of CBIS but also compared those types based on their contribution to support decision making in organizations. In short, the three levels which must be ensured for the use of CBIS include: (1) The availability of technology, (2) The acceptance /rejection by users and managers of different levels, and (3) The use of the suitable technology itself in the decision making process in organizations. The subsequent section entails the review of literature with respect to various technology acceptance models and theories.

2.5 The Individual Behavioral Acceptance Technology Models

The behavior acceptance technology models are presented in the following sub-sections. It would be first important to look into the idea from the basic concept of the acceptance model (see Figure 2.1). This model comprises three constructs namely: (1) individual reactions to using information technology, (2) intentions to use information technology, and (3) the actual use of information technology.

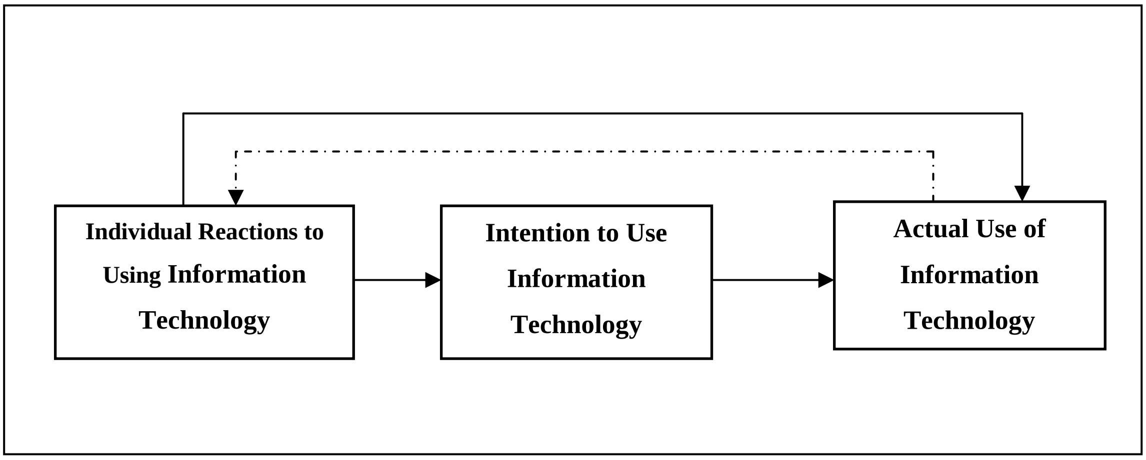


Figure 2.1: Main concept of user acceptance
Source: Venkatesh et al. (2003)

2.5.1 Technology Acceptance Theory (TAM)

Technology acceptance model (TAM) is the most famous model used to predict and explain the behavioral intention of users for adoption. TAM was introduced by Davis in his PhD dissertation (Davis et al., 1989; Venkatesh et al., 2003; Lee et al., 2010).

TAM was created to study the usage and behavioral intention based on the theoretical foundation of psychological model of the theory of reasoned action (TRA). TAM was developed for the information system (IS) field, referring to Venkatesh et al. (2003) and the aim of this model was to predict the acceptance and use of information technology (IT) of a job. It was used in different sets of technologies and users. The basic constructs for TAM are: Perceived usefulness, and perceived the ease of use (Venkatesh et al., 2003). The perceived usefulness is the extent which the user believes that utilizing for the system will enhance the performance (Davis, 1989).

On the other hand, Davis refers to the perceived ease of use as the degree where the user believes that utilizing the system will be without effort. Although TAM has weaknesses as used in many areas and studies (see Lee et al., 2003), it will be discussed thoroughly in the coming sections. The factors to be considered in TAM in order to predict the usage of any system are: Perceived Usefulness (U), Perceived Ease of Use (E), Attitude toward Using (A), and Behavior Intention to use (BI) see Figure 2.2.

The two constructs namely the perceived usefulness, and the perceived ease to use have been used in this study indirectly as effort expectancy and performance expectancy in the proposed model.

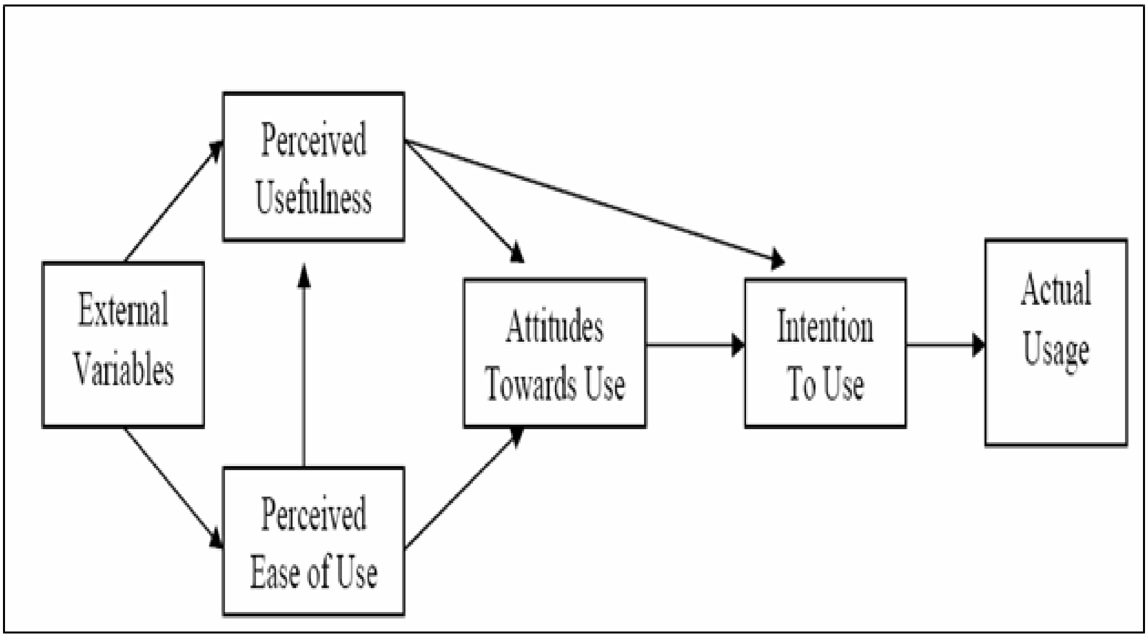


Figure 2.2: Technology Acceptance Model (TAM)
Source: Davis et al. (1989)

TAM has strengths and is used by researchers for its widespread applications. An example is in online consumer behavior by Koufaris (2002) who followed questionnaire instrument to check the proposed theoretical model. On the other hand, TAM has weaknesses such as few constructs, voluntary environment application and non-suitability for mandatory situations (Seymour et al., 2007).

In addition, the studies which applied TAM in the view of Lee et al. (2003) were shown to have a lot of limitations and drawbacks which will be mentioned later in Table 2.6. For this there have been recommendations to replace TAM by new models to suit a certain situation. This will be discussed in the following sub-sections.

2.5.2 Extended TAM Model (TAM2)

Davis and Venkatesh (2000) made some modifications to TAM or more precisely, they extended TAM into a new model known as the Extended TAM (TAM2). The two researchers deleted the attitude toward the use from TAM to give more explanations about the two major constructs i.e. perceived usefulness and behavioral intention (see Figure 2.3).

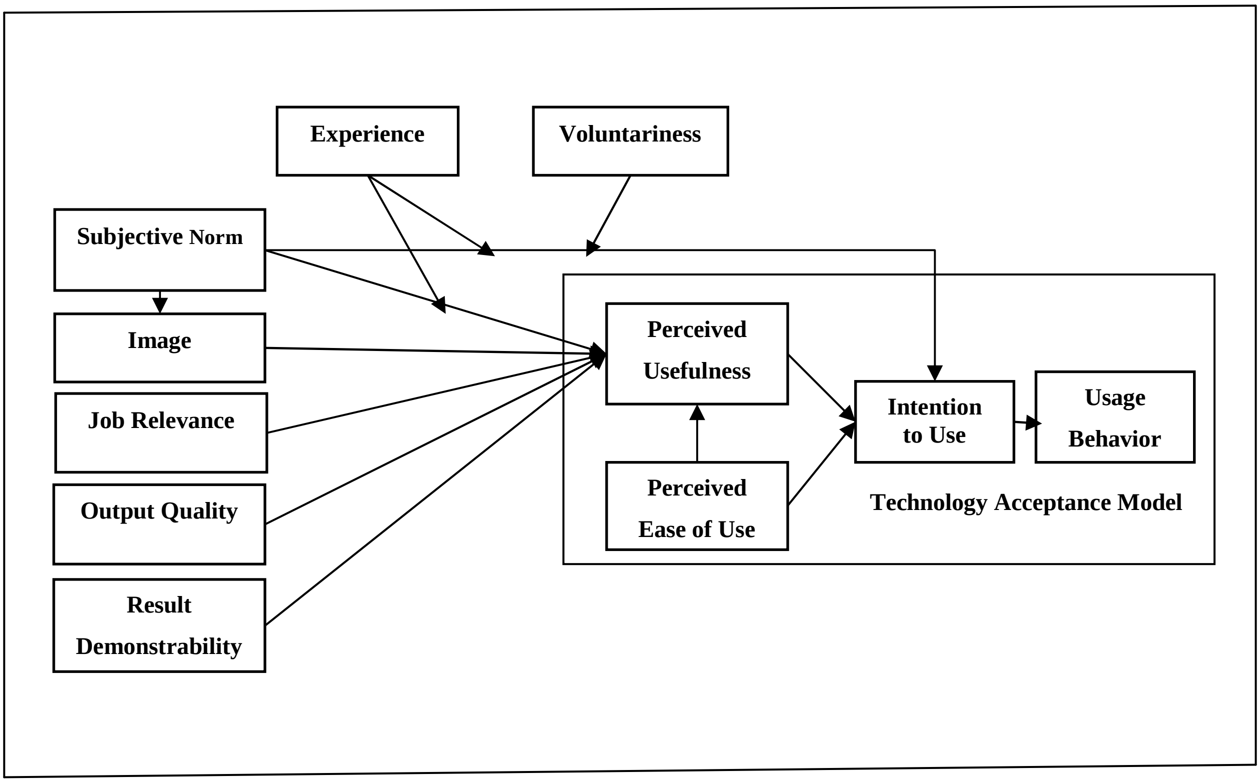


Figure 2.3: Extended TAM (TAM2)
Source: Venkatesh & Davis (2000)

Furthermore, new determinants were added such as subjective norm, image, job relevance, output quality, result demonstrability, experience and voluntariness to TAM (Venkatesh & Davis, 2000).In this study, the three constructs: (1) perceived usefulness, (2) perceived ease of use, and (3) subjective norm have been used to determine behavioral intention in TAM2. These three constructs have been reflected indirectly as: perceived usefulness to performance expectancy, ease of use to effort expectancy, and subjective norm to social influence. TAM2 was applied by other researchers for learning space, Web 2.0 (Wu et al., 2008).

2.5.3 Extended TAM Model (TAM3)

Venkatesh and Bala (2008) came up with a new model as an extension to TAM2 known as (TAM3) in 2008. They recommended new constructs as computer self-efficacy, computer anxiety, and perception of external control, computer playfulness, perceived enjoyment and objective usability (as shown in Figure 2.4). Venkatesh and Bala (2008) also moderated the relationship for the following three groups of constructs: perceived ease of use and perceived usefulness; computer anxiety and perceived ease of use; and perceived ease of use and behavioral intention with experience. In addition, the two researchers suggested that the determinants of the usefulness neither have effect on the ease of use nor the determinants of the ease of use affect usefulness. The three constructs: (1) perceived usefulness, (2) perceived ease of use, and (3) subjective norm have been used to determine behavioral intention in TAM3. These three constructs have been reflected indirectly as: perceived usefulness to performance expectancy, ease of use to effort expectancy, and subjective norm to social influence.

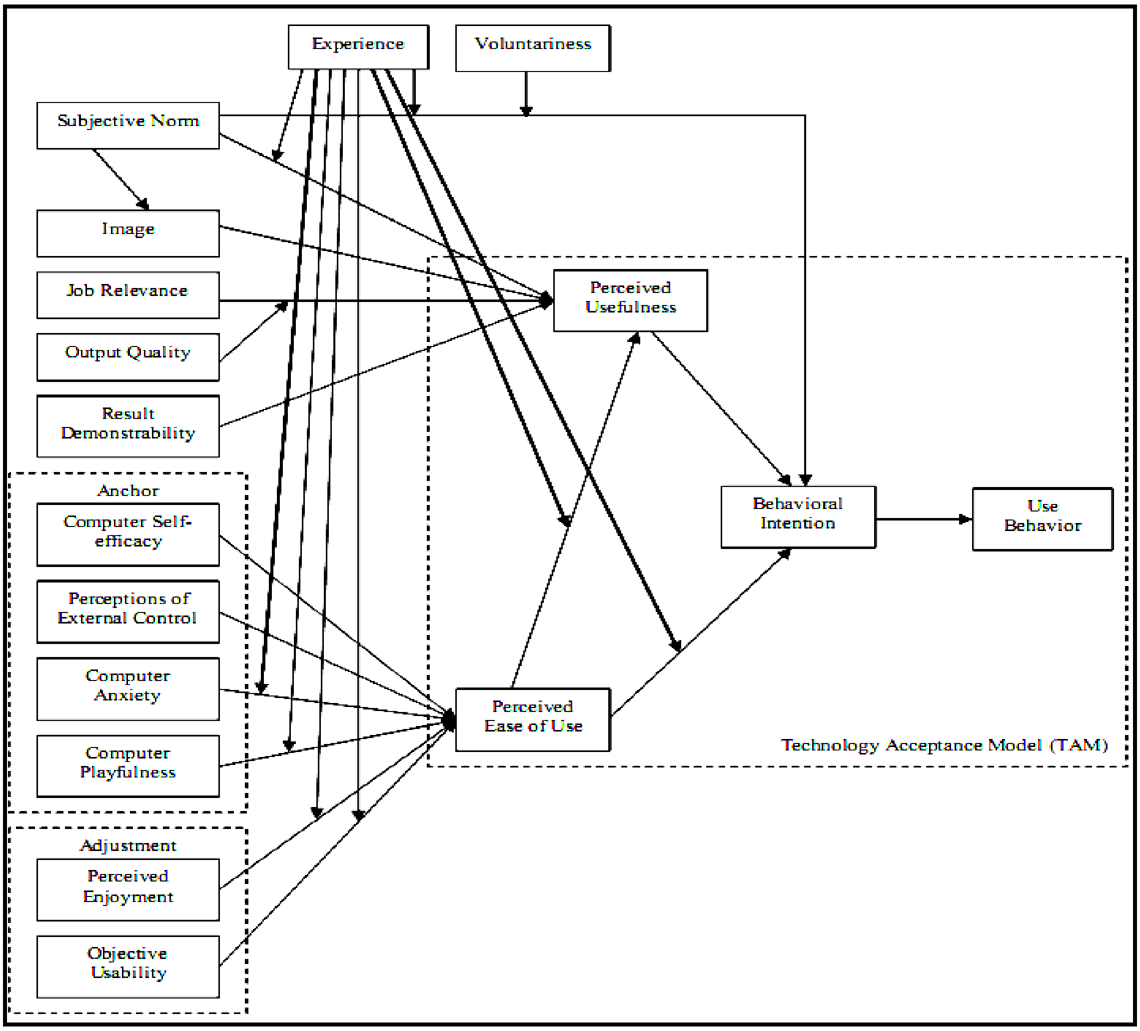


Figure 2.4: Extended TAM2 (TAM3)

Source: Venkatesh & Bala (2008)

To sum, and to connect the previous three models with this study:

TAM has two constructs namely: (1) perceived usefulness, (2) perceived ease to use, which were used to determine behavioral intention of the user. These two constructs have been used in this study indirectly as effort expectancy and performance expectancy to predict decision maker intention to use computer based information system.

In ***TAM2***, the three constructs: (1) perceived usefulness, (2) perceived ease of use, and (3) subjective norm have been used to determine behavioral intention. These three constructs have been reflected indirectly as: perceived usefulness to performance expectancy, ease of use to effort expectancy, and subjective norm to social influence. In ***TAM3***, same constructs have been used to determine behavioral intention as used in TAM2.

The following entails the discussion related to some applications of TAM, TAM2 and TAM3 with reference to CBIS by past studies.

Chau (1996) applied TAM to see factors that influence acceptance of Computer Aided Software Engineering (CASE) system. The findings indicated that ease of use has the largest influence on CASE acceptance, followed by long-term consequences. Both transitional support and near-term usefulness do not have a significant direct effect on the acceptance (one of the tools of CBIS used by IT professionals).

Also, Doll et al. (1998) applied TAM on two universities to test acceptance of some tools of CBIS such as: spreadsheets, word processing, and database. The perceived usefulness and ease-of-use were good indicators of acceptance of CBIS.

Furthermore, TAM was applied by Mathieson (1991) who asserted that both models (TAM and TPB) predict intentions to use spreadsheet which is tool of CBIS. He found that TAM is easier to apply, but provides only general information, whereas, TPB provides more specific information for developers.

TAM2 was applied by Chismar and Wiley-Patton (2002) in the context of physicians' intention to adopt Internet-based healthcare application. They employed

TAM2 to examine physicians' intention toward the adoption of Internet-based health applications. The results of their study suggest that TAM2 was partially adequate and applicable in the professional context of physicians. They found that perceived usefulness of TAM2 had a significant and strong influence on physicians' usage intention. TAM3 was applied by Daniel (211) to study diversity management through the lens of the TAM3 to gain insights that could improve both the acceptance of diversity in the organization and its impact on organizational performance.

2.5.4 Theory of Reasoned Action (TRA)

This theory came from the field of social psychology to predict the usage behaviors for users. TRA has two core constructs: attitude toward behavior and subjective norm. This model was created by Fishbein and Ajzen (1975). The aim of TRA was to describe individual's usage behavior between social influence, attitude, and behavioral intention (see Figure 2.5).This theory has a few (four) constructs only and the behavioral intention is determined by the attitude toward behavior and the subjective norm. Attitude toward behavior can be referred to as the positive or negative feeling for the individual to make a specific behavior (Fishbein and Ajzen, 1975; Venkatesh et al., 2003). On the other hand, the subjective norm is the perception of the user that the majority of the people who are important to him believe he/she should or should not perform the behavior in question (Venkatesh et al., 2003).

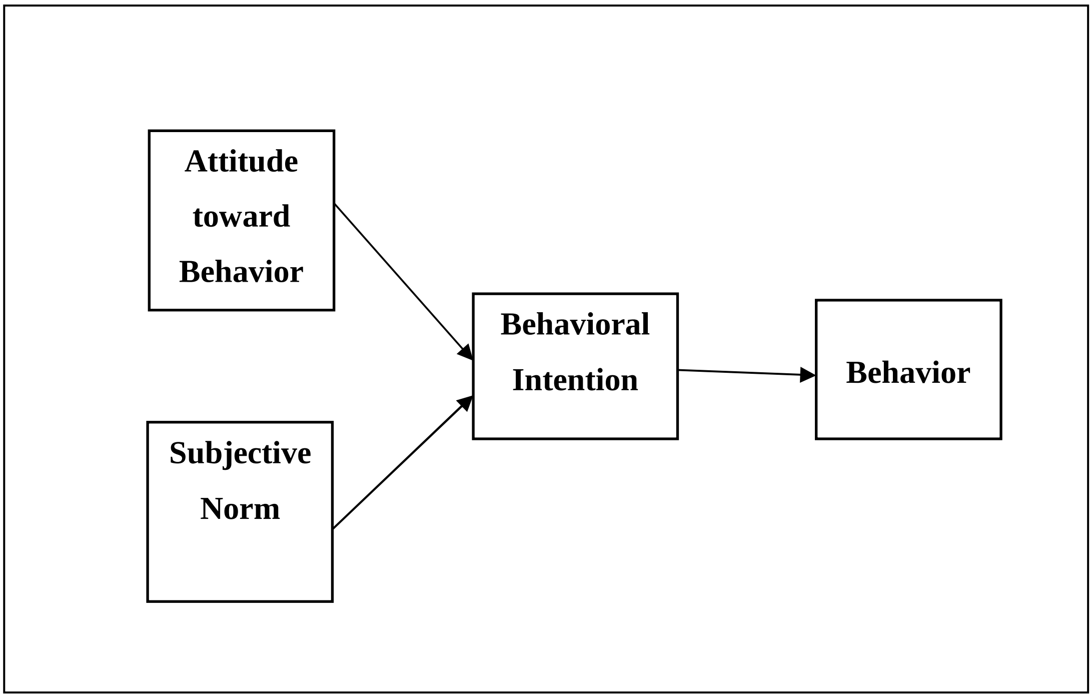


Figure 2.5: The Theory of Reasoned Action
Source: Fishbein & Ajzen (1975)

Social influence has been used as one of the determinants of user`s intention to use computer based information system in decision making in private organizations in Jordan. Theory of Reasoned Action construct namely subjective norm was used to reflect social influence in this study.

Mykytyn Jr. and Harrison (1993) applied TRA to provide a basis for how it can be applied to the acceptance of strategic information systems by senior management. The prime purpose was to unveil some of the underlying reasons for resistance and reluctance to adopt strategic information systems. They proposed that the potential use of strategic information systems by senior management can provide competitive advantage by making optimal use of strategic information relevant to the organization.

2.5.5 Motivation Model (MM)

Many researchers of psychology have supported the theory of Motivation Model. It was also validated by many researches in the domain of Information Systems. It has two core constructs namely extrinsic motivation and intrinsic motivation. This model was created by Davis et al.(1992), who defined the extrinsic motivation as “the perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself such as improved job performance, pay, or promotions" (p.112). On the other hand, they defined intrinsic motivation as “the perception that users will want to perform an activity for no apparent reinforcement other than the process of performing the activity per se" (p.112). Extrinsic motivation and intrinsic motivation were translated to the following factors: Perceived usefulness items; enjoyment items; perceived ease of use items; perceived output quality items; and moderated by task importance. Extrinsic motivation was used in this study indirectly; it was used to reflect performance expectancy determinant of the decision maker`s behavioral intention to use computer based information system.

Lee and King (1991) applied Motivation Model to investigate the acceptance of user participation on system success such as the introduction of a computer-based information system (CBIS). Their study examined the Simple Individual Computing Impact Model and the Cognition- or Motivation-Based Individual Computing Model and found that individual motivation of users is catalytic for the acceptance of system.

2.5.6 Theory of Planned Behavior (TPB)

Ajzen (1991) put forward the Theory of Planned Behavior (TPB), which was extended from TRA. The new or added construct here is the perceived behavior control which was created by Ajzen (1991) to solve the problem of TRA which fits the voluntary behavior only. Basically, there are four core constructs in this model i.e. Attitude towards behavior, subjective norm, perceived behavior control, and behavior intention (see Figure 2.6) as given below.

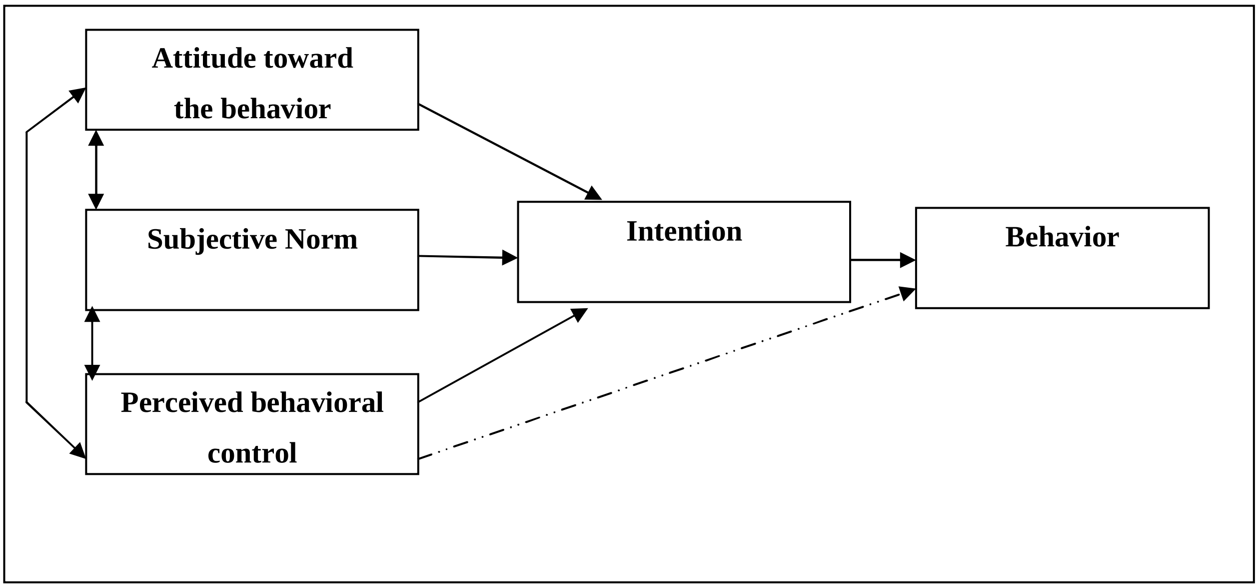


Figure 2.6: Theory of Planned Behavior (TPB)
Source: Ajzen (1991)

TPB extended TRA by adding the perceived behavior control as a new construct which Ajzen (1991) referred to as the ease or difficulty in behavior for user with reference to the internal or external constrains (Ajzen, 1991; Fishbein & Ajzen, 1975; Venkatesh et al., 2003). Subjective norm is used to reflect social influence in this study as determinant of the user`s behavioral intention to use CBIS, while the perceived behavioral control reflects facilitating conditions. Facilitating conditions construct is used in this study to predict actual use of computer based information system and not the user`s behavioral intention.

Mathieson (1991) studied the use of TPB to predict intentions to use spreadsheet which is tool of CBIS. His study compared TAM and TPB, which found TPB provides more specific information for developers.

In addition, Harisson et al. (1997) applied TPB as a theoretical background new reference to adoption of information technology by executives of small businesses. They noticed that adoption of CBIS was quite important for making good business decisions. Also, Ok and Shon (2006) conducted a study to examine the acceptance of Internet banking in Korea. They found that TPB has the ability to predict such acceptance, which is stronger than TRA.

However, like TRA, this model does not consider all factors that influence behavioral intention in using information technology. System characteristics, for example, ease of use and usefulness in TAM and other acceptance models are widely used in information system context. TPB also has no clear definition of the perception of behavioral control (Ajzen, 1991).

2.5.7 Decomposed Theory of Planned Behavior (DTPB)

The combination of TAM and TPB resulted in a new model known as the Decomposed Theory of Planned Behavior (DTPB) by Taylor and Todd (1995b). To mention here, the two researchers conducted another study of experienced and inexperienced potential users of an IT system using an augmented version of TAM, the findings gave that the augmented TAM can be applied to understand the behavior of both experienced and inexperienced users (see Taylor and Todd, 1995a). Returning to Taylor and Todd (1995b), they added other eight constructs to attitude, subjective norms, and perceived behavioral control such constructs were: attitude which was extended to perceived usefulness, ease of use, and compatibility. Also, subjective norms construct was extended to peer influence and superior's influence. Lastly, the perceived behavioral control was extended to self-efficacy, resource facilitating conditions and technology facilitating conditions (Venkatesh et al. 2003; Taylor & Todd 1995b), see Figure 2.7.

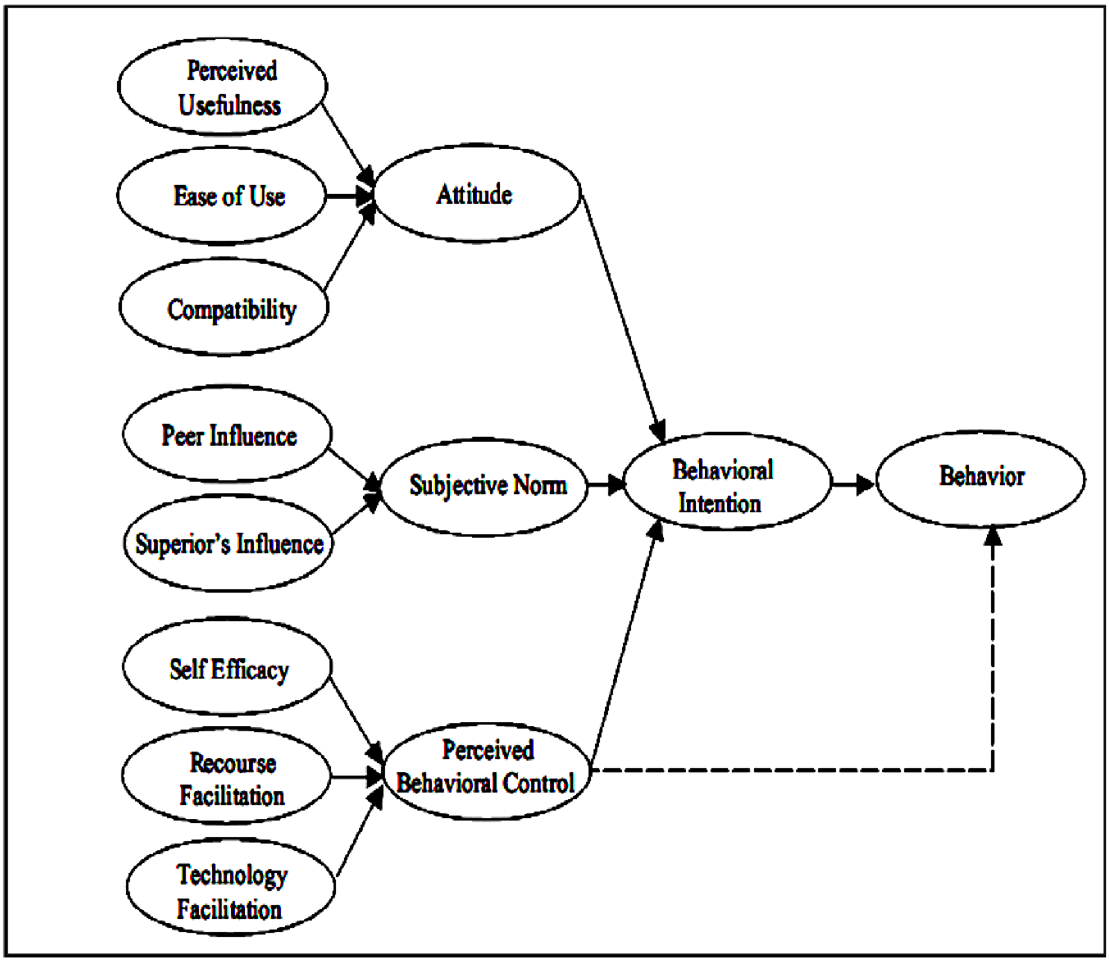


Figure 2.7: Decomposed TPB (DTPB)
Source: Taylor & Todd (1995b)

In DTPB three constructs including subjective norms, perceived behavioral control, and perceived usefulness have been used to gain three constructs for proposed model in the present study. Social influence was gained from subjective norms, performance expectancy from perceived usefulness, and facilitating condition from perceived behavioral control.

DTPB was applied by Huang et al., (2011) who proposed a theoretical model based on Decomposed Theory of Planned Behavior (DTPB) to explain and predict users' intentions to continue using virtual currency. They validated their hypothesized model empirically by using a sample collected from 421 experienced users. The results of their study demonstrated that use intention of virtual currency is strongly associated with factors such as: attitude, subjective norms, and perceived behavior control. The effect of decomposed factors such as micropayment was found to have the most influential effect on attitude; close friends influence was a major determinant of subjective norms; and internet self-efficacy was a major determinant of perceived behavior control.

2.5.8 Model of PC Utilization (MPCU)

This model sprang from the Triands theory of human behavior in 1977 to compete with the two other models i.e. TRA and TPB, and MPCU was created by Thompson et al. (1991). This model has six constructs: job-fit, complexity, long-term consequences affect towards use, social factors, and facilitating conditions, (see Figure 2.8) (Thompson et al 1991; Venkatesh et al. 2003). One example of the constructs i.e. "job-fit" Thompson et al. (1991, P. 129) was defined as "the extent to which an individual believes that using a PC can enhance the performance of his or her job".

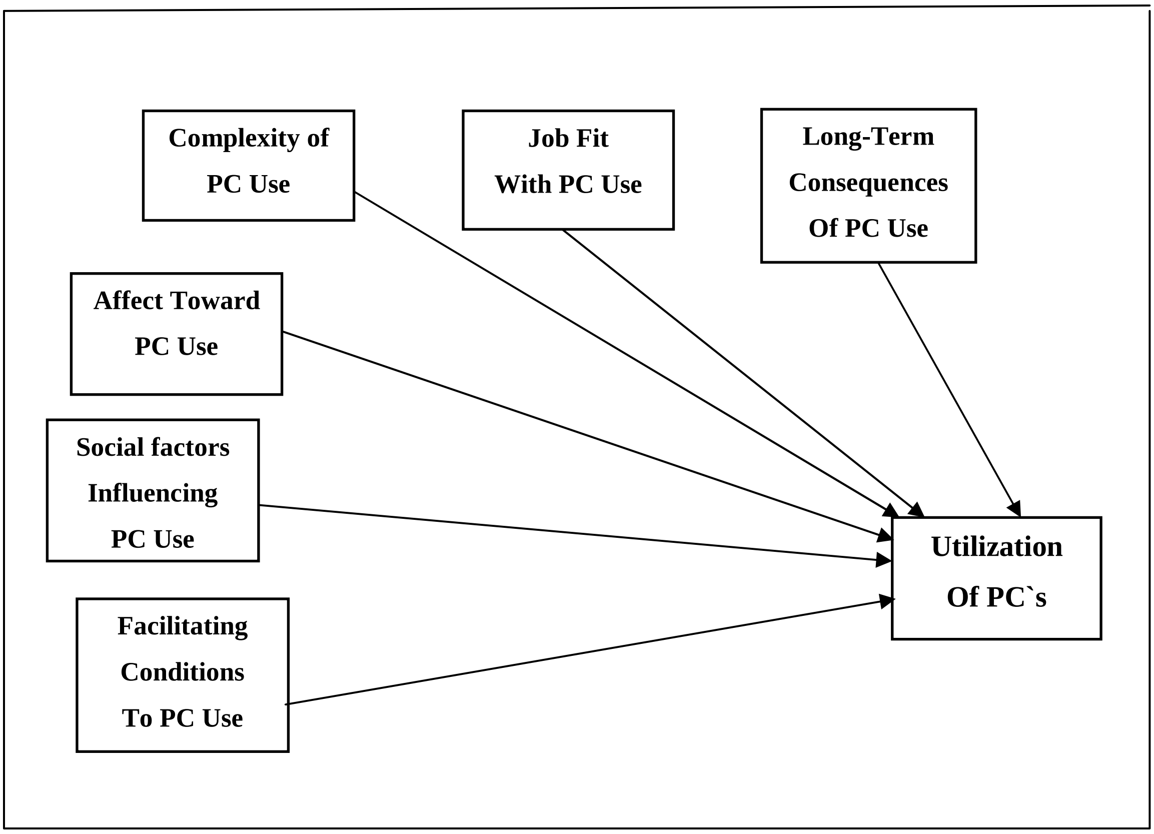


Figure 2.8: Model of Pc Utilization (MPCU)
Source: Thompson et al. (1991)

From this model MPCU, four constructs have been derived to reflect factors to predict decision maker`s intention to use computer based information system in this study i.e. job fit was used to reflect performance expectancy, complexity to reflect effort expectancy, social factor to reflect social influence, and facilitating conditions to reflect facilitating conditions.

MPCU has been applied by Igbaria (1992) to study the acceptance of microcomputers and personal computers. His study was conducted among 519 managers. Furthermore, behavioral intention factor was found to be the determinant of user acceptance of microcomputer technology.

2.5.9 Innovation Diffusion Theory (IDT)

The Innovation Diffusion Theory (IDT) dates back to sociology in 1960s. Known to Rogers, it has been included in many innovation studies of many different fields and finally it was included in the Information System (IS). Moore and Benbasat (1991) stated that their work of IDT was based on Roger's work. The core constructs for IDT theory are: Relative Advantage, Ease of Use, Image, Visibility, Compatibility, Result Demonstrability, and Voluntariness of Use (Venkatesh et al., 2003).

There are five characteristics for innovation such as: Relative advantage, compatibility, complexity, observability, and trialability. In addition, these characteristics determine users innovation: Relative advantage as " the degree to which an innovation is perceived as being better than its precursor"; compatibility as " the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters"; complexity as "the degree to which an innovation is perceived as being difficult to use"; observability as " the degree to which results of an innovation are observable to others"; and trialability as "the degree to which results of an innovation may be experimented with before adoption" Moore and Benbasat (1991, p.195).

From IDT, four constructs have been used in this study. Performance expectancy is used to reflect relative advantage, effort expectancy to reflect complexity, social influence to reflect image, and facilitating condition to reflect compatibility.

IDT was applied by many studies as follows: Rajagopal (2002) applied IDT in the perspective of implementation of enterprise resource planning (ERP) systems in the organizations to study the process of diffusion and acceptance ERP in order to integrate various operations of organization. Al-Gahtani (2003) applied IDT to investigate the adoption and acceptance of CBIS. He found that perceived attributes of computer technology influence its rate of adoption by knowledge workers working at different managerial levels across public and private organizations in Saudi Arabia. Ellahi and Manarvi (2010) proposed a research framework in their study based on combination of few constructs of three technology acceptance models comprising of IDT, MPCU and TAM. Their aim was to determine the attitudes and perceptions of the Pakistani police officers towards the adoption of Information technology. They concluded that the technologies can only improve the productivity of organizations if they are diffused, accepted and utilized thoroughly.

2.5.10 Social Cognitive Theory (SCT)

The Social Cognitive Theory related to the human behavior was suggested by Bandura who established a model based on person, environment, and behavior constructs (Compeau & Higgins, 1995). The latter two researchers extended the Social Cognitive Theory (SCT) to computer utilization and proposed a model renamed as computer self- efficacy (refer to Figure 2.9) Similarly, Venkatesh et al.

(2003) argued that the core constructs for the extended SCT model are: outcome expectations performance, outcome expectations personal, self-efficacy, affect, and anxiety.

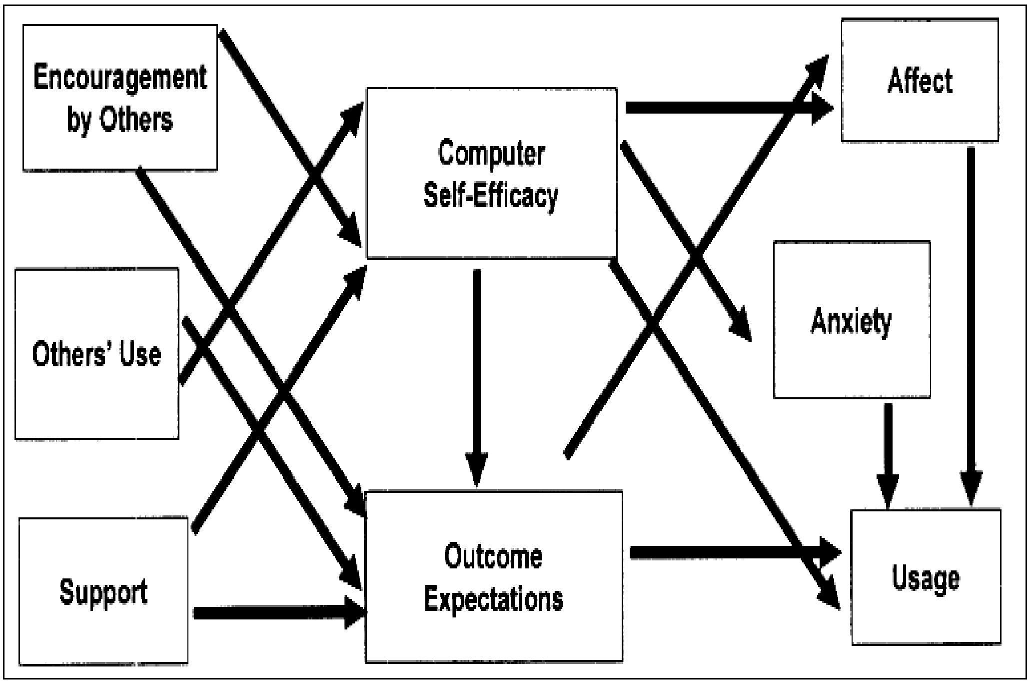


Figure 2.9: Computer Self- Efficacy Extended for SCT.
Source: Compeau & Higgins (1995)

In SCT the construct (Performance expectancy) has been derived from outcome expectation performance in order to examine decision maker`s intention to use computer based information system.

Huang et al. (2008) applied SCT to investigate the factors influencing Knowledge Management Systems (KMS) usage from the perspectives of information technology, organizational task, and personal cognitions. They found the application of SCT as a relevant and significant background for adoption of KMS which can benefit organization through accumulation and management of valuable knowledge.

2.5.11 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) conducted a meta-analysis for eight known technology acceptance model constructs with the aim to explain the user behavior in accepting and using information technology and came out with a unified comprehensive model. This model has come to be known later as the Unified Theory of Acceptance and Use of Technology (UTAUT), which has four independent key constructs i.e. Performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). In addition, two dependent constructs i.e. The behavior intention (BI) and actual behavior use (BU), include other four moderators: gender, age, experience, and the voluntariness of use as shown in Figure 2.10

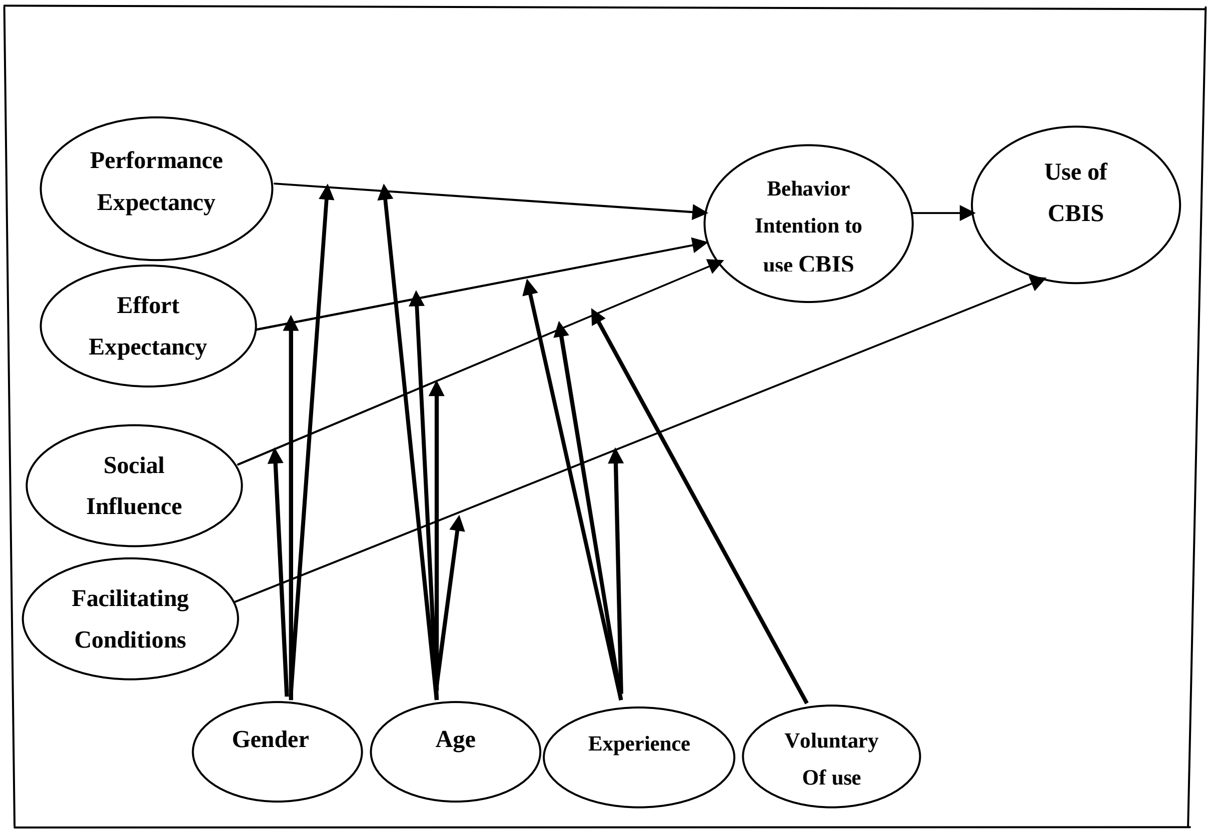


Figure 2.10: UTAUT
Source: Venkatesh et al. (2003)

UTAUT as explained by Venkatesh et al. (2003) defined PE as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (p. 447). EE is, considered as “the degree of ease associated with the use of the system” (p. 450). SI means “the degree to which an individual perceives that important others believe he or she should use the new system” (p. 451). In addition, FC implies “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (p. 453) (Venkatesh et al., 2003).

In the beginning, a conceptual UTAUT was started with 7 independent factors namely: Performance expectancy; attitude toward using technology; effort expectancy; self-efficacy; social influence; anxiety; and facilitating conditions. Based on the findings of UTAUT, they were reduced to 4 factors: Performance expectancy; effort expectancy; social influence; and facilitating conditions, which are known in the common UTAUT.

In addition, the performance expectancy roots were *perceived usefulness* from (TAM; TAM2 and DTPB) models; extrinsic motivation from (MM) model; job-fit from MPCU; relative advantage from IDT; and outcome expectations from (SCT) model. While, *effort expectancy* was adapted from perceived ease of use from TAM, and TAM2; complexity from MPCU; and ease of use from IDT. In addition, *social influence* roots were: Subjective norm in from TRA; TAM2; TPB and DTPB; social factors from MPCU; and image from IDT. As for the facilitating condition roots, they came from perceived behavioral control in TPB, and DTPB; *facilitating conditions* in MPCU, and compatibility in the IDT.

The four moderators: gender, age, experience and the voluntariness of use are not determining factors but are mediation factors which might have impact on the independent key constructs of use behavior, which was the main difference from the other models.

Based on Venkatesh et al. (2003) the existence of information technology and computers has extended a vast which sometimes reaches 50% of the capital investment of today`s organizations, So for improvement users in organizations must accept and use information technology. In addition, they explained that as much as 70% of the variance in intention is the practical limit for user acceptance and usage decisions explanation in organizations.

2.6 Discussion of Models/Theories and their Factors

All models/theories came from a background based on psychology or sociology i.e. TRA, TAM, and TAM2. The variance behavior intention in comparing TRA with TAM was 32% and 26% respectively in a study for 107 students for word processing (Davis et al., 1989). While another study of variance for the three models TAM, TRA, and DTPB was for TAM 52%, for TPB 57%, and for DTPB 60% for 786 students in measuring the behavior intention to use the computing resource center (Taylor and Todd, 1995b).

Motivation Model was applied by Davis et al. (1992) to understand the adoption for new technology, from a psychological perspective, while the IDT adopted characteristics of innovation to study the individual technology acceptance. Also, SCT which is related to social human behavior field extended to computer utilization as MPCU theory the root from human behavior extended by Thompson et al. (1991).

On the other hand, UTAUT was developed from previous mentioned eight models as a unified view technology model to explain the acceptance and use for individuals to new technology, the UTAUT has more than 70% of variance for the behavior intention which gives it advantage over the other models (Venkatesh et al., 2003).

Previous studies have not used moderating variables in some models i.e. TAM, TRA, TPB which made the researcher to look for ways to extend these models to new ones as TAM2, TAM3, and UTAUT. One example of these moderators factors i.e. Voluntariness was included in the latest three mentioned models to make them even more interesting to researchers to work within the mandatory and voluntary environments.

It can be seen from the above, that the behavior acceptance technology models have many factors, the core constructs for each model are summarized since they are the most important independent factors for the behavior intention to use or directly for the actual use so good to categorize all on one table, see Table 2.5.

TRA, TAM, and TPB models have a few numbers of factors which make them easy to apply in researches but at the same time do not suit the needs for many researches and force them to extend these mentioned models to new models as TAM2, TAM3, and UTAUT.

UTAUT added moderators to be a unified view of the previous models; in addition, it came as an extended model to be a solution for the lack of factors as an integration model and to suite all the situations in mandatory or voluntary environments.

Table 2.5: *Factors (Core Constructs) for Technology Acceptance Models/ Theories*

Model	**Factors (Core constructs)**	
TAM	Perceived Usefulness, Perceived Ease of Use, Attitude toward Using	Behavior Intention to Use
TAM2	Perceived Usefulness, Perceived Ease of Use, Subjective Norm, Image, Job Relevance, Output quality, Result demonstrability. Moderator: Experience and Voluntariness	Behavior Intention
TAM3	Perceived Usefulness, Perceived Ease of Use, Subjective Norm, Image, Job Relevance, Output quality, Result demonstrability. Computer self-efficacy, Computer Anxiety, Perceptions of External Control, Computer Playfulness, Perceived Enjoyment, Objective Usability. Moderator: Experience and Voluntariness.	Behavior Intention
TRA	Attitude, Subjective Norm	Behavior Intention
MM	Extrinsic motivation and intrinsic motivation translated as: Perceived Usefulness, Enjoyment, Perceived Ease of Use, Perceived Output Quality. Moderator: Task Importance	Behavior Intention
TPB	Attitude, Subjective Norms, Perceived Behavioral Control.	Behavior Intention
DTPB	Attitude, Subjective Norms, Perceived Behavioral Control, Perceived Usefulness, Ease of Use, compatibility, Peer Influence, Superior's Influence, Self-Efficacy, Resource Facilitating Conditions and Technology Facilitating Conditions	Behavior Intention
MPCU	Job-Fit, Complexity, Long-Term Consequences, Affect Toward Use, Social factors, and Facilitating Conditions.	----------

IDT	Relative Advantage, Ease of Use, Image, Visibility, Compatibility, Result Demonstrability, and Voluntariness of use	------------
SCT	Outcome Expectations Performance, Outcome Expectations Personal, Self-Efficacy, Affect, and Anxiety.	-----------
UTAUT	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions. Moderators: Gender, Age, Experience and Voluntariness.	Behavior Intention

Source: Adapted from (Davis & Venkatesh, 2000; Venkatesh & Bala, 2008; & Venkatesh et al., 2003)

2.7 Other Studies and the UTAUT

Many studies applied UTAUT to variety areas of research, few of which are mentioned:

In a study carried out in wireless LAN technology adoption, Anderson and Schwager (2004) considered UTAUT as one of the important sources that can help to give a good picture about the acceptance of technology. Another study by Wang and Shih (2009) in the E-government services (information Kiosks) in Taiwan validated UTAUT which the two researchers examined by applying the Structural Equation Model (SEM) technique.

Li and Kishore (2006) validated the instrument of UTAUT in the online community weblog systems in multiple subgroups to investigate the differences based on gender and other factors. The two mentioned researchers declared that more and more researchers will use UTAUT in future since it is a useful tool for predicting IT acceptance and usage and for being a very strong and competitive model to use.

Halawi and McCarthy (2006) discussed the development of the information system researches by means of identifying the relevant IS theories in eight fundamentals as follows: (1) Adaptive Structuration theory (AST) to explain technological changes that affect the design over time, (2) Delone and Mclean`s model which reviewed about 180 research studies and came with six fundamentals for IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact, (3) Diffusion theory which was developed to frame technologies,(4) The knowledge- based view of the firm. Researchers added that knowledge based resources are usually difficult to imitate and are socially complex, (5) Task Technology Fit (TTF) which is an extension for two models (TRA & TAM),(6) The Technology acceptance model (TAM which Davis recommends for extending TAM in other external variables as TAM2, (7) Stages theory which suggest initiation, cotagation, control and integration for any organization, and (8) The Unified Theory of Acceptance and Use of Technology (UTAUT) Halawi and McCarthy stated that this model offers a helpful means for managers as decision makers to measure the chance of success of new technology initiations and assists them in recognizing the diverse acceptance for them to propose interventions aimed as/at groups of users that could be less prone to embrace and utilize contemporary systems (Halawi & McCarthy, 2006).

Wang and Yang (2005) adapted UTAUT in their study about online stocks. They combined personality traits with UTAUT since this model includes eight different models to get an integrated view of user acceptance. Lee et al. (2010) in their study (Expert Systems with application) announced some good criteria: Firstly, the original

TAM was presented in the doctoral dissertation of Davis (1986) (Lee et al., 2010); Secondly, the reasons of unsuitability or weakness of traditional and amended TAM and need to extend the model in brief are the following points: the subjects understand the information technology and have completed experience of use; most of the external variables are independent so it is difficult to determine the casual relationship; and it focuses on the public technology system, but some technology systems are complicated. Thirdly, regarding the empirical two studies of Venkatesh et al. (2003) for six different organizations R2 were 69% and 70% respectively which is an additional strong point to this model. The purpose of the UTAUT is to introduce the managers to new technology assessment tools, and provide them with an understanding of the acceptance and use. UTAUT predicts and explains the behavior of users accepting technology, and allows them to accept new technology through a complete plan. Lastly, it uses software called DEMATEL as a tool of the expert systems which is one type of the CBIS system to support the operating decision makers with the required information to process their decisions.

Dasgupta et al. (2007) used the Unified Theory Acceptance and Use of Technology (UTAUT) in an empirical study to identify and test the core determinants of the user intention to use the CASE tools. In their journal literature review presented those technologies as a necessity in the organizations and capital investments that must be accepted and used. In brief, they begin from original TAM, TAM, the extended TAM2, TPB Ajzen (1991), until they reach the UTAUT. The research established that UTAUT is a useful tool for managers as decision makers in their organizations. They used correlations and regression analysis in their analysis even though the limitation of this study was that data collection was limited to students and not organizations.

Lee et al. (2003) argued in their study for TAM history in 101 articles which were published by leading- IS (journals and conferences) that TAM was introduced in 1986 and evolved many times until June 2003, they confirmed that TAM evolved and they investigated this progress in four periods in the last eighteen years: introduction, validation, extension, and elaboration (Lee et al., 2003) see Figure 2. 11.

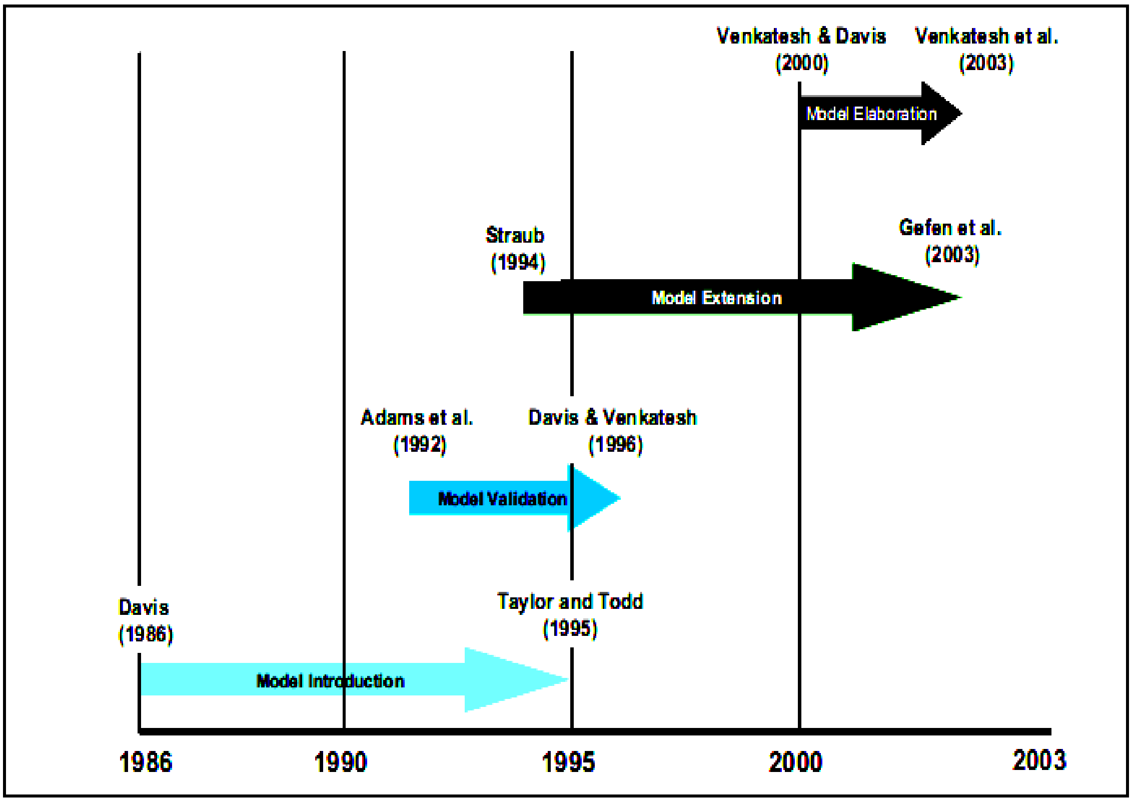


Figure 2.11: Evolution of TAM
Source: Lee et al. (2003)

In addition, Lee et al. (2003) declared that despite the frequent use of TAM by other researchers, there are some limitations such as self-reported usage, single Information System, mandatory situations as can be seen in Table 2.6.

Table 2.6: *Drawbacks of TAM Studies*

Limitations	**# of Papers**	**Explanation**	**Examples**
Self-Reported Usage	36	Did not measure actual usage	Venkatesh and Davis (2000)
Single IS	18	Use only a single information system for the research	Venkatesh (1999)
Student Sample(or University Environment)	15	Inappropriate to reflect the real working environment	Agarwal and Karahanna (2000)
Single Subject (or Restricted Subjects)	13	Only one organization, one department, MBA students	Karahanna and Straub (1999)
One Time Cross Sectional Study	13	Mainly performed based on cross-sectional study	Karahanna et al.(1999)
Measurement Problems	12	Low validity of newly developed measure, use single item scales	Agarwal and Prasad (1998)
Single Task	9	Did not granulize the tasks, and test them with the target IS	Mathieson (1991)
Low Variance Scores	6	Did not adequately explain the causation of the model	Igbaria et al. (1997)
Mandatory Situations	3	Did not classify mandatory and voluntary situation, or assume voluntary situation	Jackson et al. (1997)
Others	15	Small sample size, short exposure time to the new IS, few considerations of cultural differences, self-selection bias	Gefen and Straub (1997)

Source: Lee et al. (2003)

2.7.1 Comparison between UTAUT and other Models

The five points of how UTAUT is different from TAM and other models are hereby presented below:

1. Technology studied: Simple technologies i.e word processor was applied by Mathieson (1991) who employed TAM in his study. In contrary, individual-oriented information technology i.e. online meeting manager that could be used for web enabled video; database applications as websites; and Portfolio analyzer, were used by Venkatesh and his fellow researchers in the UTAUT model. (Venkatesh et al. 2003).
2. Participants: In a comparison made by Venkatesh et al. on four models, they found that only one model used organizational data while the other three used academic or students' data. On the other hand, the UTAUT used organizational data from industrial companies representing Entertainment, Telecom services, Banking, and public administration (Venkatesh et al. 2003).
3. Timing of measurement: All the eight models measured after the participants accepted or rejected the technology but the UTAUT measured it from the very beginning - before accepting or rejecting the technology and continued for different levels of experience(before, while and after) (Venkatesh et al. 2003).
4. Nature of measurement: This is close to the previous point, except for the experience which is examined in the previous model cross sections between the subjects. On the other hand, in the UTAUT, experience is examined through various stages (Venkatesh et al. 2003).
5. Voluntarily Vs mandatory context: Except for the TRA, the rest of the other models did not go through the voluntary tests (Venkatesh et al. 2003).

Table 2.7: *The Differences between UTAUT and the other Models*

ISSUE	UTAUT	Other Models
Technology studied	individual-oriented information technology	simple technologies
Participants	organizational employees data	Out of 4 models, 3 of them used academic data (students) and only one used data of employees in organizations
Timing of measurement	UTAUT measures it from the initial introduction (beginning) and continues it for different levels of experience (before, while, after)	eight models measure after the users accept or reject the technology
Nature of measurement	Here, experiences are examined through different stages.	experience examined cross sections between the subjects
Voluntarily Vs mandatory context	Voluntarily is available here	Old models did not go through the voluntarily tests (except for TRA and TAM2). Note that TAM2 is not among the eight models

Source: Adapted from Venkatesh et al. (2003)

As discussed above, UTAUT appears to be more advanced and appropriate considering the objectives and scope of the study. The technology used by organizations varies from simple such as word spreadsheet to specific and highly sophisticated and advanced systems such as balanced scorecard. All of the private organizations surveyed were assumed to be either voluntary or mandatory users of CBIS. As participants of this study were are decision makers who need to make important decisions in an efficient and effective manner keeping in view the available resources, UTAUT was considered as the most suitable theory of acceptance to be taken in this study. Significance of UTAUT is further discussed in the subsequent section.

2.7.2 Importance of UTAUT

Oshlyansky et al. (2007) found that any tool or method for human-computer interaction (HCI) needs to be validated in different cultures to ensure that it works with all types of users. UTAUT was validated in nine countries with different cultures, namely: Czech Republic, Greece, India, Malaysia, New Zealand, Saudi Arabia, South Africa, United Kingdom, and United States.

Seymour et al. (2007) made a comparison between TAM and UTAUT in the enterprise resource planning (ERP) systems. Through time of implementing these systems in businesses, the major problem in using TAM is that the model assumes that users in the Information Systems (IS) have some level of choice with regard to the extent of technology used. It is declared in the same paper that TAM cannot fit the ERP system since implementing the system in the organization is mandatory. Hence, the theory proposed by Venkatesh et al. (2003) was adapted.

In a study about internet banking, Abu-Shanab and Pearson (2009) adapted UTAUT with the 7-likert scale for Jordanian banks. Their findings indicated that facilitating conditions did not support the actual use of internet banking. An important contribution of their study was the establishment of a well-tested Arabic instrument in the field of technology acceptance.

Brown et al. (2010) integrated UTAUT in the collaboration technology area in a proposed model, the model combined theories from collaboration research with a recent theory from technology adoption research (i.e. UTAUT);in order to explain the adoption and use of collaboration technology. They hold that collaboration technology characteristics, individual and group characteristics, task characteristics, and situational characteristics are predictors of performance expectancy, effort expectancy, social influence, and facilitating conditions in UTAUT. Overall, UTAUT proved effective in predicting intention to use. The three groups of collaboration technology specific antecedents technology, task, and individual/ group characteristics were significant antecedents influencing performance and effort expectancy. Performance expectancy, moderated by gender and age, and effort expectancy, moderated by gender, age, and experience, had significant effects on the intention to use. The consistency of findings across these two studies and technologies contributes to the cumulative tradition and ongoing assessment of UTAUT. Lastly, the work is limited to Finland which has sophisticated technology and this may affect the findings to be generalized.

Venkatesh et al. (2007) discussed the individual level technology adoption as one of the most mature streams of information systems (IS) research. They compared the progress in the area of technology adoption with two widely-researched streams in psychology and organizational behavior: theory of planned behavior and job satisfaction. They concluded that there has been excellent progress in technology adoption research and found UTAUT being very supportive for the predictive validity in IS use contexts.

Venkatesh and Zhang (2010) sought to enrich understanding of research on technology adoption by examining a potential boundary condition, related to culture, with the unified theory of acceptance and use of technology (UTAUT). Based on the cultural differences between the U.S. and China, they conducted an empirical study in a single organization that operated both in the U.S. and China and collected data from a total of over 300 employees in one business unit in each of the two countries. Partial least squares (PLS) was used for analysis. The study confirmed the hypotheses that social influence (differences) will be more uniformly important across all employees, without contingencies related to gender, age and voluntariness that were found to be the case in the U.S. As they theorized, other UTAUT hypotheses held both in the U.S. and China and all the factors were supported again. This work contributes by examining culture as a boundary condition and identifies the bounds of generalizability of UTAUT. In comparing the variances in the origin UTAUT was about 70% In U.S. and only 64% in china for the behavior intention. with some changing with moderators relations with UTAUT (The revised UTAUT) explained 68%, this indicates the role of national culture of UTAUT theory. The two scholars gave it as with the importance of culture to be noticed in IS research in responding to other calls for importance of culture in the context of IS theories, and demonstrated the limit to the generalizability of a key IS theory.

Venkatesh et al. (2012) extended the unified theory of acceptance and use of technology (UTAUT) to study acceptance and use of technology in a consumer context. The new proposed model was named UTAUT2, which added three constructs into UTAUT: (1) hedonic motivation, (2) price value, and (3) habit. With the three following moderators: age, gender, and experience. Which were hypothesized to moderate the effects of these constructs on behavioral intention and technology use. Based on the findings from a two-stage online survey, with technology use data collected of 1,512 mobile Internet consumers supported the proposed model (UTAUT2). Compared to UTAUT, the extensions proposed in UTAUT2 produced a substantial improvement in the variance explained in behavioral intention and technology use. The partial least squares (PLS) was used to test the proposed model, the internal consistency reliabilities (ICRs) was .75 or greater, suggesting that the scales were reliable. The average variance extracted (AVE) was greater than .70 in all cases and greater than the square of the correlations, thus suggesting discriminant validity. Overall, the study confirmed the important roles of hedonic motivation, price value, and habit in influencing technology use and in UTAUT2, which is tailored to the context of consumer acceptance and use of technology.

2.8 Adoption and Acceptance of Computer Based Information System (CBIS)

IS research has given particular attention to two important issues that include the intentions of users to adopt information system (IS) and the rate of spread and use of technology within and across organizations (Taylor and Todd, 1995a) and since this study investigates the CBIS acceptance, it thoroughly reviewed the literature regarding adoption and acceptance of CBIS from the Arab countries and Jordanian Perspective.

2.8.1 Adoption and Acceptance of CBIS in the Arab Middle East Countries

In a study by Nabali (1991) the application and adoption of Computer-Based Information Systems (CBIS) was investigated in the context of hospital information system in the Arab Gulf states. She pointed out that the adoption of CBIS is viewed as a special case of innovation adoption. An adoption is the acceptance and actual use of a practice common elsewhere, while an innovation is the application of a technology in a new way of use as was noticed in the hospital information system in the Arab Gulf countries. The findings revealed that: hospitals owned by Ministries of Health are lower adopters of CBIS; managers of departments that use CBIS have more favorable attitudes towards user involvement; departments in smaller hospitals are more likely to use CBIS; and managers of user departments tend to be older. In her study personal factors included: age, education, occupation, and other personality characteristics, while Organizational factors included: centralization, formalization, functional differentiation, and complexity. Findings also indicate that users of CBIS have had more exposure to computers (including computer-related education) than non-users; non-MOH departments use CBIS significantly more than MOH hospital departments; departments in smaller hospitals are more likely to have CBIS; managers of departments that have CBIS are more likely to be older than managers of nonuser departments.

Al-Abdul Gader (1999) mentioned that CBIS can substantially contribute in the national development. The role of CBIS was quite an important factor for the policy makers in socioeconomic development of Arab Gulf countries (AGC). In addition, from an administrative viewpoint CBIS can prove instrumental in developing and managing innovations in various activities performed within the organizations. A call also stressed on the need for development of an instrument to assess perception of adoption of CBIS because the transfer of CBIS to AGC could not be achieved effectively unless it was managed, operated, and used with indigenous techniques and models. Furthermore, a comparison was made among various issues related to diffusion of CBIS in AGC and developed countries on the basis of strategy, structure, systems, staff and skills. Strategically, it was found that AGC focus on acquisition of technology, whereas developed countries see it as an opportunity to develop and advance the required technology. Structurally, in AGC there is no formal structure to manage CBIS, whereas in developed countries there are highly formalized structures to develop and manage CBIS. In case of systems, AGC largely focus only on a generic MIS whereas the developed countries have strategically advanced CBIS systems aligned with their business requirements. In case of staff, in AGC, organizations encounter the shortage of in-house trained personnel to manage CBIS, thus they rely on external contractors, whereas in developed countries, organizations are self-sufficient as far as availability of competent personnel is concerned, they have well developed departments to manage CBIS lead by a CBIS director. Finally, in terms of skills, in AGC the focus is still there on technical skills, where as in developed countries organizations have gone beyond the technical expertise and focusing on marketing of CBIS to its potential users in a wide range of functional areas. Based on aforementioned gap between AGC and developed countries in terms of the issues as highlighted above, he emphasized on the importance of developing a plan to cope with the CBIS diffusion barriers in AGC. He identified eight major CBIS diffusion barriers as follows:

CBIS planning, human resource, management, top management involvement, organizational structural issues, financial resources, support services, technical issues, and users' negative attitude.

Al-Gahtani (2003) used the acronym of the computers and information technologies within the scope of CBIS. An investigation was done on how perceived attributes of computer technology influence its rate of adoption of knowledge workers' perceptions, of different managerial levels across public and private organizations in Saudi Arabia. The literature suggested that Rogers' five characteristics of innovation namely, relative advantage, compatibility, complexity, trialability, and observability are catalytic for ensuring higher rates of diffusion and adoption of innovation. Moreover, encouraging the use computer-based information systems can lead to significant productivity gains, cost reduction, and competitive advantage; yet their introduction has met with resistance in many organizations. This resistance is evident from infrequent use of computers which limits the opportunity for sustainable development. Furthermore, he argued that user acceptance tests performed early in design are sufficiently predictive of future user acceptance, and could reduce the risk of user rejection by enabling designers to better screen, prioritize and refine application ideas.

AL-Gahtani et al. (2007) extended UTAUT on knowledge workers using desktop computer applications on a voluntary basis in Saudi Arabia, examined the relative power of a modified version of UTAUT in determining 'intention to use' and 'usage behavior'. It was found that the model explained 39.1% of intention to use variance, and 42.1% of usage variance. Moreover, Performance expectancy has a positive effect on intention as suggested by Venkatesh et al. (2003). Furthermore, their results revealed that Effort Expectancy did not have a positive impact on intention in the presence of moderating variables. In addition, it was found that the facilitating conditions factor did not have a significant impact on the actual use of computer applications; and results also indicated that Subjective Norm positively influences intention among Saudi users but this impact is reduced with increasing age and experience.

Al-Zhrani (2010) studied the adoption and significance of management information system (MIS) in the decision making process during crises using a sample data from administrative officers in the Directorate General of Border Guard (DGBG) in Saudi Arabia. He further examined the limitations such as poor planning, coordination and control activities, lack of uniform standards, and organizational issues such as clear organizational structure hamper the use of MIS in such problematic situations. Al- Zahrani's results show that MIS was satisfactorily used indecision-making during crises and he recommended that it should be used more intensively in decision making and that the MIS units should be maintained to ensure a free flow of information and adequate use of MIS in decision-making.

Al-Zahrani and Goodwin (2012) studied E-Government`s programs and services adoption and acceptance in Saudi Arabia. Based on the UTAUT, they integrated the unique features of E-Government to comprehend understanding of usage of e-Government in Saudi Arabia. Furthermore, they considered inclusion of trust, privacy and cultural context of Saudi Arabia. In studying citizen adoption of E-Government services in Saudi Arabia, they modified UTAUT that integrated the factors of E-Government. They recommended that trust and privacy should be included in the proposed model. The “experience” and “voluntariness” from UTAUT's moderating factors were proposed as being included in "citizen's demographics" while “Saudi culture” have been added to the list of moderating factors.

2.8.2 Adoption and Acceptance of CBIS in Jordan

Ismail (2011) conducted an empirical study about marketing information system (MKIS) decision making on Royal Jordanian Airlines (RJA). The study categorized MKIS in 4 components: internal records (data bases), marketing intelligence, marketing research, and analyzing marketing information (decision support system), and this component DSS which is one type of CBIS. He concluded that the ultimate purpose of MKIS is to facilitate mangers’ mission to make decision at all levels of operations based upon the information flow. Information is the essential ingredient of management and decision making for both external and internal factors. In addition, the decision maker must try to find out the various alternatives available in order to get the most satisfactory result of a decision. Identification of various alternatives not only serves the purpose of selecting the satisfactory one, but also avoids any bottleneck situation by using, probabilistic analysis, decision trees, and cost/volume/profit analysis. The Royal Jordanian Airlines utilized and depended more on decision support system (DSS) in decisions making and this variable took the first priority, while the second priority was for the intelligence marketing as a main source of information. The study concludes that there is a significant relationship between DSS variables and taking the right decision. With little effect for data base (internal records), the study also concluded that there is no significant relationship between marketing research and the right for decision making. He aims at highlighting the significance and importance of utilizing marketing information system (MKIS) on decision-making, by clarifying the need for quick and efficient decision-making due to time saving and prevention of duplication of work.

Barakat et al. (2011) argued that the rapid advancements in terms of application and adoption of MIS and the global economic crisis have affected the MIS job market. They recommended that the universities in Jordan must develop MIS curriculum according to the market needs in order to foster higher employment rates of their MIS graduates. As recruiters are no longer looking for Grade Point Average as a hiring criterion and that new skill sets have been adapted by human resource departments with respect to hiring new MIS graduates. Their study highlighted the most important skills needed for entry level positions as perceived by MIS students. The top five skills required in the Middle East job market were: good communication skills, team player and cooperative skills, overall personality and demeanor, leadership skills and being trustworthy.

Al-Omari et al. (2012) found a positive impact of software, information networks and the quality of information on the process of managerial decision-making. Another finding was a lack of high response from the personnel, who do not receive periodic training in order to develop their abilities. His study is especially important for the tourism sector in Jordan in light of the scarcity of resources particularly at a time when Jordan faces huge challenges due to political and security circumstances that call for more efficient and effective management. In this regard the tourist agencies are compelled to pay more attention to information technology or CBIS to reach outcomes that are more beneficial in decision making under crises situations as mentioned above. Furthermore, the companies who want to adopt CBIS and want its thorough application and acceptance in their organization must provide appropriate training to users of CBIS. He concluded that there is a significant need for the software to be provided by CBIS that can lend support to the process of decision making in Jordanian tourist companies, as it aligns with the requirements of the work done by decision makers and the system and the software can easily be applied and updated according to the need of the decision maker.

Al- Dalabeeh and Al- Zeaud (2012) stressed on the significance of adoption of Accounting Information System to meet the requirements of modern management of pharmaceutical companies in Jordan. Their study exposed to the problem of measuring the costs of public shareholding industrial companies in Jordan, through accounting information systems. The results of their study aimed at investigating the effect of the accounting information systems in Jordan indicate that: There is a positive impact of adoption of accounting information systems with respect to measurement of costs of business operations such as cost of materials used, ordering and re-ordering, production costs for individual centers in the Jordanian companies. Thus accounting information systems give highly useful input to decision makers who can effectively plan for company’s profits.

The aforementioned literature signifies the increasing adoption and acceptance of CBIS in Jordanian companies. However, it is important to highlight some of the general problems related to adoption and acceptance of CBIS in Jordan. AL-Mahid and Abu-Taieh (2006) used CBIS interchangeably with IS and gave reasons for the failure of information systems in developing countries such as Jordan. They cited fifteen possible reasons for this failure; it was shortened and highlighted to: (1)

language and cultural barriers, (2) individual ownership of data, (3) lack of cooperation, (4) fear or attitudes of using computers, (5) status, (6) lack of coordination, (7) poor or unavailability of data, and (8) lack of support from higher management. They also suggested some possible solutions as: (1) educating the users and IT personnel in how to use computers in a good way, (2) communication in different levels in private and governmental sectors, (3) provide PC`s to be available to all users, (4) connectivity to the Internet, (5) promote accepting and using IT as one area for development.

On the basis of all of the above mentioned discussion in the light of previous studies as discussed in various sections of this chapter, we can conclude that the adoption and acceptance of CBIS is quite significant in both the developed as well as the Arab countries in order to facilitate decision making in various areas of business. However there are several barriers in diffusion of CBIS encountered by companies in Arab countries, if coped can be quite beneficial for decision makers to make efficient and effective decisions that can have a positive impact on companies' success and profitability. In the light of the literature, this study intends to measure the acceptance of CBIS in decision making in Jordanian organizations. This leads to the summary of the chapter presented in the subsequent section.

2.9 Summary

Many theories were developed to investigate the technology acceptance in the IS (Information System) literature. The research model which will be developed and tested in this study primarily adapted from the Unified Theory of Acceptance and Use of Technology (UTAUT) model developed by Venkatesh et al. (2003).

Literature review was partitioned into four parts; the first gives some information about ICT levels in the venue for this study, Jordan. The other three parts include: decision making, CBIS, and Technology theories. UTAUT, the solid model for this study, was described in more detail than the other models. Decision making factors were also discussed and five of them were particularly chosen in the conceptual model: Time, cost, risk, benefits, and resources. In addition, the decision making process was added to UTAUT and it will be discussed in more detail in Chapter 3, the preliminary work for Chapter 4 (the research methodology).The UTAUT model was chosen for the purpose and scope of this study in the context of organizations.

The literature showed decision making process models from different points of view, which varied for scholars with a range from four to five steps. Generally, however, the following steps were agreed upon: (1) identifying the problem, (2) generating alternatives, (3) ranking and selecting, (4) implementing the selected alternatives, and (5) evaluating the outcomes as mentioned by Vlahos et al., (2004). The above steps were in the scope of the study in the managers' decision making at different levels.

For the computer- based information system (CBIS) components and types were viewed in various experts' views. For the CBIS components, the majority of researchers agreed with the (proposed) the components as: (1) hardware, (2) software, (3) data (storages), (4) procedures, and (5) users (in the study meant managers). However, few experts added: knowledge; cooperation; human machine (computer) interaction; and telecommunications, (refer to Table 2.1). Similarly, CBIS types varied from the researchers` points of view. Some limited CBIS to one type only, while others suggested ten types, refer to Table 2.2 (Mentzas, 1994).

In short, CBIS can be looked at as an umbrella with its faces (Turban et al., 2007, 2011). It can be seen from the low managerial level as: transaction processing system, or, classical (structured or programmed) or in the middle managerial level as: management information system (MIS), or additionally, for top managerial level or semi (un-structured) as: decision support system (DSS),

This study adopted the concept of CBIS as discussed by Al-Abdul Gader (1999), who argued the scope of CBIS in Arab countries is limited mainly to the adoption of MIS. As he discussed that in Arab countries, there is shortage of skilled personnel who can use and manage CBIS, similarly companies in Arab countries are less formalized and lack strategic vision to exploit the benefits of CBIS like technologically advanced and developed countries.

UTAUT was applied by many studies as: Seymour et al. (2007) applied UTAUT to examine users' acceptance of enterprise resource planning system (ERP) which is one type of CBIS, Al-Zahrani and Goodwin (2012) acceptance of E-Government programs and services in Saudi Arabia, Abu-Shanab and Pearson, (2009) applied UTAUT to study the acceptance E- banking Applications in Jordan.

After narrowing the scope of this research for the decision makers, which implies existing of an environment (organizations), CBIS was needed to process decisions, and since individuals (different levels of managers) were the focus of processing not the machines (PC`s), the aim for this study was for a solid and in the same scope (organization environment), with the capability of measuring the levels of acceptance and use for users (managers). UTAUT was adapted (refer to Figure 2.10) by Venkatesh et al., (2003) as a basic theory and was extended in a conceptual model in Chapter 3, based on Figure 2.1; the intention (behavior intention) to use technology was the basic or main concept (Venkatesh et al., 2003), which has significance impact on the (actual) use as in TAM, TAM2, TAM3, TRA, TPB, DTPB, and surely UTAUT. These models were respectively shown in Figures 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, and 2.10. Adoption and Acceptance of CBIS in Jordon has been discussed in detail with reference to past studies in Section 2.8. Finally the chapter concludes by highlighting various barriers that obstruct the adoption and acceptance to use CBIS in Jordon. The conceptual model and methods are discussed in detail in Chapter 3.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology, and how the research went through the procedures and methods of data collection, data analysis, subjects of the study, data collection instrument, preliminary works, Pilot-survey, main-survey, data analysis procedures, validity and reliability.

3.2 The Research Process

In order to meet the objectives of the study, the researcher carried out a number of procedures that were done sequentially and systematically. From literature review evidences were collected about decision making factors, CBIS necessity for managers, and UTAUT as a basic theory in the conceptual model for this study. Two preliminary studies were conducted to have an insight about issues and challenges the study could encounter. The factors of decision making were classified into two groups. The main group was: time, cost, benefit, risk, and resources, while the other group was feasibility, ethics, intangible, and financial impact. Structural interviews (standardized) were conducted by the researcher in five Jordanian organizations for the decision makers who are managers at different managerial levels, to identify the use of CBIS of his research in Jordan. So the preliminary work was done into two parts: structured interviews in Jordan and, empirical study on decision making factors from 1990-2010. The preliminary works are reported in further detail in Chapter 4.

For the main study the researcher conducted a pilot study in order to check the reliability of the instrument (adapted questionnaire), which was validated (content validity) by two experts in the relevant academic field from two Universities in Jordan. Jordanian universities were selected as the adapted questionnaire was in Arabic language after translation process. After translation process the instrument was pretested. A total of 156 questionnaires were distributed, and 103 were returned. The usable questionnaires were only 100, and after data cleaning, 2 cases were removed with the (outliers) mahalanobis test. After data was screened, the exploratory factor analysis (EFA) was calculated. All the items were validated to be used in the main study. The pilot study details will be discussed at the end of this chapter. After the pilot study was done, the instrument was ready for the main study. The organizations which were piloted were removed from the main survey. Data was collected from 116 ICT private and registered organizations in Jordan, and was screened, for analysis Structural Equation Modeling (SEM) technique in order to generate the integrated and extended UTAUT. Structural Equation Model (SEM) has been applied, since model fit goodness' measures including X2/ df, GFI, CFI, REMSEA, and TLI were used. SEM technique has also been used by previous studies in Arab countries who adopted UTAUT (Al-Gahtani et al., 2007). The details of the stages are mentioned after the assumptions of SEM were checked and were satisfied with the collected data.

The hypotheses for the conceptual model were tested and from the findings the research objectives were achieved, and the research (proposed) model was introduced, the research process summarized in Figure 3.1.

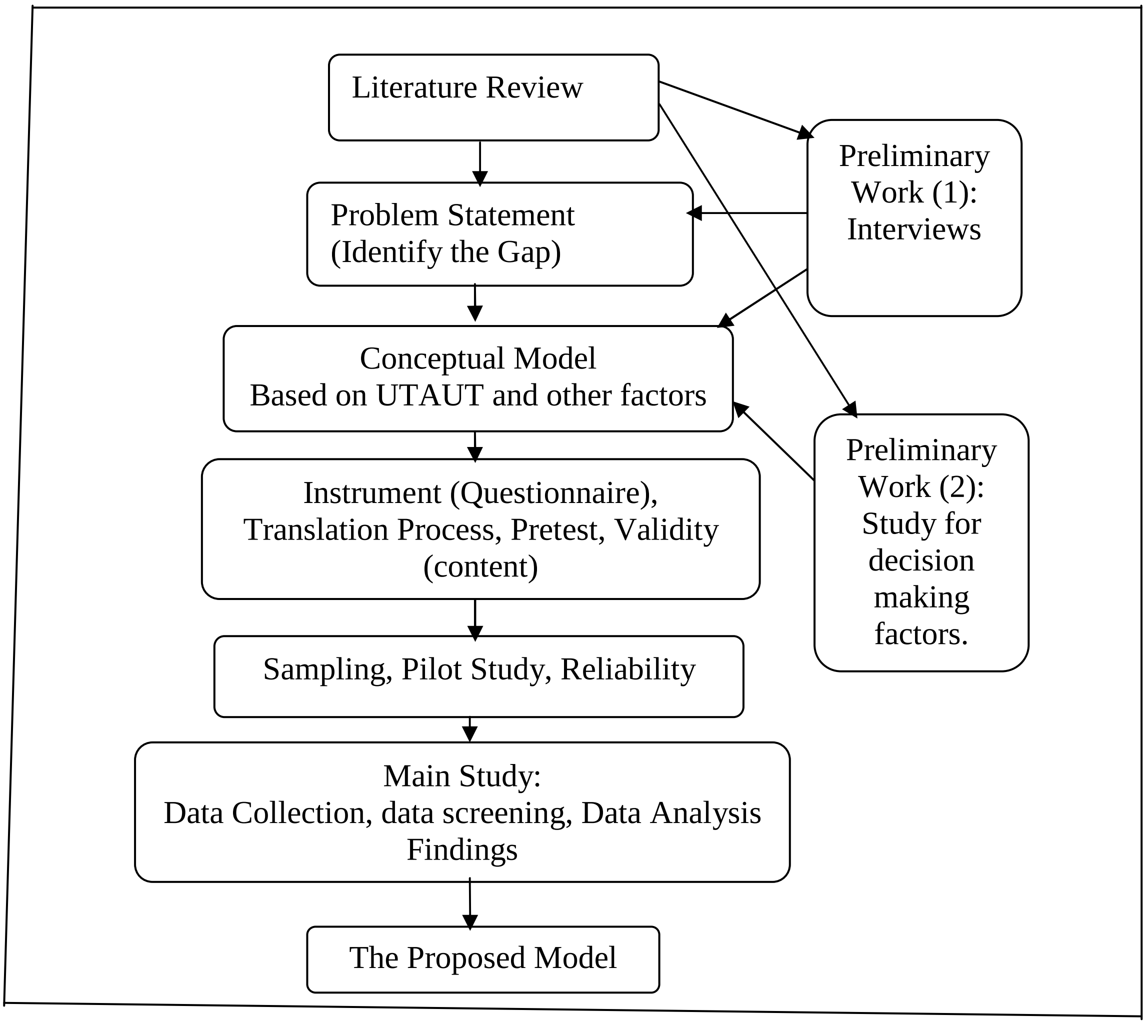


Figure.3.1: The Research Process.

3.3 The Conceptual Model

In view of the foregoing discussions and submissions, a conceptual model based on UTAUT, pre-pilot-interviews, and a pre-pilot-study on decision making factors, is shown in Figure 3.2. UTAUT is a good example from an integration viewpoint of technology, as described in Chapter 2, where the authors of UTAUT integrated other models factors. The performance expectancy roots were from five factors (perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations). Effort expectancy was adapted from (perceived ease of use, complexity, and ease of use). In addition, social influence roots were from (subjective norm, social factors, and image). As for facilitating condition roots, they came from (perceived behavioral control, facilitating conditions, and compatibility). The four moderators were: gender, age, experience and the voluntariness of use. The UTAUT authors did a commendable grouping work which required lots of efforts.

In the present study new factors have been added to UTAUT. As the core focus of this study relates to adoption and acceptance of CBIS in decision making, thus, the decision making process (DMP) was the final output of the conceptual model. It was theorized to be a dependent factor for the actual use of CBIS from UTAUT. It comprised of five decision making factors: time (Lurie & Swaminathan, 2009; Stair & Reynolds, 2006 & 2010; Turban et al., 2007 &2011), cost (Stair & Reynolds, 2006 & 2010; Standing et al., 2010; Turban et al., 2007 & 2011), risk (Adiar, 2007; Stair & Reynolds, 2006& 2010; Standing et al., 2010), benefits (Bhushan & Rai, 2004; Luecke, 2006; Standing et al., 2010), and resources (Fitzgerald, 2002 ; Luecke, 2006). These five factors were independent factors for the decision making process as mentioned above in the light of the past literature.

Structural Equation Modeling (SEM) is a multivariate technique that combines aspects of multiple regressions, and factor analysis estimation concurrently. Also, SEM is preferred over the regression analysis, this is because it is suitable tool when the study using multiple latent and predictor variables. SEM is quite useful when the questionnaire is designed for the interval or ratio scales. Furthermore, it is appropriate and is quite frequently used in the researches in the social science where the instrument seeks to measure the degree of agreement using Likert scale (Hair et al., 2010).

Assumptions to satisfy structural equation modeling (SEM) criteria for this conceptual model are as follows: in case of first group the decision making factors can be correlated. In addition, in case of second group, the four independent factors (performance expectancy, effort expectancy, social influence and facilitating conditions) from UTAUT can also be correlated

However, the inter group factors cannot be correlated, besides, other relations as: the relation between any factor of the first group (time, cost, risk, benefits, and resources) and the behavior intention to use CBIS, or the actual use will not be discussed (will not be hypothesized). In the same manner, no relations between any factors of the second group will be hypothesized with the DMP factor. In addition, in the measurement model (CFA), all factors are estimated (freely), and items (indicators) are allowed to load for any factor without crossing.

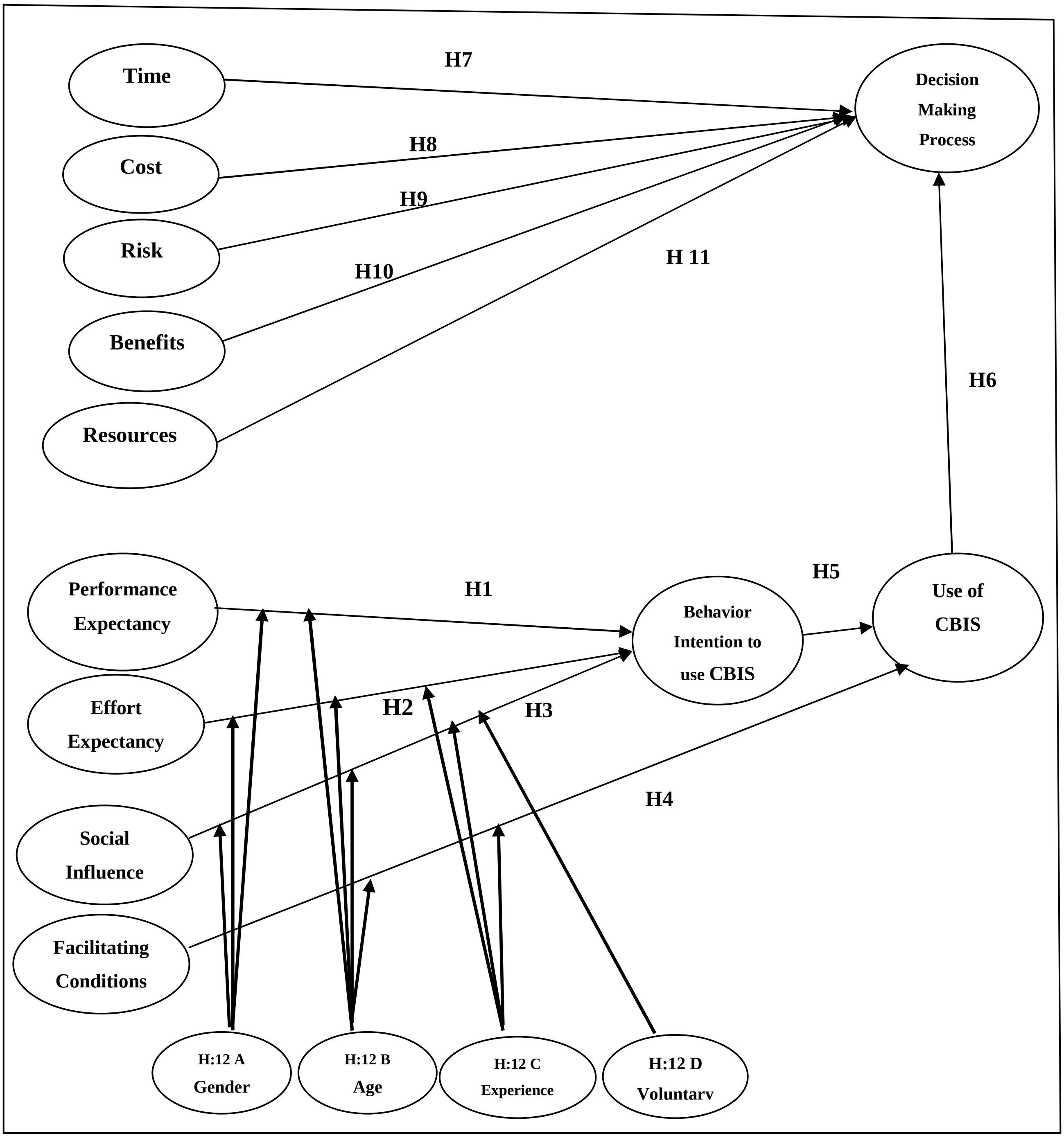


Figure 3.2: The Conceptual Model

3.4 Research Methods

For the purposes of this study, quantitative methodology was used to collect evidence so as to answer the research questions stated in the first chapter. The study runs in two phases: A pilot study in which the instrument is tested for reliability and to ensure that the research is free from any procedural fallacies (shortages). The second phase is the main (real) study in which the instrument (a questionnaire) was used to collect data (Sekaran 2003). In particular, the study dealt with data in a quantitative method via the SEM technique (Hair et al., 2006).

A conceptual model (refer to Figure 3.2) was built from the review and the preliminary work in Chapter 4. Some necessary factors were collected and presented in Table 3.1.

Table 3.1: *Gained Factors that were Added to UTAUT Model*

Stage	Not limited to but also Part of the Aims	Resulted Factors
Pre-Pilot-Interviews	To ensure some factors for the decision making process. See Chapter 4.	cost , time, benefits, risk, resources
Pre-Pilot-Study	To determine the change of the decision making factors how they change over years from 1990-2010. See Chapter 4.	Cost, time, risk, resources, and benefits and secondary factors.
Literature Review	To Collect evidences to achieve the objectives of this research	Cost, time, benefits, risk, resources, systematic way, Decision making process.

The hypotheses of the study, which were represented in the conceptual model, are mentioned in the following section.

3.5 Hypotheses of the Study

The following hypotheses tested in details in chapter 5, and they are formulated as follows:

The first main three hypotheses: Performance expectancy (PE), Effort expectancy (EE), and Social influence (SI) will have a significant positive effect on users for intention use CBIS system in decision making process in organizations. This hypothesis was forked into the following three sub- hypotheses:

H1: Performance expectancy (PE) will have a significant positive effect on users for intention use CBIS in decision making process in organizations.

H2: Effort expectancy (EE) will have a significant and positive effect on users for intention use CBIS in the decision making process in organizations.

H3: Social influence (SI) will have a significant and positive effect on users for intention use CBIS in the decision making process in organizations.

The next hypothesis: Facilitating conditions (FC) will have a significant and positive effect on users for the use CBIS system in the decision making process in organizations. This hypothesis was denoted as H4.

The hypothesis: The behavior intention to use (BIU) for CBIS will have a significant positive effect on the actual use (AUS) for CBIS in this study. And this hypothesis was denoted as H5.

The next hypothesis: Actual use (AUS) for CBIS will have a significant positive effect on decision making process (DMP) for users in this study. And this hypothesis was denoted as H6.

The main hypothesis: Time, Cost, Benefits and Resources will have a significant positive effect on the decision making process in this study, and Risk (High Risk) will have a significant negative effect on the decision making process in this study. This hypothesis was forked into the following five sub- hypotheses:

H7: Time will have a significant positive effect on the decision making process in this study.

H8: Cost will have a significant and positive effect on decision making process in this study.

H9: High Risk will have a significant negative effect on decision making process in this study.

H10: Benefits will have a significant and positive effect on decision making process in this study.

H11: Resources will have a significant and positive effect on decision making process in this study.

The main hypothesis: There are significant differences among the subjects' responses for the four constructs (PE, EE, SI, and FC) due to the following moderated variables Gender, Age, Experience, and Voluntariness. And this hypothesis was forked into the following four sub- hypotheses as follows:

H12a: Gender will have a significant effect with (PE, EE, and SI) in this study.

H12b: Age will have a significant effect with (PE, EE, SI, and FC) in this study.

H12c: Experience will have a significant effect with (EE, SI, and FC) in this study.

H12d: Voluntaries of use will have a significant effect with social influence (SI) in this study.

These mentioned hypotheses from H1 to H12d were the skeleton for the conceptual model.

After the conceptual model was initiated, there was a need to check it and thus make the research support the theoretical ideas with practical evidence. For this, each construct had a hypothesis to be checked by a questionnaire. The construct in the decision making process is a dependent factor (the final output), which root was from (Vlahos et al., 2004).

The following Table 3.2 restates to the hypotheses and the construct in addition the questions numbers were used from the questionnaire in Appendix B.

Table 3.2: *Constructs used in the Conceptual Model*

Operational Constructs	**Items**	**References**
Performance Expectancy (PE): The degree to which the decision maker believes that using the CBIS will help him or her to attain gains in job performance.	1. I would find the CBIS useful in decision making processing in my organization. 2. Using the CBIS enables me to accomplish decision processing more quickly. 3. Using the CBIS increases my productivity. 4. Using the CBIS will significantly increase the quality of my decisions. 5. If I use the CBIS, I will increase my chances of getting better decisions.	Venkatesh et al. (2003)
Effort Expectancy (EE): The degree of ease associated with the use of the CBIS.	6. I expect my interaction with the CBIS would be clear and understandable. 7. It would be easy for me to become skillful at using the (CBIS) system. 8. I would find the (CBIS) system easy to use. 9. I expect CBIS to be flexible to interact with. 10. Learning to operate the CBIS is easy for me. 11. Working with the CBIS is not difficult; it is	Venkatesh et al. (2003) .

	easy to understand how to use it.	
Social influence (SI): The degree to which the decision maker perceives that important others believe he or she should use the new CBIS.	12. People who influence my behavior think that I should use the CBIS. 13. People who are important to me think that I should use the CBIS. 14. The senior management of this organization has been helpful in the use of the CBIS. 15. In general, the organization has supported the use of the CBIS.	Venkatesh et al. (2003)
Facilitating conditions (FC): The degree to which the decision maker believes that an organizational and technical infrastructure exists to support use of the CBIS.	16. I have the resources necessary to use the CBIS. 17. I have the knowledge necessary to use the CBIS. 18. The CBIS is compatible with other systems I use. 19. A specific person (or group) is available for assistance with CBIS difficulties. 20. Guidance will be available to me in the usage of CBIS.	Venkatesh et al. (2003)
Behavior intention (BI): Refers to the expected action of the decision maker regarding the actual usage of CBIS.	21. I intend to use the CBIS in the next few months. 22. I predict I would use the CBIS in the next 4 months. 23. I plan to use the CBIS in the next 3 months. 24. Assuming I have access to the CBIS, I intend to use it in decision making process. 25. Given that I have access to the CBIS, I predict that I would use it in decision making process.	Venkatesh et al. (2003)

Actual use of CBIS (AUS): Refers to application of CBIS by decision makers.	26. I use the CBIS in processing decisions in my organization. 27. I use the CBIS in processing decisions for organizational level and non-organizational level. 28. Other users in my organization are using CBIS in processing decisions.	Venkatesh et al. (2003)
Decision Making process (DMP): Refers to the systematic course of actions decision makers adopt to incorporate the use of CBIS.	29. Decision making Process consists of several steps. For each of the following steps (29-33) what you consider to be valuable for the CBIS. Identify problem or issue. 30. Generating alternative courses of action. 31. Evaluating the outcomes. 32. Ranking the alternatives and choosing one. 33. Implementing the chosen alternative.	Vlahos et al. (2004)
Time: Refers to the importance of avoiding delays in making decisions.	34. Time factor is necessary to be noticed in decision making process. 35. Time as a factor in decision making process, will help decision makers to achieve decisions better and faster. 36. Including time factor in decision making process brings a lot of benefits.	Luecke (2006)
Cost: Refers to selection of alternative decision and its suitability to the budget.	37. Cost factor is necessary to be noticed in decision making process. 38. Decision makers, who ignore cost factor for decision making process, normally have problems in their organizations. 39. Including cost factor in decision making process brings a lot of benefits.	Luecke (2006)

Risk (high-Risk): Related to the unexpected outcomes of chosen alternative.	40. High-risk factor is necessary to be noticed in decision making process. 41. Decision makers, who ignore high-risk factor in decision making process, normally have problems in their organizations. 42. Including high-risk factor in decision making process brings a lot of benefits.	Luecke (2006)
Benefits: The profits from implementing the alternative decision.	43. Benefits factor is necessary to be noticed in decision making process. 44. Benefits factor in decision making process results good decisions. 45. Including benefits factor in decision making process brings a lot of advantages.	Luecke (2006)
Resources: For each alternative, should keep in mind if the required resources are available.	46. Resource factor is necessary to be noticed in decision making process. 47. Resources as a factor in decision making process results good decisions. 48. Including resources factor in decision making process brings a lot of advantages.	Luecke (2006)

3.6 The Questionnaire Design

A questionnaire (see Appendix B) was designed to measure all the variables mentioned in the conceptual model. Based on the literature of previous studies, questions were developed to measure the constructs used in the study. The final questionnaire comprised of two parts: first part was about the demographic questions, and the second part consisted of the items related to constructs.

In the following sub-sections the study provides a description about scales of questionnaire, language of the questionnaire, and the questionnaire items. A paragraph was included in the first page with thanks, title of the research and the researcher name were mentioned, and the purpose of data collection was made sure to be only for academic research.

3.6.1 Scale of the Questionnaire

A common and frequently used seven-point Likert scale was used, ranging from 1 as strongly disagree to 7 as strongly agree and 4 as a neutral point (Table 3.3). It is worth mentioning here that the 7-point Likert scale was used and validated by well-known researches such as Davis (1989), Venkatesh et al. (2003). Abu-Shanab & Pearson, 2009 also used seven-point Likert scale to develop Arabic instrument using UTAUT in Jordan.

Table 3.3: *Seven Point Likert Scale*

Scales	**Strongly Disagree**	**Disagree**	**Disagree Somewhat**	**Undecided (Neutral)**	**Agree Somewhat**	**Agree**	**Strongly Agree**
Code	**SD**	**D**	**DS**	**N**	**AS**	**A**	**SA**
Item	1	2	3	4	5	6	7

3.6.2 Language of the Questionnaire

Translation was done by academic experts from the School of Computing, Universiti Utara Malaysia, and the translation process was based on (Brislin, 1976; Abu-Shanab & Pearson, 2009), as follows:

1. An academic translation center in Irbid - City in the north of Jordan did translation from English into Arabic and checked for understandability of meaning.
2. Translation was then made from Arabic into English and was compared for possible differences.
3. Finally, the corrections needed were made to have the final version in Arabic.

In addition, content validity for the Arabic version was done. The pretest was performed before piloting within two organizations, eight managers (four from each organization). The questionnaires were processed, the feedback was received, and the questionnaire was updated.

Before launching the pilot-survey, there was a need to have the instrument translated from English into Arabic by two experts in translation in cooperation with the researcher so as to obtain the Arabic version of the questionnaire. The Arabic version of the instrument was sent to two professors from Amman Ahleyya and Azzaytouna Universities for referral and feedback. The instrument was checked for clarity, content validity and suitability, to ensure the readability and suitability of the research objectives.

A small segment of the population underwent for some preliminary data collection (pretest 2 organizations and pilot study 24 organizations), before starting on data collection to the main sample. This was aiming to ensure that no problems are involved and that the instrument, which was validated to be used safely in the main stage of the research.

It is worth mentioning at this point that, the organizations which were used in pretest and pilot-survey must be removed from the population for the main-survey.

3.6.3 Questionnaire Measurement Items

Items in the questionnaire consist of two major parts: firstly the demographic information items which (eight major items) were included: gender, age, education level, experience, manager level, organization size, voluntariness use, and actual usage periods. The second part has 12 latent variables: time, cost, risk (high risk), benefits, resources, performance expectancy, effort expectancy, social influence, facilitating conditions, behavior intention to use CBIS, actual use of CBIS, and the decision making process. Also, 4 moderators were included: Gender, Age, experience, and voluntariness.

3.7 Sampling of the Study

In order to select the sample, the population (the organizations information details) list was obtained. Thus, the population comprised of 184 private ICT organizations. All of those organizations were contacted through the human resources departments. 142 organizations showed willingness to participate in the survey. Two organizations were used in the pretest. Systematic randomly method was used (Sekaran, 2003) to select 24 organizations (every 6th organization was selected) in the pilot study. The remaining 116 organizations were all included in the main survey.

The study tried to survey all the population in order to have a sufficient and adequate sample with structural equation modeling (SEM) technique, assuring at the same time the specific target group of the respondents who are exclusively decision makers of organizations. In the pretest, two organizations were removed and from the stage for the pilot sampling organizations, 24 organizations were removed from the sample. In total the main survey was done on a total of 116 organizations.

3.8 Data Collection

A letter from the researcher's supervisor which asserted that the data would only be used for academic purposes was made ready for every organization that showed willingness to participate in the study. In addition, for addressing formality and legality, letters of acceptance of collection data were obtained from organizations. A structured questionnaire was used to collect data in line with Sekaran's directions who holds that a questionnaire which is an organized set of questions, is considered a good and effective tool for data collection (Sekaran, 2003).

Each organization in the target population (184 organizations) was asked by telephone if it wanted to cooperate in this study. 42 organizations did not show interest or they claimed they are not using any type of CBIS in decision making process for their managers. In addition, one procedure was used to ensure that the respondents were only users of CBIS, by a question in the beginning of the survey:

Are you using CBIS in processing your decisions in organization? □ Yes □ No.

So the questionnaire with the no answer was excluded which was no either if he /she did not stop was excluded.

After contacting each organization from the meant sample, a total of 642 questionnaires were given to the 116. One week later, the majority of the copies were collected, then after another week the rest of the copies were collected. 373

questionnaires were returned, 364 were usable, and after data screening, 4 cases were excluded to have only 360 questionnaire ready for analysis.

3.9 Data Analysis

The first step after data collection was data editing and coding, which was required to save data systematically; this was done by using SPSS software version 17.0, data was coded by capitalizing first letters or giving brief names approximating the original variable names: Performance Expectancy was denoted by “PE”, Behavior intention to use CBIS as “BIU”, and for the short name Benefits denoted as “BNFT”.

Structural equation modeling (SEM) was used for this study, which is a multivariate statistical approach. It tests the relationships between independent and dependent factors (Gefen et al., 2000).

Analysis was done through three steps. Firstly, descriptive analysis was carried out for the demographic part, and then data screening to check the adequacy of data for the statistical assumptions, which was done through: missing data, treatment of outlier’s response bias, normality, multicollinearity, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), reliability, and validity. The last step was using the Structural Equation Modeling (SEM) technique, with AMOS 16.0 software.

3.10 Data Screening

This is an important step, and must be done in the earliest stage, since the result of this stage will affect all the following results. Screening data was done through the following sub-sections.

3.10.1 Missing Data

To ensure data screening, it was necessary to deal with any missing data occurring due to the subject or respondent failure to answer one or more questions For data screening the first step is to identify the missing data, as mentioned before, missing data means information not available for a subject (or case) about whom other information is available, and often it occurs when a respondent fails to answer one or more questions in a survey (Hair et al., 2010).

3.10.2 Dealing with Outliers (Mahalanobis Distance)

Outliers issue is an observation that is substantially different from the other observations or it is an extreme value on one or more value (Hair et al., 2010). No less important in data screening is addressing the issue of outliers whose rule was dealt with by (Hair et al., 1995& 1998). Evaluating the multivariate outlier case hinges on the value obtained from any standard set of the critical Chi square value through the use of a number of independent variables as the degrees of freedom at an alpha level of .001 (Tabachnick & Fidell, 2000).

3.10.3 Assessment of Normality

In order to assess normality, there is a need to ensure whether data is within the normal distribution. There is also a need to test it with Kurtosis and Skewness. Kurtosis measure of the peakedness or flatness of a distribution when it compared with a normal distribution, a positive value indicates a relatively peaked distribution, and a negative value indicates a relatively flat distribution. Skewness measures of the symmetry of a distribution, in most instances the comparison is made to a normal distribution. A positive skewed distribution has relatively few large values and tails off to the right, and a negatively skewed distribution has relatively few small values and tails off to the left (Hair et al., 2010).

It is necessary to carry out this step before doing any analysis which will result in a powerful assessment. Normality is tested via a simple test comparing Kurtosis and Skewness from normal distribution. As held by Kline (2005) and Hair et al. (2006, 2010), the statistical value (Z) for Skewness is < 3.0, and for the Part of Kurtosis, based on Kline (2005) it is need to be < 8.0.

3.10.4 Multicollinearity

As Hair et al. (2010) mentioned that multicollinearity extent to which a variable can be explained by the other variables, in addition, Multicollinearity is defined as the high correlation among a set of variables within a specific construct. When the dependent variables are moderately correlated, some multivariate techniques work effectively. A problem of multicollinearity arises when the independent variables have a high degree of correlation among them. Calculating the impact of each variable is difficult to estimate due to multicollinarity which causes overestimation of independent variables. According to Hair et al. (2006, 2010) the value greater than 0.9 of correlation coefficient creates multicollinearity problem. It is then vital to remove strong correlated pairs of the dependent variables or connect them into a single measure (Pallant, 2005). Although some of the variables for this research are highly correlated, they fell within the acceptable range (< 0.9) suggested by Hair et al. (2006, 2010).

3.11 Measurement Model Assessment

After conducting the preliminary data screening described, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used.

3.11.1 Exploratory Factor Analysis (EFA)

The aim of the factor analysis is to verify that the questionnaire items really measure the intended construct (Sekaran, 2000, 2003). Also, Hair et al. (2006, 2010) provide very useful information about the analysis parameters to be examined. In order to ensure the measure of sampling adequacy (MSA) with minimum value of more than 0.50, the Anti-image correlation matrix was used. For the MSA of Kaiser-Meyer-Olkin (KMO) was computed to determine data appropriateness for factor analysis, with a minimum value of .70 to be acceptable. Bartlett's test of sphericity was used to test the significance of correlation among all factors, with 5 percent cut off point was used in determining the significance level. Principal component analysis with Varimax rotation was used as an extraction method. The Factor with Eigen value above one (1) was retained. In evaluating item loading on factors, the loading factor values are recommended to be > 0.50 as the pilot sample also.

3.11.2 Confirmatory Factor Analysis (CFA)

The a priori measurement models assessed initially with EFA were then assessed using confirmatory factor analysis (CFA). The CFA of the measurement models was conducted using AMOS 16.0 software.

3.12 Instrument`s Reliability

The researcher for reducing measurement error must address two important things of a measure reliability and validity, reliability extent to which variable or set of variables is consistent in what it is intended to measure (Hair et al., 2010). Other scholars as: Nunnaly (1978); Sekaran (2003), looked for reliability as the consistency of the degree of measuring something at each time under the same conditions with the same subjects.

For the purposes of this study, reliability was checked for the pilot study for each scale alone and then for the composite reliability. In the same way for the main study, Cronbach Alpha was calculated for each scale alone, and then the composite reliability was tested. Cronbach Alpha was with high value. According to (Nunnally, 1978; Nunnally & Bernstein,1994) the Cronbach Alpha must be above 0.70, and the higher Cronbach Alpha is the better, Values < 0.70 are considered poor, while those value in range of 0.7 considered acceptable, while values > 0.80 are considered good (Sekaran, 2003).

On the whole, the reliability test was high and the Cronbach Alph value was 0.929. for the main study. Cronbach Alpha or Coefficient Alpha (α) is a powerful test of reliability in statistics (Miller, 1995).

For the purposes of this study, reliability which was defined according to Sekaran (2003) as: “attests to the consistency and stability of the measuring instrument,” (p. 422) was tested by using Cronbach Alpha to measure the internal consistency of the items in the survey. Cornbach`s alpha test is used to test the reliability and it needs to be more than 0.7 to be acceptable in the research.

3.13 The Validity

Sekaran (2003) states: “validity means evidences that the instrument, techniques or process used to measure a concept does indeed measure the intended concept” (p. 425). Therefore, the instrument was validated for the content validity, as mentioned before; the instrument was checked for clarity, content validity and suitability, to ensure the readability and suitability of the research objectives.

Validity is the degree to which a measure accurately represents what it is supposed to, and ensuring validity starts with a thorough understanding of what is to be measured and then making the measurement as accurate as possible, also validity extent to which measures correctly represents the concept of study and the degree to which it is free from any systematic or random error. Validity is concerned with how well the concept is defined by measure(s), whereas reliability relates to the consistency of measure(s) (Hair et al., 2010). In this research construct validity was used which includes both of convergent validity and discriminant validity:

1. For checking on convergent validity of the measurement scales, there will a need to calculate composite reliability (CR) and average variance extracted (AVE) values. In order for convergent validity to be achieved, the CR value should exceed the required minimum of 0.70, and the AVE value should exceed the required minimum of 0.5 (Fornell and Larcker, 1981).
2. The evidence of discriminant validity will be obtained by comparing the square root of the AVE value of each latent construct with the correlations between other constructs in the model, the square root of the AVE value of each latent construct must exceeds the correlations between other constructs (Hair et al., 2006, 2010).

3.14 The Pilot Study

The researcher conducted a pilot study in order to check reliability of the instrument, in addition to make sure that a thorough analysis is presented through detecting problems with the items format, wording so as to guarantee the respondent’s understanding of instructions, questions and scales (Sekaran, 2003). It was conducted in ICT private organizations in Jordan as part of scale development methodology.

3.14.1 Population and Sampling of the Pilot Study

24 organizations were included in pilot study to have an adequate sample to be analyzed with EFA, after calling the human resources in each organization from the sample. 156 questionnaires were distributed, 103 questionnaires were returned, 100 of them questionnaires were usable; through data cleaning two were removed

because of outliers; the two cases with ID`s 25, and 88 were removed. Thus, the final data available for analysis was 98 cases.

3.14.2 The Questionnaire Part

As mentioned in the questionnaire design section in this chapter, the pilot study questionnaire was prepared in the Arabic language with a note that says "your comment please" to collect any hints from respondents. That was placed at the end of the questionnaire to have feedback about the questionnaire.

3.14.3 Data collection for the pilot study

With drop and collect method and after calls to the human resources departments the needed copies were sent in February, 2011. In the first two weeks 156 questionnaires of the questionnaire were given to 24 organizations from the population; the returned copies were 103, with 100 usable with response rate 64%. After data was cleaned by removing 2 outliers, 98 cases were ready for analysis and used for the exploratory factor analysis (EFA).

3.14.4 Data analysis for the pilot study

After data was edited to the SPSS software version 17.0, analysis was made for demographic information. Data were screened and Exploratory Factor Analysis (EFA) was calculated, reliability was calculated for all items, which give an acceptable rates above 0.7 (Sekaran, 2003), which indicated the readiness to be used in the main study. Data analysis will be discussed in further detail in Chapter 5.

3.14.5 Demographic information of the Pilot Study

Eight major dimensions of demographics for the 98 respondents were as follows: the males were 69 (70.4%), while females were 29 (29.6%), ages for the respondents were for the first period less than 35 years 36 (36.7 %), while it was for the second period from 36 to 45 years 41 (41.8 %), and for the eldest respondent 46 and above (21.4%). Respondents belonged to varying educational levels: bachelors were 78 (79.6%), the postgraduate were 20 (20.4%). Experiences for the first period from 1-4 years were 16 (16.3%); while for the second period from 5 to 9 years 17 (17.3%), and for the third period from 10 to 14 years 26 (26.6 %), and for the fourth one over 14 years were 39 (39.8 %).

For the managerial level, for the low level respondents were 29 (29.6%), and for the middle level 49 (50%), and for the top level 20 (20.4%). Organizations sizes for the respondents were 50for the small ones (51%), while for the middle were 26 (26.6%), and for the large ones were 22 (22.4%).

In addition, voluntary respondents were 58 (59.2%), while mandatory were 40 (40.8%). Finally, the actual use of CBIS indecision making process for the interval 1-4H was 15 (15.3%), while for 5-9H were 24 (24.5%), also, for the third period were 42 (42.9%), and for the last period were 17 (17.3%). The previous mentioned was summarized in the following Table 3.4.

Table 3.4**:** *Demographic Characteristics for the Respondents of the Pilot Study*

Construct	Classification	Frequencies	Percentage (%)
Gender	Male	69	70.4%
	female	29	29.6%
Age	Less than 35	36	36.8 %
	From 35-45	41	41.8 %
	46 and above	21	21.4%
Educational Level	Bachelor	78	79.6%
	Postgraduates	20	20.4%
Experience	1-4 years	16	16.3 %
	5-9 years	17	17.3 %
	10-14 years	26	26.6 %
	Above 14 years	39	39.8%
Managerial level	Low Level	29	29.6 %
	Middle Level	49	50%
	Top Level	20	20.4 %
Organization Size	Small	50	51%
	Middle	26	26.6%
	Large	22	22.4%
Voluntary Use	Voluntary	58	59.2%
	Mandatory	40	40.8%
Actual Use	1-4 H	15	15.3%
	5-9 H	24	24.5%
	10-14 H	42	42.9%
	above14 H	17	17.3%

3.14.6 Exploratory Factor Analysis (EFA) of the Pilot Study

For the Assumption that the independent factors of the conceptual model were correlated in two groups: The first group of decision making factors: time, cost, risk, resources, and benefits. The second group from UTAUT model: performance expectancy, effort expectancy, social influence, and facilitating conditions. For that EFA was calculated for each group, after that EFA was done to all the factors in the proposed model (see the Tables, 3.5, 3.6, 3.7). Factor analysis was used to check if the items in a questionnaire are actually measuring the construct to be measured (Sekaran, 2000, 2003).

In the process of factor analysis reference was made to Hair et al. (2006). The authors provided very useful information about the analysis parameters to be examined. Anti-image correlation matrix was used to check the measure of sampling adequacy (MSA) with minimum value of >0.50; The MSA of Kaiser-Meyer-Olkin (KMO) was computed to determine data appropriateness for factor analysis, with a minimum value of .70 to be acceptable. Bartlett's test of sphericity was used to test the significance of correlation among all factors was with 5 percent cut off point was used in determining the significance level. Principal component analysis (PCA) with Varimax rotation was used as an extraction method. Factor with Eigen value above one (1) was retained. In evaluating item loading on factors the loading values were > 0.50, as the pilot sample contained 98 cases. The conceptualization was taken into consideration. So though the loading value is important criteria yet the way the factors were conceptualized is equally important (Hair et al., 2006, 2010).

Table 3.5: *Exploratory Factor Analysis (EFA) of the Pilot Study for the DM Factors*

Rotated Component Matrix[a]

	Component				
	Resources	**Benefits**	**Time**	**Risk**	**Cost**
RES48	.918				
RES47	.886				
RES46	.880				
BNFT45		.908			
BNFT43		.893			
BNFT44		.866			
TIME35			.877		
TIME34			.861		
TIME36			.858		
RISK40				.889	

RISK42				.861	
RISK41				.798	
COST38					.829
COST39					.821
COST37					.794
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.					0.765
Bartlett's Test of Sphericity.					P= 0.000
Approx. Chi-Square.					814.145
Total variance					79.776%

Table 3.6: *Exploratory Factor Analysis (EFA) of the Pilot Study for Second Grouped Factors.*

Rotated Component Matrix[a]				
	Component			
	Effort Expectancy	**Performance Expectancy**	**Facilitating Conditions**	**Social Influence**
EE10	.885			
EE7	.840			
EE9	.828			
EE11	.824			
EE8	.808			
EE6	.720			
PE3		.888		
PE1		.852		
PE4		.818		
PE5		.815		
PE2		.680		
FC18			.857	
FC20			.795	
FC19			.781	
FC17			.765	
FC16			.759	

SI13	.820
SI14	.814
SI12	.769
SI15	.748
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.848
Bartlett's Test of Sphericity.	P= 0.000
Approx. Chi-Square.	1426.263
Total variance	72.455%

Table 3.7: *Exploratory Factor Analysis (EFA) of the Pilot Study for All the Factors*

Rotated Component Matrix[a]												
	Component											
	EE	**PE**	**FC**	**BIU**	**SI**	**DMP**	**TIME**	**RES**	**BNFT**	**COST**	**RISK**	**AUS**
EE10	.864											
EE7	.833											
EE9	.818											
EE11	.803											
EE8	.801											
EE6	.711											
PE3		.850										
PE1		.822										
PE4		.783										
PE5		.772										
PE2		.699										
FC18			.818									
FC19			.795									
FC20			.788									
FC16			.674									
FC17			.648									
BIU24				.768								
BIU25				.705								
BIU22				.688								

BIU21	.564								
BIU23	.547								
SI13		.763							
SI14		.759							
SI15		.746							
SI12		.738							
DMP33			.809						
DMP32			.766						
DMP31			.667						
DMP29			.602						
DMP30			.556						
TIME34				.801					
TIME36				.795					
TIME35				.792					
RES48					.886				
RES47					.848				
RES46					.826				
BNFT45						.882			
BNFT43						.875			
BNFT44						.851			
COST39							.772		
COST37							.735		
COST38							.726		
RISK40								.884	
RISK42								.875	
RISK41								.743	
AUS28									.832
AUS27									.655
AUS26									.582
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.								0.772	
Bartlett's Test of Sphericity.								P= 0.000	
Approx. Chi-Square.								3557.875	
Total variance								77.259 %	

Based on the last Table 3.7, it showed that each construct items were grouped together with loading > 0.5, in the same time the other two tables emphasized the same results, the maximum loading items were for the effort expectancy factor, they ranged from 0.711 to 0.864, while the lowest loading were for the actual use of CBIS, and they ranged from 0.582 to 0.832. For the Kaiser-Meyer-Olkin Measure of Sampling Adequacy test it was significant with 0.772, the total variances are for all factors 77.259%.

Factors with Eigen values greater or equal to one accounted for about 77.259 % of the total variance. The first rotated factor comprised 6 items [EE6, EE7, EE8, EE9, EE10, EE11]. The factor loadings were from 0.711 to 0.864which accounted for 28.581 % of variance. These items addressed Effort Expectancy “EE”. The second rotated factor comprised 5 items [PE1, PE2, PE3, PE4, PE5]. The factor loadings were from 0.699 to 0.850which accounted for 9.378% of variance. These items addressed Performance Expectancy “PE”. The third rotated factor comprised 5 items [FC16, FC17, FC18, FC19, FC20]. The factor loadings were from 0.648 to 0.818which accounted for 6.389 % of variance. These items addressed facilitating conditions “FC”.

The fourth rotated factor comprised 5 items [BIU21, BIU22, BIU23, BIU24, BIU25]. The factor loadings were from 0.547 to 0.768which accounted for 5.327% of variance. These items addressed Behavior Intention to Use CBIS “BIU”. The fifth rotated factor comprised 4 items [SI12, SI13, SI14, SI15]. The factor loadings were from 0.738 to 0.63 which accounted for 4.848% of variance. These items addressed Social Influence “SI”. The sixth rotated factor comprised 5 items [DMP29, DMP30, DMP31, DMP32, DMP33]. The factor loadings were from 0.556 to 0.809which accounted for 4.409% of variance. These items addressed decision making process "DMP". The seventh rotated factor comprised 3 items [Time34, Time35, Time36]. The factor loadings were from 0.792 to 0.801 which accounted for 4.298 % of variance. These items addressed "TIME". The eighth rotated factor comprised 3 items [RES46, RES47, RES48]. The factor loadings were from 0.826 to 0.868 which accounted for 3.791 % of variance. These items addressed Resources "RES".

The ninth rotated factor comprised 3 items [BNFT43, BNFT44, BNFT45]. The factor loadings were from 0.851 to 0.882 which accounted for 3.154 % of variance. These items addressed Benefits "BNFT". The tenth rotated factor comprised 3 items [Cost37, Cost38, Cost39]. The factor loadings were from 0.726 to 0.872 which accounted for 2.678% of variance. These items addressed "COST". The 11th rotated factor comprised 3 items [RISK40, RISK41, RISK42]. The factor loadings were from 0.743 to 0.884 which accounted for 2.259% of variance. These items addressed "RISK". The 12th rotated factor comprised 3 items [AUS26, AUS27, AUS28]. The factor loadings were from 0.582 to 0.832 which accounted for 2.146% of variance. These items addressed Actual Use of CBIS "AUS". The final questionnaire is given in Appendix B.

The analysis has resulted 12 factors (constructs) with all their items which represented in the next section (in reliability section), with Eigen values > 1, all the loading were above 0.50 which indicated the statistical assumptions KMO measure. Thus, EFA indicated that all the 12 factors namely: time, cost, benefits, resource, risk, performance expectancy, effort expectancy, social influence, facilitating conditions, behavior intention to use, and actual use, and decision making process are likely constructs for the chosen measure.

3.14.7 Correlation Analysis of the Pilot Study

Referring to Table 3.8 results shown from the matrix of correlation using Pearson method option for the factors ensured the significant correlations between all the decision making factors group together and also the decision making processing factor: TIME, COST, RISK, RES, BNFT, and DMP, in addition, the same results appeared from the factors that were adopted in the UTAUT group all factors together and also the decision making factor: PE, EE, SI, FC, BIU, AUS, and DMP.

Table 3.8: *Correlation Matrix using Pearson Method of the Pilot Study for All the Factors*

	Correlations											
	TIME	**COST**	**RISK**	**RES**	**BNFT**	**DMP**	**PE**	**EE**	**SI**	**FC**	**BIU**	**AUS**
TIME	1											
COST	.455**	1										
RISK	-.362**	-.587**	1									
RES	.307**	.338**	-.367**	1								
BNFT	.216*	.212*	-.249*	.250*	1							
DMP	.521**	.615**	-.567**	.512**	.311**	1						
PE	.279**	.179	-.144	.079	.060	.225*	1					
EE	.326**	.257*	-.290**	.125	.150	.316**	.328**	1				
SI	.309**	.312**	-.231*	-.015	.199*	.354**	.274**	.381**	1			
FC	.428**	.376**	-.409**	.334**	.258*	.385**	.256*	.454**	.401**	1		
BIU	.430**	.296**	-.302**	.131	.308**	.329**	.415**	.511**	.460**	.392**	1	
AUS	.436**	.387**	-.437**	.090	.201*	.364**	.320**	.325**	.392**	.392**	.593**	1

**. Correlation is significant at the 0.01

*. Correlation is significant at the 0.05

3.14.8 Reliability of the Pilot Study

Internal consistence reliability (ICR) was calculated, for each factor all the items for reliability were calculated, all the items succeeded to avoid the acceptable percentages > 0.70 (Sekaran, 2003), each Table for each constructs with its related items is shown in Appendix D, the Cronbach Alpha to each construct with the internal reliability for all the constructs` items, in addition, the correlation were attached together, in the case if any item is deleted, all the results were exceeding the acceptable levels.

According to Nunnaly (1978) and Sekaran (2003) reliability mean the consistency of the degree to which the instrument measures in the same way each time it is used under the same condition with the same subjects.In this pilot study the calculation of each scale was done alone, and then the reliability in total was made. Also, the same technique was followed for the main survey; the reliability test from Cronbach Alpha was with high value. Which refering to (Nunnally, 1978; Nunnally & Bernstein, 1994), it must be above 0.70, the higher Cronbach Alpha is the better, Values < 0.70 are considered poor, while those value in range of 0.7 considered acceptable, in addition, values > 0.80 are considered good (Sekaran, 2003).

In total, the reliability test was high, Cronbach Alpha value was 0.931. and the value for each construct (factor) exceeded 0.80, which gives a good indicator for the questionnaire reliability, details is shown in the following Table. 3.9.

Table 3.9: *The Reliability Test of the Pilot Study (Chronbach Alpha with N=98)*

Factor	Valid Items	Chronbach Alpha of the Pilot Study
Performance Expectancy (PE)	5	0.898
Effort Expectancy (EE)	6	0.932
Social Influence (SI)	4	0.849
Behavior Intention to Use (BIU)	5	0.850
Actual Use of CBIS (AUS)	3	0.843
Facilitating Conditions (FC)	5	0.889
Decision Making Process (DMP)	5	0.881
TIME	3	0.882
COST	3	0.815
RISK	3	0.816
Resources (RES)	3	0.911
Benefits (BNFT)	3	0.889

3.15 Summary

This chapter serves as a guide for the researcher to achieve the research objectives, and answer the research questions, in order to narrow the gaps in this research. It started with the research method approach, the conceptual model was configured. In addition, hypotheses were forked to test the conceptual model. Developing instrument and its design with translation process was discussed. Constructs were combined with the hypotheses in the conceptual model, and 12 constructs were used, besides, 4 moderators. Quantitative methods so as to achieve the main research objectives were used, and structural equation modeling (SEM) technique version 16.0, with the analysis of moment structure (AMOS) software 17.0 were used, the pilot study was discussed, and reliability and validity issues were explained. Next chapter will be for preliminary work which was fulfilled in Chapter 4.

CHAPTER FOUR
PRELIMINARY WORKS

4.1 Introduction

This chapter outlines the preliminary works prior to the main study. It contains two major parts. The first part comprised of structural interviews which were conducted in Jordan in October, 2009; while, the second part consisted of an empirical study to have an insight about the decision making factors from 1990-2010.

4.2 Preliminary Interviews for Decision Makers in Jordan

The information and communication technology (ICT) sector is an important sector for Jordan's economy in Jordan. The aim of this interview is only to help the researcher to investigate the use of CBIS in Jordan, in October, 2009, and to test factors for the decision making process of CBIS.

4.2.1 The Instrument of Interview and Translation Process

Face-to-face interviews were conducted, each starting with greeting and enveloped with politeness. An introduction was given about the research for 3-5 minutes. The researcher took notes without biasing the interviewees to any answer and made sure that the time was not too long i.e. each interview lasted between 10-15 minutes and ended with thanking the participants. After one paragraph of the topic title and the researcher name and university, two items were asked to be answered by the interviewees, firstly demographic information, and then followed by four open ended questions.

Translation was done after confirming the questions from specialist from the Computing School from UUM University as follows: (1) an academic translation center in Irbid - City in north part of Jordan from English to Arabic and checked for understandability of meaning. (2) Translation was then made from Arabic to English and was compared for possible differences, and (3) finally, the corrections needed were made to have the final version in Arabic to ensure reliability and validity.

4.2.2 Steps and Procedures Used in the Preliminary Interviews

Personal interviews were used as a tool to collect preliminary data only and the following steps were used: (1) To select the sample, the researcher tried to interview ten organizations, from the framed population registered ICT organizations consisting 170 organizations in October 2009. When the pilot and main survey were not conducted, the population there was 184 organizations, (see Chapter 3). The human resources departments in each organization were contacted to serve as the sample but only five of them agreed. This was done by telephone calls made to five organizations. (2) Structured interviews were employed as they have more reliability and validity over the unstructured interviews (Campion et al., 1988); qualitative approach using purposive sampling (judgment) technique was employed for the target respondents i.e. decision maker who are using CBIS in organization. Notes were taken by the researcher; this issue was discussed by (Sekaran, 2003). (3) Data was collected from the interviews, grouped and tabulated to make sense. A simple descriptive analysis was made for the frequencies of the participants' answers. Descriptive analysis with percentages was used to deal with the data.

4.2.3 Findings and Results

The findings for the demographic and actual use are summarized in Table 4.1. From eighteen respondents only two were females (11%) and sixteen males (89%), the youngest respondents' age was 29, while the oldest was 55 with Age-Average age 39.8 years for the respondents. The respondents managerial levels were 8 low-level (33%) and 9 middle-levels (50%), while, only 3 (17%) only were from top-levels, (see to Table 4.1).

Table 4.1: *Demographic Information and CBIS Use of the Participants*

Participants	**Gender**	**Age**	**Managerial Level**	**CBIS Use**
Participant 1	male	34	Middle	Yes
Participant 2	male	40	Middle	No
Participant 3	female	39	Low	No
Participant 4	male	33	Low	No
Participant 5	male	45	Middle	Yes
Participant 6	male	46	Top	Yes
Participant 7	male	43	Low	No
Participant 8	male	45	Middle	N0
Participant 9	Male	32	Low	Yes
Participant 10	Male	37	Middle	No
Participant 11	Male	36	Low	No
Participant 12	Male	29	Low	Yes

Participant 13	Male	55	Top	N0
Participant 14	Female	34	Low	N0
Participant 15	Male	39	Middle	Yes
Participant 16	Male	41	Low	N0
Participant 17	Male	46	Top	N0
Participant 18	Male	41	Middle	N0

The respondents who were using the CBIS in decision making process were six of eighteen managers.

The answers from the respondents for the three questions as follows:

Q3: What are the advantages of using the CBIS in decision making in your opinion?

Q4: In the decision making process, what do you think are the major factors or issues to look for?

Q5: What is the software that you use in processing your decisions? (If you are a CBIS user).

After collecting data from interviewees, they were translated by expert to English. Furthermore, they were tabulated in Table 4.2.

Table 4.2: *The Respondents Answers in the Structured Interviews*

Participants	**Comments from the participants**
Participant 1	Ans3: CBIS give me information easy and fast my decisions. Ans4: Benefits, reduce cost, this will reduce risk. Ans5: I use spreadsheet.
Participant 5	Ans3: Help in work. Ans4: cost and time are very important Ans5: I use spreadsheet.

Participant 6	Ans3: I am IT manager with experience 9 years as manager, it make my work easy and faster to respond. Ans4: needed information, cost and time are very important, and be careful from the unexpected problem. Ans5: dashboard with business objects.
Participant 9	Ans3: Help me in work, the integrated system is good. Ans4: I think data, cost, resources and time. Ans5: I use TIBCO (integrated system) and SOA (service oriented architecture).
Participant 12	Ans3: useful for all managers. Ans4: benefit, cost, resources, risk, customers, data and time. Ans5: oracle, SQL.
Participant 15	Ans3: CBIS easy and fast. Help me a lot. Ans4: cost, time, risk. Ans5: I use dashboard.

Based on the two previous Tables, four groups of directions can be grasped as follows:

1. The CBIS Use: From 18 participants only 6 (33.3%) of them declared they are using the CBIS in processing their decisions in their organizations, which means 12 (66.7%) managers are not using CBIS in decision processing in those five organizations.
2. For the third question which was the advantages of CBIS: The answers of the CBIS-Users (managers), the answers obtained included: “Easily, help, fast, useful, and integrated”. While, for the managers who did not use CBIS, they mentioned words as: “no need, do not know about, think will be good in future, and good to use future”.
3. Decision making factors: The interviews findings support the previous empirical study for the decision making factors, time, cost, risk, resources, and benefits shared with other factors.

4. Some tools of CBIS (softwares): Tools were mentioned as: Spreadsheets, dashboard, business object, integrated system, oracle, and service oriented architecture.

4.2.4 Conclusion

From the Interviews conducted in five organizations in Jordan with the decision makers (managers) in different managerial levels, the aim was to collect a preliminary data regarding use of CBIS in decision making in organizations in Jordan, and to help the researcher identify and incorporate factors related to decision making in the proposed model. The researcher conducted 18 personal interviews in five ICT organizations through which he was keen not to be biased with the participants in any answer. All along, the participants were assured that their answers would only be used for the research purposes, including names of people and organizations that were promised not to be declared, and letters were obtained from organizations to verify data collection.

Lastly, many factors were found to affect the CBIS in decision making and from the results of the 18 interviewees, only 6 of them were using the CBIS. This means that the adoption and use of the CBIS in decision making in Jordanian organizations still needs more focus and further research.

These interviews have some limitations such as the sample size and the self-reporting. In addition, it is good to adapt a technology theory which involves the Use and Intention to Use in a future research model; this was taken in consideration in the proposed model in the main study for this thesis, and this open the doors for future researches.

4.3 Empirical Study on Decision Making Factors from 1990-2010

Decision making is important in peoples` lives at different levels (Lucke, 2006). The process of decision making, whether it is complex or easy, depends on the nature of the problem and the available situations. The need to know the significance (relevant) decision making factors, has leaded the researcher to conduct this empirical study, about decision making factors. In this study the aim has been to determine the change to the nine decision making factors mentioned in Chapter 2 and how they changed over time extending from 1990 to 2010.

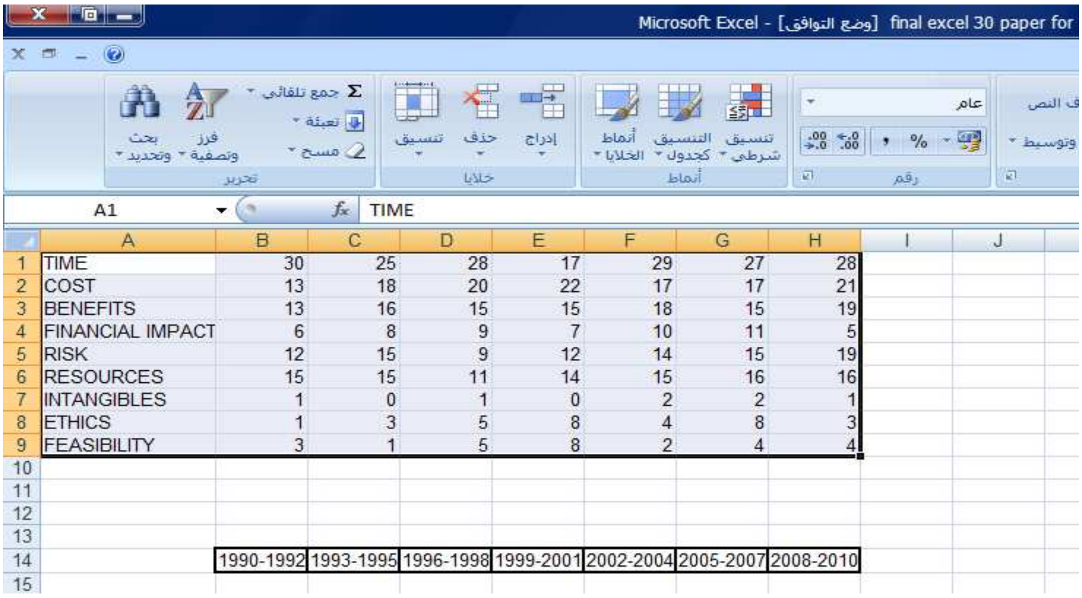
4.3.1 Steps and Procedures

Since the interest is to count each factor`s frequency in each year was used to collect data from the available resources (Science direct, ACM, and IEEE, online UUM database). The procedure was carried out following the steps outlined as follows: (1) papers related to the decision making factors were selected from the search engines in the available resources from the UUM university resources and the period from 1990-2010 was divided into seven categories with 3 years each period. (2) From the literature work in Chapter 2, the nine factors: cost, time, risk, benefits, financial impact, resources, ethics, feasibility, and intangible were the chosen factors. (3) The data gathered from this step ranges from occurring 0 time to 30 occurring times which are given here below in Table 4.3.

Table 4.3: *Decision Making Factors for the Periods: [1990-1992]… [2008-2010]*

No Papers	Title	Author	Time	Cost	Benefits	Financial impact	Risk	Resource	Intangible	Ethic	Feasibility
1											
2											
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
30	Total										

After tabulating the data, Microsoft Excel software was used to present the data in an understandable way. The data for the nine previously mentioned factors and seven periods are shown in Figure 4.1.



	A	B	C	D	E	F	G	H
1	TIME	30	25	28	17	29	27	28
2	COST	13	18	20	22	17	17	21
3	BENEFITS	13	16	15	15	18	15	19
4	FINANCIAL IMPACT	6	8	9	7	10	11	5
5	RISK	12	15	9	12	14	15	19
6	RESOURCES	15	15	11	14	15	16	16
7	INTANGIBLES	1	0	1	0	2	2	1
8	ETHICS	1	3	5	8	4	8	3
9	FEASIBILITY	3	1	5	8	2	4	4
14		1990-1992	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010

Figure 4.1: Decision Making Factors with Frequencies

4.3.2 Analysis and Findings

The descriptive analysis method with Microsoft Excel was used and many graphs were obtained. At least nine figures were made for each factor alone and for all the periods, since the work has seven periods with nine factors, to obtain better results. However, it was a good idea to compare all the factors in all the periods in one figure and rank them to categorize the relevant factors in one group. From the analysis in each period a figure was represented.

Ranking the nine factors in ascending order for each period showed that the factors are separated into two groups: main and secondary. For a holistic view Figure 4.2 shows the nine factors with the seven periods from 1990-2010.

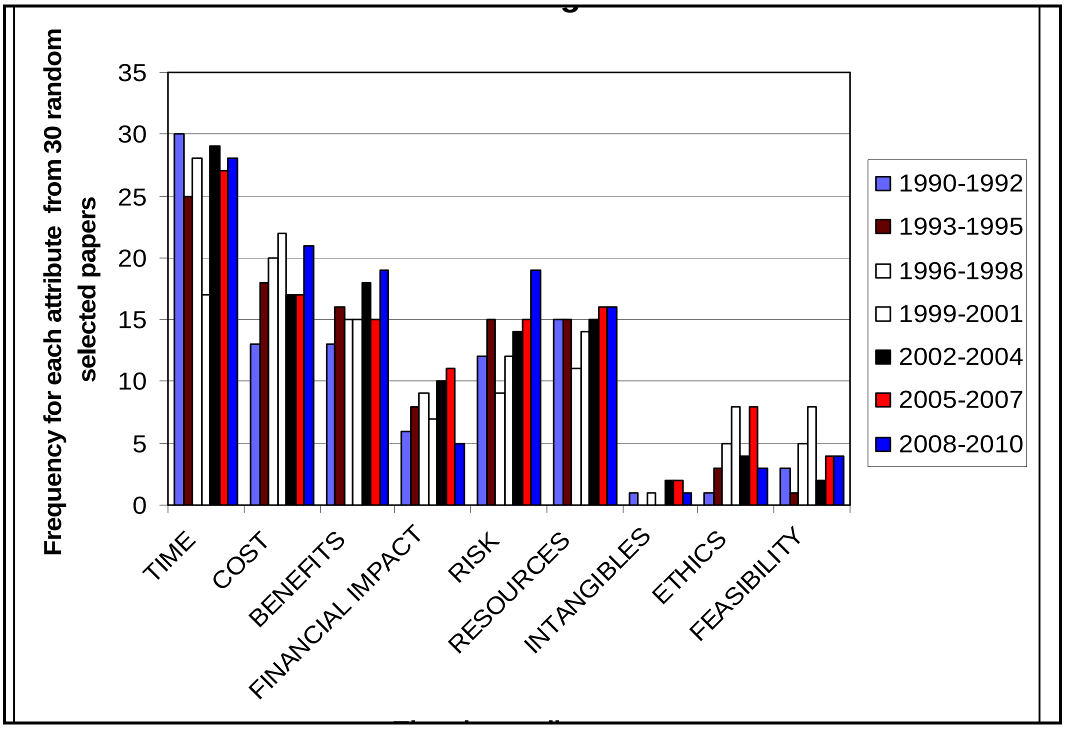


Figure 4.2: Decision Making Factors from the Years 1990-2010 with Seven Periods 3 years; Rang for Every Factor [0, 30]

The averages for the decision making factors are presented in the following Figure 4.3

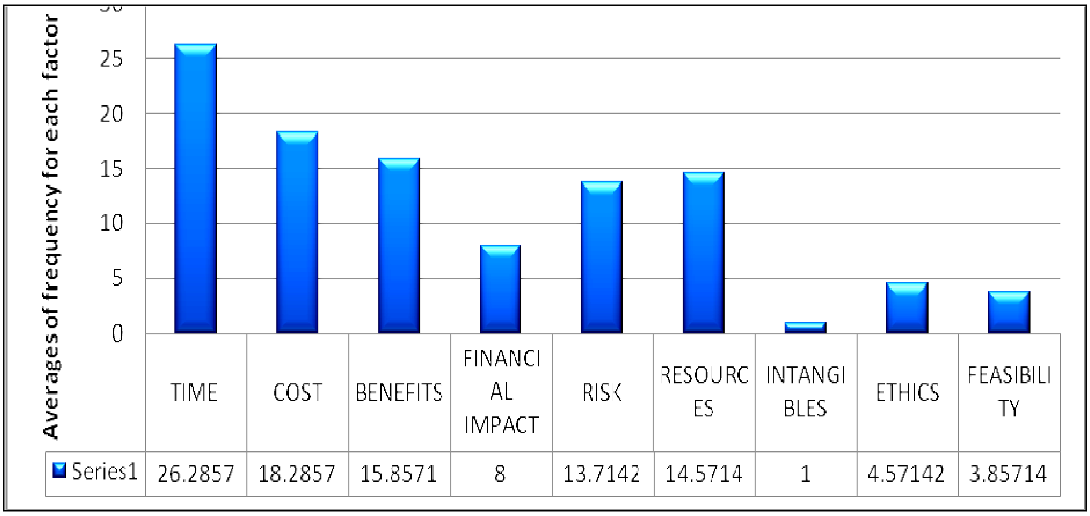


Figure 4.3: The Average of Frequency for the Nine Decision-Making Factors from 1990-2010

4.3.3 Results

As seen in the findings in the previous sections**,** decision making factors were categorized into two groups: the major (important) group which consists of five factors: cost, time, risk, resources, and benefits, while the second group consists of four factors: financial impact, feasibility, intangibles, and ethics. These results give future implications for decision makers to be aware of these factors in the main group while processing decision. However, it is better to present this in Figure 4.4.

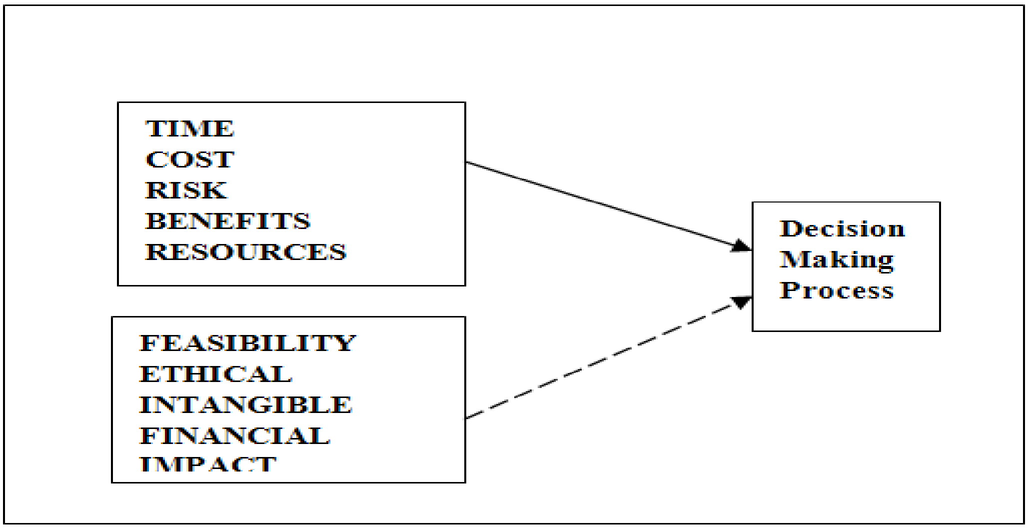


Figure 4.4: Two Categories for the Decision Making Factors

4.3.4 Conclusion

Basically, researchers try to help decision makers in the Decision Support Systems (DSS) being one type of CBIS. It should be noted that the decision making process is the core in making bad or good decisions in organizations. Different ways in processing decisions are suggested using a systematic way before processing (see Chapter 2). Besides, after categorizing the nine factors into two categories, the main study used the five resulted factors namely Cost, time, risk, resources, and benefits in the conceptual model. Those factors were an independent constructs with significance impact for the decision making process. Though time is the most important factor, it is not easy to rank these factors here and this might be saved for future research. The decision making factors still need more research to be conducted. With a comprehensive model verifying all the factors as it helps in the decision making process and produces more powerful results.

CHAPTER FIVE
FINDINGS AND HYPOTHESES TESTING

5.1 Introduction

This chapter presents findings and results for data analysis, which was carried out based on the research design and methodology mentioned previously in chapter three for the main survey. This chapter is more specifically structured as follows: testing the assumptions of structural equation modeling in terms of sample size, response rate, demographic information, data screening. Some measurements will be confirmed through: the factor analysis exploratory factor analysis (EFA); confirmatory factor analysis (CFA); assumptions of SEM technique; internal consistency and composite reliability; construct (convergent and discriminant) validity; structural model and versions of specified and re-specified model will be given; moderators` effect test; the hypotheses will be tested; and finally the proposed (final) model will be addressed.

5.2 Demographic (Characteristics) information

Eight major items were included in the characteristics information including: (1) gender, (2) age, (3) education level, (4) experience in years, (5) manager level, (6) organization size, (7) Voluntary, and (8) the actual use. The final sample contained 247 (68.6%) males and 113 (31.4%) females, respondents who were under 35 years old were 162 (45%) and 129 (35.8%) were from 35 to 45 years old. Specifically, the oldest were 69 (19.2%) aged 46 years or above. For the education level 251 (69.7%)

were having bachelor and 109 (30.3%) were postgraduates. In addition, 83 (23.1%) of the respondents were with four years or less experience and 79 (21.9 %) had an experience range from five to nine years. Also, 87 (24.2%) of the respondents had experience from ten to fourteen years, and the high experience was for 111 (30.8 %). Managers with low level were 164 (45.6%) and 112 (31.1%) were for middle level, while managers for the top level were 84 (23.3%). Lastly, 145 (40.3%) of the respondents referred to small organizations size and 131 (36.4%) were from middle organizations and 84 (23.3%) were from large organizations, voluntary respondents were 243 (67.5%), while the mandatory were 117 (32.5%). Finally, the actual use for CBIS varies, for the 1-4 H level there were 46 (12.8%), and for 5-9 H 164 (45.6%), where for the 10-14 H were 113 (31.4%), and for the last period above 14 H were 37 respondents (10.3%).All the information about the target group is summarized in Table 5.1.

Table 5.1: *Demographic Characteristics for the Respondents*

Construct	**Classification**	**Frequencies**	**Percentage (%)**
Gender	Male	247	68.6%
	Female	113	31.4%
Age	Less than 35	162	45%
	From 35-45	129	35.8%
	46 and above	69	19.2%
Educational Level	Bachelor	251	69.7%
	Postgraduates	109	30.3%
Experience	1-4 years	83	23.1 %
	5-9 years	79	21.9 %
	10-14 years	87	24.2 %
	Above 14 years	111	30.8%
Managerial level	Low Level	164	45.6 %
	Middle Level	112	31.1%
	Top Level	84	23.3 %
Organization Size	Small	145	40.3%
	Middle	131	36.4%
	Large	84	23.3%
Voluntary Use	Voluntary	243	67.5%

	Mandatory	117	32.5%
Actual Use	1-4 H	46	12.8%
	5-9 H	164	45.6%
	10-14 H	113	31.4%
	above14 H	37	10.3%

5.3 Assumptions for Structural Equation Modeling

Before analysis was done, it was necessary to see the assumptions of Structural Equation Modeling (SEM) techniques, which work with the suitable data as to be clean and reflect the real results for respondents. These assumptions was based on the acceptable sample size, screening data throughout, treatment of missing data, outliers, normality and multicollinearity.

5.3.1 Sample Size

Since this study considers the use of the structural equation modeling (SEM) technique, the sample size must adhere to the rules of such technique to have a good, representative analysis. Far a way of minimum samples, the range of 100- 150 is needed to ensure the Maximum Likelihood Estimation (MLE) stability, also a suggestion with the range from 150-400 was preferred by (Hair et al., 2006). In this study the sample size 360 cases usable were used for analysis. This is an indication of the adequacy of the sample size as it meets the requirement of the structural equation modeling technique.

5.3.2 The Response Rates

As mentioned earlier in the methodology chapter, the researcher tried to survey the majority of the population because of narrow scope of the respondents (decision makers using CBIS), and to have sufficient respondents sample to support SEM technique, 642 copies were distributed. The survey yielded 373 (58.09%) copies, the usable questionnaire were 364 copies with a response rate of 56.7%. Data cleaning was made and 4 copies were removed and for that matter, analysis was made upon 360 (56.07%) cases. The total of the usable response (360) was considered acceptable as the margin of error (accuracy) was ±5%. Table 5.2 present the response rate.

Table.5.2: *The Response Rates*

Survey instrument	**Total**	**percentage**	**Marginal error**	**Confidence Interval**
Total Survey	642	100%	±5%	95%
Total of Non_ respondents	642-373= 269	41.9 %		
Less: Non_ respondents	373-364= 9	1.4%		
Outliers	364-360= 4	0.62 %		
Total respondents (used)	360	56.07%	±5%	95%

5.3.3 Data Screening

This is an important step, and must be done in the earliest stage, since the result of this stage will affect all the following results. Screening data can be done through the following sub-sections.

5.3.3.1 Missing Data

For data screening, the first step is to identify the missing data, as mentioned before, from 642 given questionnaires 373 were resulted, and from looking through them 9 of them were not suitable; more than half of the parts were not completed by the respondents; If more than 50% missing data, and have no sample size problems, delete the case respondent (Hair et al., 2010). All these nine questionnaires were excluded from the analysis, in other words no problem of missing data.

5.3.3.2 Dealing with Outliers (Mahalanobis Distance)

The second important step in data processing is handling the issue of outliers; this was done through evaluating the case based on the critical Chi-square value obtainable from any standard set of statistical tables. Using the number of independent variables as the degrees of freedom at an alpha, in this study, the Mahalanobis distance value for potential outlier cases was identified by inspecting the output provided by SPSS 17.0.Which Mahalanobis Distances is evaluated based on χ^2 with degree of freedom 48, which is the number of the items in this research in the survey questionnaire. Referring to χ^2 table the value was 84.03. In the following Table, the 4 cases were deleted. However, any case with Mahalanobis Distance greater than 84.03 (see Table 5.3) is considered a multivariate outliers, which therefore was deleted from the dataset, for this reason the mentioned four cases were deleted and the final data cases remain were (364 - 4) 360 usable cases.

Table5.3: The *Deleted Cases after Mahalanobis Technique was Applied*

Number	Observation Cases	Mahalanobis d-Square
1	40	125.88013
2	99	110.12040
3	108	109.30867
4	293	103.95559

5.3.3.3 Assessment of Normality

Normality concerns the fact that data should be in line with the normal distribution. This is a crucial step that should precede data analysis so that we may have powerful and effective assessment. To test normality, simple test comparing Kurtosis and Skewness for normal distribution is needed. Based on Kline (2005), Hair et al. (2006), the statistical value (Z) for Skewness is < 3.0, and for the other Part Kurtosis, based on Kline (2005) it is need to be < 8.0. Table5.4 shows the overall distribution of variables for the analysis of structural equation modeling (SEM). A skewness range from 0.727 to -2.004 was well below the suggested level of the absolute value of 3.0. In addition, a kurtosis range from-0.118 to 6.003 revealed that the variables are not overly peaked and well below the absolute value of 8.0. Thus the presented values reveal that the variables are normally distributed and have met the criteria for the SEM analysis.

Table 5.4: *Factors Involved in the Analysis of Structural Equation Modeling*

Factors	Mean	Std. Deviation	Skewness	Kurtosis
PE	5.8729	.82463	-1.518	4.274
EE	5.7903	.85840	-1.141	2.701
SI	5.6208	1.02373	-2.004	6.003

FC	5.0656	.98599	-.859	.640
BIU	5.9767	.71288	-1.013	2.426
AUS	6.0565	.93831	-1.779	4.548
DMP	6.0522	.84111	-1.912	5.085
TIME	6.0611	.87538	-1.466	2.827
COST	5.9880	.81470	-1.476	3.848
RISK	2.8130	1.34312	.727	-.118
BNFT	6.0741	.81350	-1.024	.680
RES	6.0120	.93961	-1.310	2.335

5.3.3.4 Multicollineraty

Multicollinearity is defined as the high correlation among a set of variables within a specific construct. When the dependent variables are moderately correlated, some multivariate techniques work effectively. A problem of multicollinearity arises when the independent variables have a high degree of correlation among them. Calculating the impact of each variable is difficult to estimate due to multicollinarity which causes overestimation of independent variables. According to Hair et al. (2006, 2010) the value greater than 0.9 of correlation coefficient creates multicollinearity problem. Although some of the variables for this research are highly correlated, they fell within the acceptable range < 0.9 suggested by Hair et al, (2006, 2010) as shown in Table 5.5,There was no evidence of multicollinearity of the variables so all these variables were used for further analysis.

Table 5.5: *Correlation Matrix of the Constructs in the Study*

	TIME	**COST**	**RISK**	**BNFT**	**RES**	**PE**	**EE**	**SI**	**FC**	**BIU**	**AUS**	**DMP**
TIME	1											
COST	.458**	1										
RISK	-.197**	-.216**	1									
BNFT	.317**	.301**	-.135*	1								
RES	.404**	.407**	-.135*	.409**	1							
PE	.305**	.295**	-.108*	.184**	.205**	1						
EE	.335**	.278**	-.072	.182**	.214**	.531**	1					
SI	.322**	.310**	-.107*	.170**	.218**	.243**	.296**	1				
FC	.190**	.172**	.024	.111*	.183**	.226**	.348**	.228**	1			
BIU	.426**	.390**	-.089	.241**	.298**	.528**	.558**	.439**	.271**	1		
AUS	.381**	.331**	-.100	.188**	.265**	.355**	.442**	.352**	.221**	.567**	1	
DMP	.578**	.552**	-.277**	.456**	.512**	.334**	.351**	.325**	.234**	.405**	.443**	1

**. Correlation is significant at the 0.01

*. Correlation is significant at the 0.05

Another test was done to ensure the absent of multicollinearity referring to the multiple analysis data (see Table 5.6). The tolerance was ranged between 0.464 and 0.927, and the variance inflation factor (VIF) was ranged from 1.078 and 2.175, which satisfied the value of tolerance > 0.10 and the value of VIF < 10, thus multicollinearity among the data was not existed.

Table: 5.6*: Testing of Multicollinearity Using Tolerance and VIF*

		Collinearity Statistics	
Model		**Tolerance**	**VIF**
1	PE	.630	1.587
	RES	.700	1.429
	EE	.560	1.784
	SI	.756	1.322

FC	.845	1.183
BIU	.464	2.157
AUS	.625	1.599
TIME	.642	1.557
COST	.669	1.496
RISK	.927	1.078
BNFT	.790	1.266

Dependent Variable: decision making factor (DMP).

5.4 Measurement Model Assessment

After conducting the preliminary data screening described, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were employed to assess the measurement part of the proposed research model.

5.4.1 Exploratory Factor Analysis (EFA)

In order to measure the suitability of the items for their exact measuring of the intended construct, factor analysis is needed Sekaran (2000, 2003). Reference in this context is made to Hair et al. (2006, 2010) where the authors provide explanation concerning the analysis parameters to be examined. Anti-image correlation matrix was used to check the measure of sampling adequacy (MSA) with minimum value of 0.50. The MSA of Kaiser-Meyer-Olkin (KMO) was computed to determine data appropriateness for factor analysis, with a minimum value of 0.70 to be acceptable. Bartlett's test of sphericity was used to test the significance of correlation among all factors, with 5 percent cut off point was used in determining the significance level. Principal component analysis with Varimax rotation was used as an extraction method. Factor with Eigen value above one (1) was retained. In evaluating item loading on factors the loading valueswere > 0.50 as the main sample contained 360 cases. The conceptualization was taken into consideration. So though the loading value is important criteria yet the way the factors were conceptualized is equally important (Hair et al., 2006, 2010).

5.4.1.1 Factor Analysis for the Independent Constructs of UTAUT

The principal component analysis (PCA) was conducted to determine the underlying factors of the UTAUT instrument. The assumptions of inter-correlation of variables suggested that the data was appropriate for the usage of PCA. Bartlett's Test of Sphericity was found to be statistically significant [X^2 (190) = 5318.101, p = 0.000)]. The measure of Kaiser - Meyer - Olkin (KMO) was 0.897 indicating adequate information about the measure of each construct. The overall measurement of sampling adequacy (MSA) fulfilled the requirement (> 0.50). The factor loadings at > 0.50 were accepted, while the loadings of < 0.50 were suppressed. All the questionnaire items were subjected to Varimax rotation method using PCA. The results revealed four factors measured by the data with 20 items retained for further analysis as shown in Table 5.7.

Table 5.*7**:** Rotated Component Matrix of the Independent Constructs of UTAUT*

	Component			
Items	**Effort Expectancy**	**Performance Expectancy**	**Facilitating conditions**	**Social Influence**
EE10	.864			
EE9	.851			
EE7	.849			
EE8	.838			

EE11	.825			
EE6	.747			
PE3		.866		
PE4		.846		
PE5		.830		
PE1		.825		
PE2		.755		
FC16			.820	
FC18			.802	
FC19			.801	
FC17			.800	
FC20			.792	
SI13				.864
SI12				.861
SI14				.850
SI15				.782
Kaiser-Meyer-Olkin Measure of Sampling Adequacy				0.897
Bartlett's Test of Sphericity				P=0.000
Approx. Chi-Square				5318.101
Total variance				%74.210

Factors with Eigen values greater or equal to one accounted for about 74.2% of the total variance. The first rotated factor comprised 6 items [EE6, EE7, EE8, EE9, EE10, EE11]. The factor loadings were from 0.747 to 0.865 which accounted for 38.2 % of variance. These items addressed Effort Expectancy “EE”.

The second rotated factor comprised 5 items [PE1, PE2, PE3, PE4, PE5]. The factor loadings were from 0.755 to 0.866which accounted for 14.2 % of variance. These items addressed Performance Expectancy “PE”. The third rotated factor comprised 5 items [FC16, FC17, FC18, FC19, FC20]. The factor loadings were from 0.792 to 0.820which accounted for 12.11% of variance. These items addressed Facilitating conditions “FC”. The fourth rotated factor comprised 4 items [SI12, SI13, SI14, SI15]. The factor loadings were from 0.782 to 0.864 which accounted for 9.60 % of variance. These items addressed Social Influence “SI”.

5.4.1.2 Factor Analysis for the Decision Making (DM) Factors (Time, Cost, Risk, Benefit, and Resources).

The principal component analysis (PCA) was conducted to determine the underlying factors of Decision Making (DM) Factors instrument. The assumptions of inter-correlation of variables suggested that the data was appropriate for the usage of PCA. Bartlett’s Test of Sphericity was found to be statistically significant [X^2 (105) = 3140.516, p = 0.000)]. The measure of Kaiser-Meyer-Olkin (KMO) was 0.837 indicating adequate information about the measure of each construct. The overall measurement of sampling adequacy (MSA) fulfilled the requirement (> 0.50). The factor loadings at > 0.50 were accepted, while the loadings of < 0.50 were suppressed. The (DM) Factors 15 items were subjected to Varimax rotation method using PCA. The results revealed five factors measured by the data with only 15 items retained for further analysis as shown in Table 5.8.

Table 5.8: *Rotated Component Matrix of the Final Decision Making Items*

	Component				
	Resources	**Risk**	**Time**	**Cost**	**Benefits**
RES48	.895				
RES47	.864				
RES46	.861				
RISK40		.890			
RISK42		.886			
RISK41		.883			
TIME35			.882		
TIME36			.865		
TIME34			.805		

COST38				.853	
COST37				.837	
COST39				.829	
BNFT44					.856
BNFT43					.843
BNFT45					.825
Kaiser-Meyer-Olkin Measure of Sampling Adequacy					0.837
Bartlett's Test of Sphericity					P=0.000
Approx. Chi-Square					3140.516
Total variance					80.37%

Factors with Eigen values greater or equal to one accounted for about 80.37% of the total variance. The first rotated factor comprised 3 items [RES46, RES47, RES48]. The factor loadings were from 0.861 to 0.895 which accounted for 36.20 % of variance. These items addressed Resources “RES”. The second rotated factor comprised 3 items [RISK40, RISK41, RISK42]. The factor loadings were from 0.883 to 0.890 which accounted for 14.87 % of variance. These items addressed “RISK”. The third rotated factor comprised 3 items [Time34, Time35, Time36]. The factor loadings were from 0.805 to 0.865 which accounted for 11.45 % of variance. These items addressed “TIME”. The fourth rotated factor comprised 3 items [Cost37, Cost38, Cost39]. The factor loadings were from 0.829 to 0.853 which accounted for 9.23 % of variance. These items addressed “COST”. The fifth rotated factor comprised 3 items [BNFT43, BNFT44, BNFT45]. The factor loadings were from 0.825 to 0.856 which accounted for 8.60 % of variance. These items addressed “Benefits”.

5.4.1.3 Factor Analysis for All Constructs for CBIS in DM Study in One time

The principal component analysis (PCA) was conducted to determine the underlying factors of (CBIS) in DM instrument. The assumptions of inter-correlation of variables suggested that the data was appropriate for the usage of PCA. Bartlett's Test of Sphericity was found to be statistically significant [X^2 (1128) = 12309.347, p = 0.000)]. The measure of Kaiser -Meyer - Olkin (KMO) was 0.912 indicating adequate information about the measure of each construct. The overall measurement of sampling adequacy (MSA) fulfilled the requirement (> 0.50). The factor loadings at > 0.50 were accepted, while the loadings of < 0.50 were suppressed. The (CBIS) in DM items were subjected to Varimax rotation method using PCA. The results revealed 12 factors measured by the data with 48 remaining items retained for further analysis as shown in Table 5.9.

Table 5.9: *Rotated Component Matrix of the Final (CBIS) in DM Items*

Rotated Component Matrix[a]												
	Component											
	EE	**PE**	**FC**	**BIU**	**DMP**	**SI**	**RES**	**RISK**	**BNFT**	**Cost**	**Time**	**AUS**
EE10	.835											
EE9	.832											
EE7	.822											
EE8	.821											
EE11	.804											
EE6	.714											
PE3		.844										
PE4		.818										
PE5		.813										
PE1		.799										
PE2		.731										
FC16			.815									
FC19			.796									
FC17			.795									

FC20	.792									
FC18	.790									
BIU22		.733								
BIU24		.729								
BIU25		.715								
BIU23		.689								
BIU21		.666								
DMP32			.784							
DMP33			.782							
DMP31			.728							
DMP29			.628							
DMP30			.613							
SI13				.830						
SI12				.830						
SI14				.828						
SI15				.762						
RES48					.871					
RES47					.843					
RES46					.834					
RISK40						.882				
RISK41						.880				
RISK42						.876				
BNFT44							.840			
BNFT45							.816			
BNFT43							.811			
COST38								.818		
COST37								.788		
COST39								.770		
TIME35									.828	
TIME36									.803	
TIME34									.732	
AUS27										.825
AUS28										.813
AUS26										.750

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.912
Bartlett's Test of Sphericity.	P= 0.000
Approx. Chi-Square.	12309.347
Total variance	76.31%

Factors with Eigen values greater or equal to one accounted for about 76.31% of the total variance. The first rotated factor comprised 6 items [EE6, EE7, EE8, EE9, EE10, EE11]. The factor loadings were from 0.714 to 0.835which accounted for 29.22 % of variance. These items addressed Effort Expectancy “EE”. The second rotated factor comprised 5 items [PE1, PE2, PE3, PE4, PE5]. The factor loadings were from 0.713 to 0.844which accounted for 9.32 % of variance. These items addressed Performance Expectancy “PE”. The third rotated factor comprised 5 items [FC16, FC17, FC18, FC19, FC20]. The factor loadings were from 0.790 to 0.815which accounted for 6.25% of variance. These items addressed Facilitating conditions “FC”.

The fourth rotated factor comprised 5 items [BIU21, BIU22, BIU23, BIU24, BIU25]. The factor loadings were from 0.666 to 0.733which accounted for 5.34% of variance. These items addressed Behavior Intention to Use CBIS “BIU”. The fifth rotated factor comprised 5 items [DMP29, DMP30, DMP31, DMP32, DMP33]. The factor loadings were from 0.613 to 0.784which accounted for 4.59% of variance. These items addressed Decision Making Process “DMP”. The sixth rotated factor comprised 4 items [SI12, SI13, SI14, SI15]. The factor loadings were from 0.762 to 0.830 which accounted for 4.10 % of variance. These items addressed Social Influence “SI”. The seventh rotated factor comprised 3 items [RES46, RES47, RES48]. The factor loadings were from 0.834 to 0.871 which accounted for 3.63 % of variance. These items addressed Resources “RES”.

The eighth rotated factor comprised 3 items [RISK40, RISK41, RISK42]. The factor loadings were from 0.876 to 0.882 which accounted for 3.28 % of variance. These items addressed "RISK". The ninth rotated factor comprised 3 items [BNFT43, BNFT44, BNFT45]. The factor loadings were from 0.811 to 0.840 which accounted for 3.01 % of variance. These items addressed Benefits "BNFT".

The tenth rotated factor comprised 3 items [Cost37, Cost38, Cost39]. The factor loadings were from 0.770 to 0.818 which accounted for 2.73 % of variance. These items addressed "COST". The 11th rotated factor comprised 3 items [Time34, Time35, Time36]. The factor loadings were from 0.732 to 0.828 which accounted for 2.69 % of variance. These items addressed "TIME". The 12th rotated factor comprised 3 items [AUS26, AUS27, AUS28]. The factor loadings were from 0.750 to 0.825 which accounted for 2.09 % of variance. These items addressed Actual Use of CBIS "AUS".

5.4.2 Confirmatory Factor Analysis (CFA)

The a priori measurement models assessed initially with EFA were then assessed using confirmatory factor analysis (CFA). The CFA of the measurement models was conducted using AMOS 16.0 software.

Three measurement models were specified using Amos 16.0 software. The first confirmatory models were for: (1) decision making factors including five factors time, cost, benefits, resource, and risk; (2) the second group of UTAUT (the exogenous factors): performance expectancy, effort expectancy, social influence, and facilitating conditions; and (3) All the construct final measurement model for the study "The Roles of CBIS in DM" 12 constructs. In addition, this study checked measurement models for each construct, and the independent variables and dependent variables as a part of SEM techniques. See Appendix F.

5.4.2.1 Assessment of Model Adequacy for Decision Making Measurement Model Including Time, Cost, Benefits, Resource and Risk Factors

The measurement model (CFA) has been analyzed using AMOS V.16.0 with Maximum Likelihood Estimation (MLE).

Table 5.10: *Results of Goodness-of-fit Indices of Measurement Model of the DM Factors*

Goodness of fit indexes	χ^2	**Df**	χ^2**/df (CMIN/df)**	**P**	**CFI**	**NFI**	**TLI**	**RMSEA**
Recommended value	-	-	< 3.0	>.05	> .90	> .90	> .90	< .05
Model	86.251	80	1.078	.297	.998	.973	.997	.015

Table 5.10 showed the results for Goodness-of-Fit Indices (GFI) for the measurement model. The model adequacy indicated that a statistically fit structured model with root mean square error of approximation (RMSEA) = .015 (<.05), comparative fit index (CFI) = .998 (> .90), Tucker-Lewis index (TLI) = .997 (> .90) and the overall normed fit index (NFI) = .973 (>.90). Moreover, the chi-square statistics of (X^2 = 86.251, df = 80, P = .297) and relative chi-square (CMIN/df = 1.078) which fell below the threshold point of 3.0 as suggested by Kline (2005). This result shows that the measurement model fitted the data by supporting the five constructs (compounds) namely: time, cost, benefits, resource, and risk; the measurement model was represented in Figure 5.1

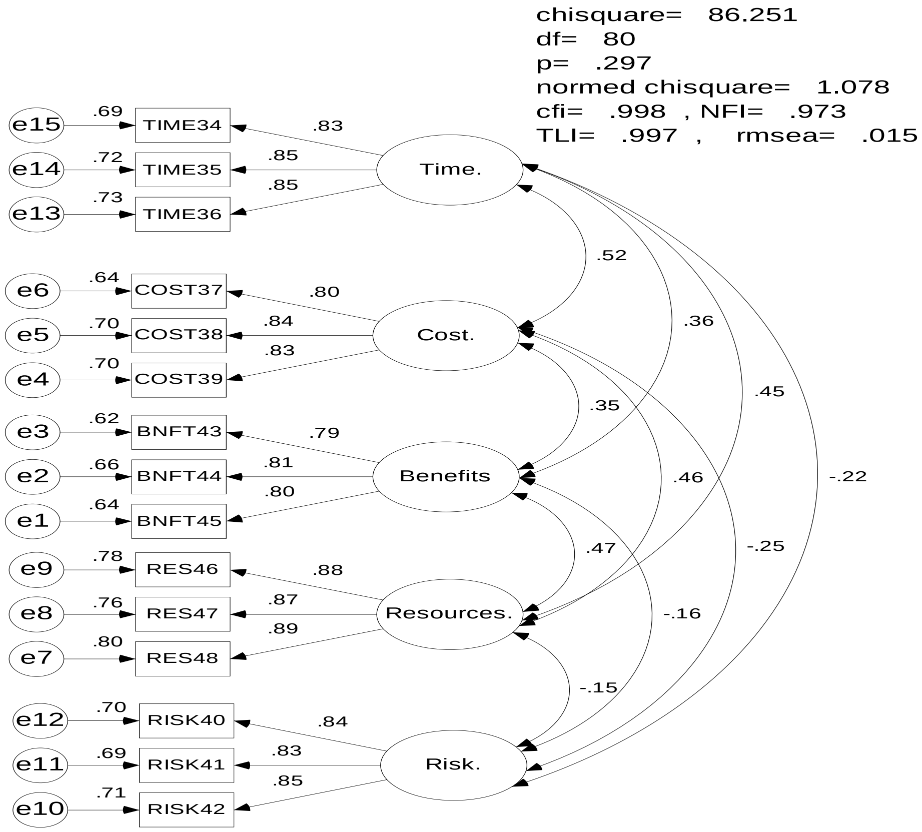


Figure 5.1: Measurement Model of the Grouped Decision Making Factors

Table 5.11: *Maximum Likelihood Parameter Estimates of the Standardized Factor Loadings, Standard Error, Critical Ratio, and Squared Multiple Correlation for Measurement Model of DM Factors.*

Factor Loadings		**S.E.**	**C.R.**	**SMC**
Time 34	.832	-	18.214	.692
Time 35	.848	0.053	18.590	.719
Time 36	.855	0.057	-	.730
Cost 37	.799	0.061	16.262	.638
Cost 38	.838	0.062	16.978	.702
Cost 39	.834	-	-	.695
Benefits 43	.790	0.066	-	.624
Benefits 44	.811	0.066	14.849	.658
Benefits 45	.800	-	14.600	.640
Resource 46	.884	0.041	22.885	.781
Resource 47	.871	0.043	22.392	.759

Resource 48	.892	-	-	.796
Risk 40	.837	0.062	17.399	.701
Risk 41	.830	0.056	17.281	.689
Risk 42	.845	-	-	.714

Table 5.11 shows the elaborated evaluation of the measurement model parameters. All standardized regression weights were significant with CR > ± 1.96, $p < 0.05$ and all the error variance were < 1.0 indicating that there was no violation of estimates revealed.The standardized regression weights range from 0.041 to 0.066. These values indicate that the 15 measurement indicators are significantly represented.

The explained variances for the 15 measurement variables are represented by their squared multiple correlations (SMC): the higher the value of the squared multiple correlation, the greater the explanatory power of the regression model.SMC results indicate a strong relationship between the indicators and their factors. Examination of the Modification indices (MI) did not give any suggestions to modify the measurement model. As the adequacy of the measurement model was supported by parameters estimates, the directions of the estimates were theoretically justifiable.

5.4.2.2 Assessment Model Adequacy for UTAUT Measurement Model Including: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Behavior Intention To Use And Actual Use Factors.

The measurement model (CFA) has been analyzed using Amos V.16.0with Maximum Likelihood Estimation (MLE). Table 5.12 shows the results for Goodness-of-Fit Indices for the measurement model. The model adequacy indicated that a statistically fit structured model with root mean square error of approximation

(RMSEA) = .032 (<.05), comparative fit index (CFI) = .985 (> .90), Tucker-Lewis index (TLI) = .982 (> .90) and the normed fit index (NFI) = .948 (>.90). Moreover, the chi-square statistics of (X^2 = 267.074, df = 194, P = .000) and relative chi-square (CMIN/df = 1.377) which fell below the threshold point of 3.0 as suggested by Kline (2005). This result shows that the measurement model fitted the data by supporting the six constructs (compounds), namely, performance expectancy, effort expectancy, social influence, and facilitating conditions, behavior intention to use, and actual use factors, resource, and risk; the measurement model was represented in Figure 5.2.

Table 5.12**:** *Results of Goodness-of-fit Indices of Measurement Model of the UTAUT Compounds*

Goodness of fit indexes	χ^2	**Df**	χ^2**/df (CMIN/df)**	**P**	**CFI**	**NFI**	**TLI**	**RMSEA**
Recommended value	-	-	< 3.0	>.05	> .90	> .90	> .90	< .05
Model	267.074	194	1.377	.000	.985	.948	.982	.032

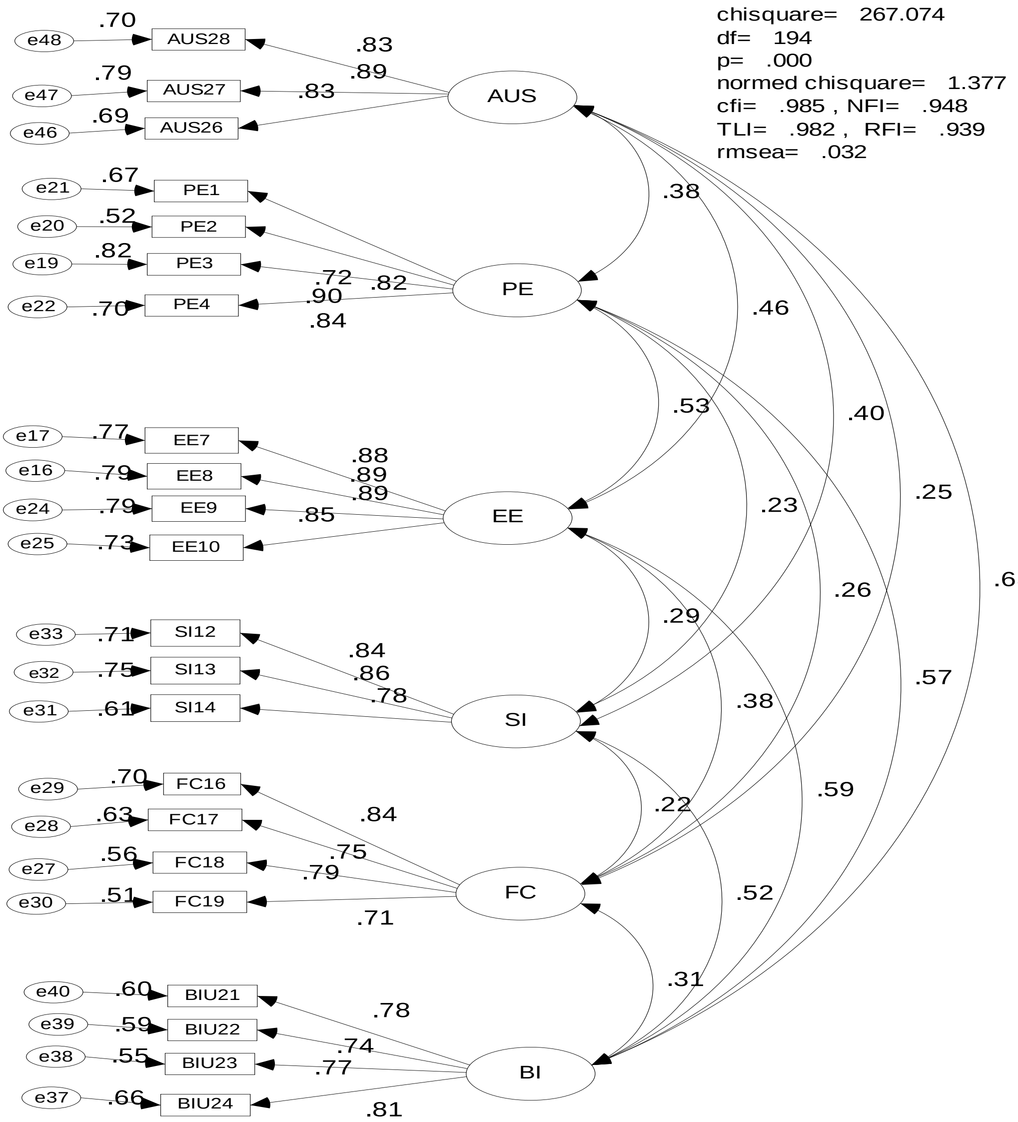


Figure 5.2: Measurement Model of the Grouped UTAUT Model Factors

Table 5.13 shows the elaborated evaluation of the measurement model parameters. All standardized regression weights were significant with CR > ± 1.96, p < 0.05 and all the error variance were < 1.0 indicating that there was no violation of estimates revealed. The standardized regression weights range from 0.039 to 0.081. These values indicate that the 22 measurement indicatorsare significantly represented by their respective latent constructs (compounds).

Table 5.13**:** *Maximum Likelihood Parameter Estimates of the Standardized Factor Loadings, Standard Error, Critical Ratio, and Squared Multiple Correlation for Measurement Model of the UTAUT Factors*

	Factor Loadings	**S.E.**	**C.R.**	**SMC**
PE1	.819	.047	20.178	.671
PE2	.722	.048	16.385	.521
PE3	.905	-	-	.818
PE4	.837	.045	20.909	.700
EE7	.876	0.040	23.595	.767
EE8	.890	-	-	.792
EE9	.887	.039	24.208	.787
EE10	.853	.040	22.372	.728
FC16	.838	.081	14.940	.703
FC17	.794	.078	14.310	.630
FC18	.748	-	-	.560
FC19	.714	.073	12.907	.510
SI12	.843	.066	16.213	.711
SI13	.864	.069	16.454	.747
SI14	.780	-	-	.609
BIU21	.777	.080	14.131	.603
BIU22	.769	.072	13.995	.591
BIU23	.739	-	-	.545
BIU24	.811	.070	14.738	.658
AUS26	.830	-	-	.688
AUS27	.887	.058	19.233	.786
AUS28	.834	.058	18.082	.695

The explained variances for the 22 measurement variables are represented by their squared multiple correlations (SMC).The higher the value of the squared multiple correlation, the greater the explanatory power of the regression model. Modification indices (MI) suggestions were made, and six items were deleted, namely: PE5, EE6, EE11, SI15, FC20, and BI25. SMC results indicate a strong relationship between the indicator and their factors. Examination of the Modification indices MI did not give any suggestions to modify the measurement model. As the adequacy of the measurement model was supported by parameters estimates, the directions of the estimates were theoretically justifiable.

5.4.2.3 Assessment of Overall Measurement Model (CFA) Fit in one Time

The two CFA models (for decision making factors and UTAUT) were assessed for their overall fit using fit indices provided by AMOS 16.0. The specified models for Final measurement model for "CBIS in DM" are shown in Figure 5.3 and the results of the model assessments are presented with the criteria of acceptable model fit in Table 5.14. The model adequacy indicated that a statistically fit structured model with root mean square error of approximation (RMSEA) = .022 (<.05), comparative fit index (CFI) = .987 (> .90), Tucker-Lewis index (TLI) = .985 (> .90) and the normed fit index (NFI) = .916 (>.90). Moreover, the chi-square statistics of (X^2 = 834.311, df = 713, P = .001) and relative chi-square (CMIN/df = 1.170) which fell below the threshold point of 3.0 as suggested by Kline (2005). This result shows that the measurement model fitted the data by supporting the 12 constructs: time, cost, benefits, resource, risk, performance expectancy, effort expectancy, social influence, facilitating conditions, behavior intention to use, actual use and decision making process for the CBIS factors.

Table 5.14: *Results of Goodness-of-fit Indices of Measurement Model of the Compounds*

Goodness of fit indexes	χ^2	Df	χ^2/df (CMIN/df)	P	CFI	NFI	TLI	RMSEA
Recommended value	-	-	< 3.0	>.05	> .90	> .90	> .90	< .05
Model	834.311	713	1.170	.001	.987	.916	.985	.022

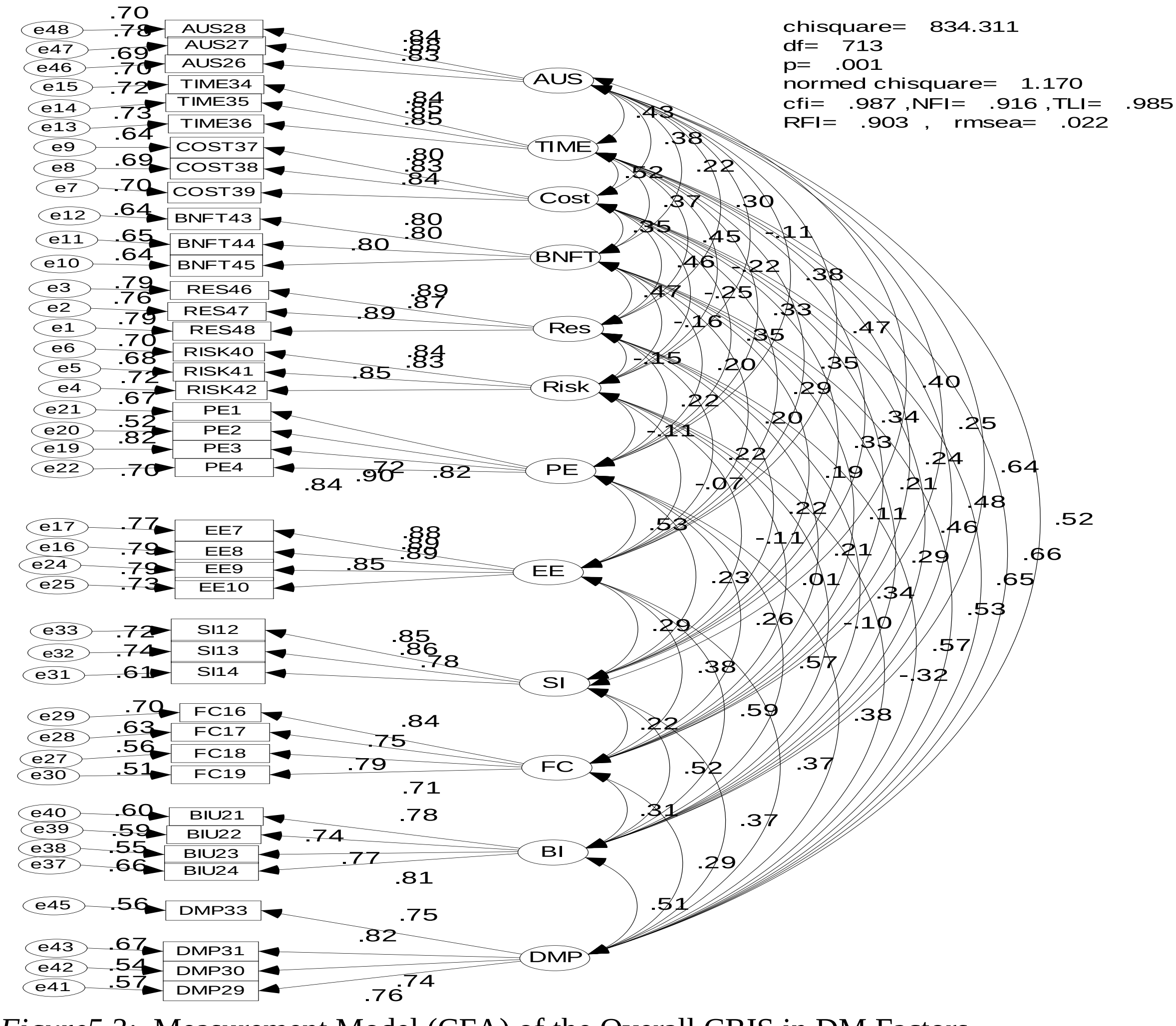


Figure5.3: Measurement Model (CFA) of the Overall CBIS in DM Factors

Table 5.15 shows the elaborated evaluation of the measurement model parameters. All standardized regression weights were significant with CR > ± 1.96, p < 0.05 and all the error variance were < 1.0 indicating that there was no violation of estimates revealed. The standardized regression weights range from 0.039 to 0.080. These values indicate that some of the items were deleted based on the modification indices (MI) suggestions, and they were: PE5, EE6, EE11, SI15, FC20, BIU25, and DMP32, and the remained measurement indicators are significantly represented by their respective latent constructs (compounds).

Table 5.15:*Maximum Likelihood Parameter Estimates of the Standardized Factor Loadings, Standard Error, Critical Ratio, and Squared Multiple Correlation for Measurement Model of all the Factors.*

	Factor Loadings	**S.E.**	**C.R.**	**SMC**
RES46	.886	.041	23.024	.786
RES47	.869	.043	22.332	.755
RES48	.891			.795
RISK40	.837	.061	17.488	.701
RISK41	.827	.056	17.318	.685
RISK42	.848			.719
COST37	.799	.060	16.541	.639
COST38	.833	.061	17.257	.693
COST39	.838			.702
BNFT43	.799	.066	14.798	.638
BNFT44	.804	.065	14.861	.647
BNFT45	.798			.637
TIME34	.836	.053	18.506	.698
TIME35	.846	.057	18.768	.715
TIME36	.853			.727
EE7	.877	.040	23.640	.728
EE8	.890			.793
EE9	.886	.039	24.193	.786
EE10	.853	.040	22.372	.728
PE1	.818	.047	20.165	.670
PE2	.722	.048	16.389	.521
PE3	.905			.819

PE4	.837	.045	20.978	.701
FC16	.838	.081	14.994	.703
FC17	.793	.078	14.340	.628
FC18	.750			.562
FC19	.714	.073	12.932	.510
SI12	.847	.066	16.317	.718
SI13	.859	.069	16.454	.738
SI14	.782			.611
BIU21	.776	.080	14.189	.602
BIU22	.768	.072	14.039	.590
BIU23	.740			.548
BIU24	.811	.070	14.820	.658
DMP29	.758	.058	15.404	.574
DMP30	.736	.058	14.860	.542
DMP31	.818			.669
DMP33	.747	.066	15.130	.558
AUS26	.832			.693
AUS27	.883	.057	19.342	.779
AUS28	.836	.057	18.237	.698

The explained variances for remain measurement variables are represented by their squared multiple correlations (SMC), the higher the value of the squared multiple correlation, the greater the explanatory power of the regression model.SMC results indicate a strong relationship between the indicator and their factors.

Examination of the Modification indices (MI) is suggested to modify the measurement model by removing few indicators (Hatcher, 1994), namely, time, cost, benefits, resource, and risk, performance expectancy, effort expectancy, social influence, facilitating conditions, behavior intention to use, actual use, and decision making process for the CBIS factors.

5.5 Instrument`s Reliability for the Main Survey

As held by Nunnaly (1978) and Sekaran (2003), reliability refers to the consistency of the degree of measurement each time the instrument is meant to measure the intended subject under the same conditions and for the same subjects. The reliability test was made for each factor within its items (indicators) per construct, (see Appendix E). Then the reliability was calculated in total. With reference to (Nunnally, 1978), Nunnally and Bernstein (1994), it must be above 0.70, and the higher Cronbach Alpha the better, Values < 0.70 are considered poor, while those value in range of 0.7 considered acceptable, in addition, values > 0.80 are considered good (Sekaran, 2003), in all levels the significance of reliability was existed. From the Cronbach Alpha which was calculated high values were obtained, based on the findings all the values exceeded not only 0.80, but also, 0.84, see Table 5.16

Table 5.16: *The Reliability Test of the Main Study (Chronbach Alpha with N=360)*

Factor	**Valid Items**	**Chronbach Alpha of the Main Study**
Performance Expectancy (PE)	5	0.916
Effort Expectancy (EE)	6	0.943
Social Influence (SI)	4	0.880
Behavior Intention to Use (BIU)	5	0.885
Actual Use of CBIS (AUS)	3	0.886
Facilitating Conditions (FC)	5	0.879
Decision Making Process (DMP)	5	0.884
TIME	3	0.881
COST	3	0.863
RISK	3	0.875
Resources (RES)	3	0.913
Benefits (BNFT)	3	0.842

In addition, the reliability in total was 0.929, the high values replicated and come over the pilot Cronbach Alpha test, which gives another evidence of the good reliablity for the questionnaire.

5.6 Validity of Measurement Model

The next step was to test the validity of measures. As mentioned in research methodology chapter. Validity is the degree to which a measure accurately represents what it is supposed to, and ensuring validity starts with a thorough understanding of what is to be measured and then making the measurement as accurate as possible, also validity extent to which measures correctly represents the concept of study and the degree to which it is free from any systematic or random error. Validity is concerned with how well the concept is defined by measure(s), whereas reliability relates to the consistency of measure(s) (Hair et al., 2006, 2010), in this research construct validity was used which includes both of convergent validity and discriminant validity:

1. For checking on ***convergent validity*** of the measurement scales, there was a need to calculate composite reliability (CR) and average variance extracted (AVE) values. In order for convergent validity to be achieved, the CR value should exceed the required minimum of 0.70, and the AVE value should exceed the required minimum of 0.5 (Fornell and Larcker, 1981).

2. The evidence of ***discriminant validity*** was obtained by comparing the square root of the AVE value of each latent construct with the correlations between other constructs in the model, the square root of the AVE value of each latent construct must exceeds the correlations between other constructs (Hair et al., 2006, 2010).

For checking convergent validity of the measurement scales, there was a need to calculate the composite reliability (CR) and average variance extracted (AVE)values. Convergent validity to was achieved, the CR for all the value exceed the required minimum of 0.70, and the AVE value exceeded the required minimum of 0.5 for the values of constructs (see Table 5.17), In general, the average variance extracted from the constructs demonstrated satisfactory levels of reliability and validity.

The internal consistency and validity results permitted an estimation of the structural model. The evidence of discriminant validity was obtained by comparing the square root of the AVE value of each latent construct with the correlations between other constructs in the proposed model (please, refer to the correlation Table 5.5 and compare with Table 5.17).

Table 5.17**:** *Results from the Test of Measurement Model, Reliability, and Validity*

Constructs/factors	**Indicators**	**SL (>0.70)**	**SMC (>0.50)**	**S.E**	**CR (>0.70)**	**AVE (>0.50)**
	TIME34	.836	.698	.029	.937	.990
TIME	TIME35	.846	.715	.033		
	TIME36	.853	.727	.028		
	Cost37	.799	.639	.031		
Cost	Cost38	.833	.693	.030	.985	.979
	Cost39	.838	.702	.027		
Benefit	BNFT43	.799	.638	.034		
	BNFT44	.804	.647	.034	.982	.972
	BNFT45	.798	.637	.037		
Resource	RES46	.886	.786	.024		
	RES47	.869	.755	.028	.988	.985
	RES48	.891	.795	.026		
RISK	RISK40	.837	.701	.087		
	RISK41	.827	.685	.073	.964	.949
	RISK42	.848	.719	.074		
PE	PE1	.818	.670	.029		
	PE2	.722	.521	.034	.989	.985
	PE3	.905	.819	.021		
	PE4	.837	.701	.026		
	EE7	.877	.768	.022		

EE	EE8	.890	.793	.022	.992	.990
	EE9	.886	.786	.021		
	EE10	.853	.728	.023		
SI	SI12	.847	.718	.048		
	SI13	.859	.738	.051	.976	.965
	SI14	.782	.611	.053		
FC	FC16	.838	.510	.058		
	FC17	.793	.703	.059	.976	.961
	FC18	.750	.628	.057		
	FC19	.714	.562	.060		
BIU	BIU21	.776	.658	.033		
	BIU22	.768	.602	.027		
	BIU23	.740	.590	.030	.988	.980
	BIU24	.811	.548	.023		
AUS	AUS26	.832	.698	.032		
	AUS27	.883	.779	.032	.985	.979
	AUS28	.836	.693	.035		
DMP	DMP29	.758	.574	.036		
	DMP30	.736	.542	.038		
	DMP31	.818	.558	.036	.983	.972
	DMP33	.747	.669	.047		

5.7 Results of Hypotheses Testing and Assessment of the Structural Model with Latent Variables

This section presents the results of hypotheses tests and overall structural model assessments. Research hypotheses were tested using Structural Equation Modeling (SEM) using Amos V.16.0 with Maximum Likelihood Estimation (MLE). In the coming sections versions of the model will be generated. Furthermore, the better model will be labeled as the research or the proposed model for this study.

5.7.1 Model Version One

The following sub-section discusses the adequacy or fitness of the versions. Which were based on the hypothesized model or the conceptual model`s assumptions. For this the next section will be about the specification stage.

5.7.1.1 Model Specification

The hypothesized model consisted of nine exogenous (independent) variables, namely time, cost, risk, benefit, resource, performance expectancy, effort expectancy, social influence and facilitating conditions. With other two mediating variables, namely, behavior intention to use CBIS, and actual use of CBIS, and one endogenous (dependent) variable, namely decision making process for CBIS, (refer to chapter 3, Figure 3.1). The data for this model were analyzed and estimated with the maximum likelihood estimation (MLE) using AMOS V.16.0.

5.7.1.2 Assessment of Model Adequacy for Hypothesized Model (*Version 1*)

Table 5.18 shows the results for Goodness-of-Fit Indices (GFI) for the first form of the hypothesized model. The model adequacy has indicated that a statistically fit structured model with root mean square error of approximation (RMSEA) = 0.049, comparative fit index (CFI) = 0.926, Tucker-Lewis index (TLI) = .921 and the normed fit index (NFI) = 0.854 Moreover, the chi-square statistics of (X^2 = 1437.976, df = 768, P = .000) and relative chi-square (CMIN/df = 1.872) which fell below the threshold point of 3.0 as suggested by Kline (2005).

Table 5.18**:** *Results of Goodness-of-fit Indices of Hypothesized Model (Version 1)*

Goodness of fit indexes	χ^2	**Df**	χ^2**/df (CMIN/df)**	**CFI**	**NFI**	**TLI**	**RMSEA**
Recommended value	-	-	< 3.0	> .90	> .90	> .90	< .05
Model	1437.976	768	1.872	.926	.854	.921	.049

Although from the result from Table 5.19, that shows the fit indices fell within the acceptable values, one factor loading between facilitating conditions (FC) and to the actual use of CBIS (AUS) was not supported with CR = 0.067. Thus, the first form of the hypothesized model was not accepted as a solution, for that the model was admissible and requirements were not achieved. The test of the modification indices (MI), suggests modifying this form of the hypothesized model to a better model. As the adequacy of the competing model was not supported by parameters estimates, the directions of the estimates were not theoretically justifiable.

Table 5.19**:** *Maximum Likelihood Parameter Estimates of the Standardized Factor Loadings, Standard Error, and Critical Ratio for the Hypothesized Model (Version1)*

Hypothesis				**Factor Loading**	**S.E.**	**C.R.**	**P value**
H1	PE	→	BI	.367	.044	6.870	***
H2	EE	→	BI	.391	.043	7.342	***
H3	SI	→	BI	.414	.036	7.446	***
H4	FC	→	AUCBIS	.067	.039	1.300	0.194
H5	BI	→	AUCBIS	.597	.080	9.284	***
H6	AUCBIS	→	DMP	.287	.041	5.116	***
H7	Time	→	DMP	.347	.047	6.003	***
H8	Cost	→	DMP	.344	.050	5.880	***
H9	RISK	→	DMP	-.168	.026	-3.137	0.002
H10	Benefits	→	DMP	.279	.049	4.866	***
H11	Res	→	DMP	.242	.039	4.495	***

***significant at p< 0.001

Based on Table 5.19, the hypotheses, which were forked to check the conceptual model, are stated with their symbols from H1 to H11, while the last hypothesis for the moderated was separated, and discussed in the coming sections. The relation → was the representation of the actual relation in the baseline (hypothesized) model in Figure 5.4. All the hypotheses were supported in Figure 5.4, except the forth hypothesis (H4), which was between → the facilitating conditions (FC) and the actual use (AUS).

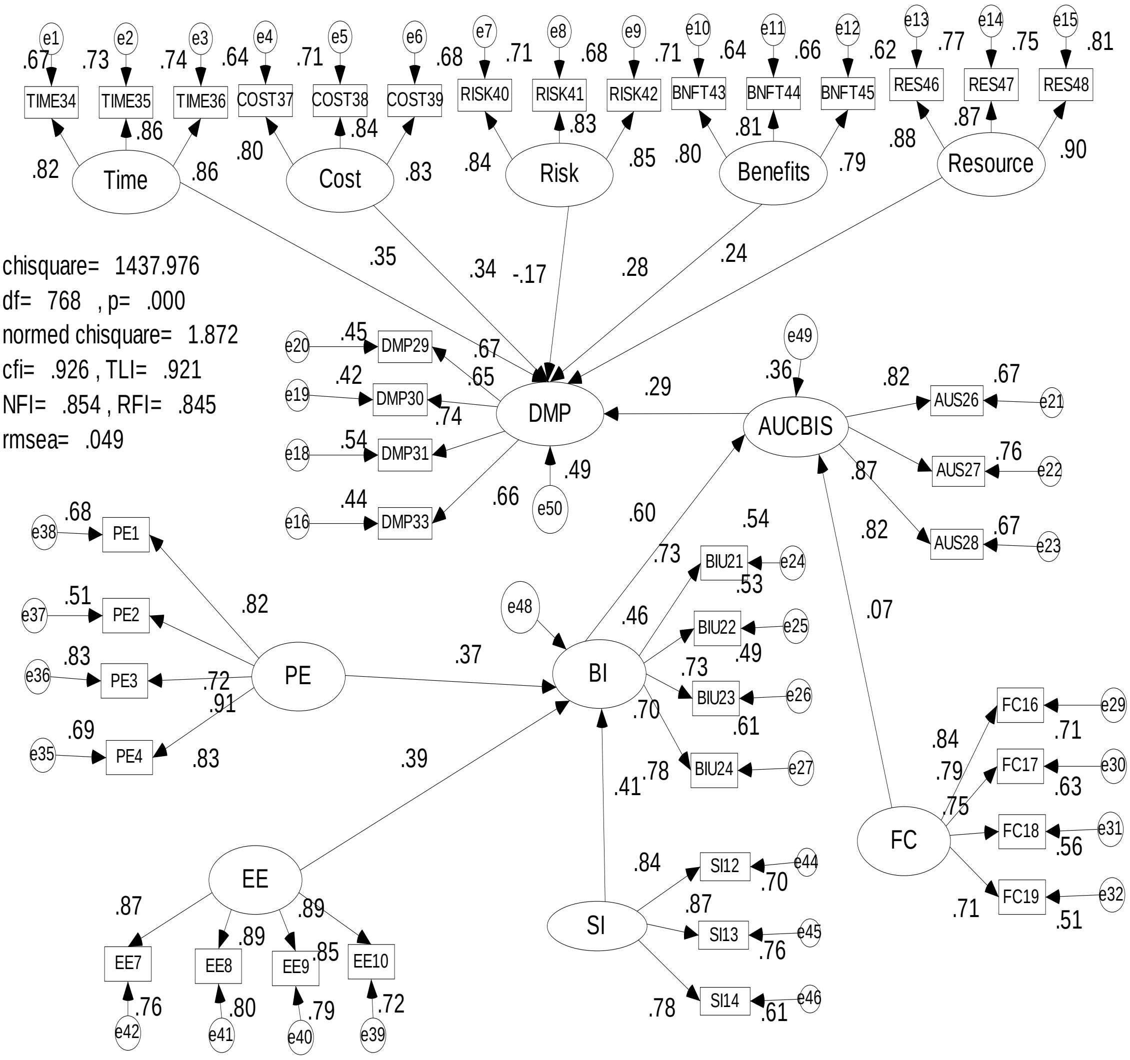


Figure 5.4: The Hypothesized Model and Factor Loadings (Version one)

Before going to this step, to remind the reader, assumptions were mentioned previously in Chapter 3 about: decision making factors are one group, and can be correlated; also, the exogenous (independent) factors of UTAUT are one group and can be correlated. Based on modification indices suggestions of SEM, the DM factors were correlated, in addition, the exogenous factors of UTAUT were correlated as another group. The model with the non-significant loading factor (facilitating conditions) is stated in Appendix G, few hints will be given about this model in the coming sections.

5.7.2 Model Version Two and the Re-Specification

The unsupported hypotheses and exogenous variable facilitating conditions (FC) were removed and the model was re-specified. Table 5.20 shows the results for Goodness-of-Fit Indices (GFI) for the first form of the hypothesized model. The structural model yielded a chi-square value of (X^2 = 804.862) with 606 degrees of freedom (χ^2/df = 1.328). All fit indexes of this structural model were satisfactory (CFI = 0.976, TLI = 0.974, NFI = 0.911, RMSEA = 0.030).

Table 5.20**:** *Results of Goodness-of-fit Indices of Hypothesized Model (Version 2)*

Goodness of fit indexes	χ^2	**Df**	**χ^2/df (CMIN/df)**	**P**	**CFI**	**NFI**	**TLI**	**RMSEA**
Recommended value	-	-	< 3.0	>.05	> .90	> .90	> .90	< .05
Model	804.862	606	1.328	.000	.976	.911	.974	.030

After that the re-specified model version2, which will be the research model or the main result of the findings is in the coming page, see Figure 5.5.

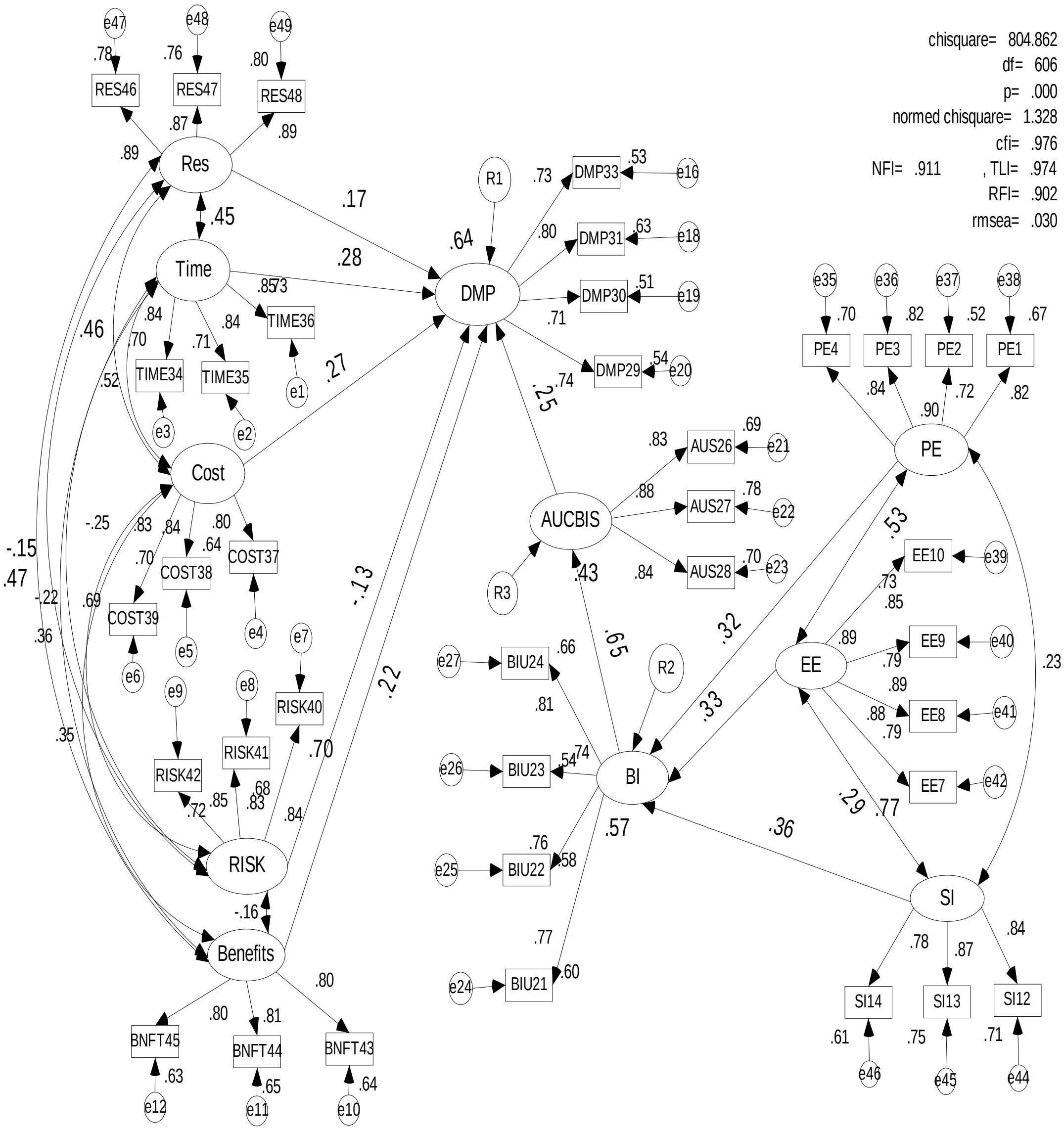


*Figure 5.5:*The Hypothesized Model and Factor Loadings (Version two)

The result shows that the fit indices fell within the acceptable values and all factor loadings were significant with C.R > ± 1.96 as shown in Table 5.20. Thus, the re-specified hypothesized model was accepted as the solution for the model.

The second step in model estimation involved examining the significance of each hypothesized path in the research model. The results included factor loading standardized error; critical ratio is presented in Table 5.21. Namely, resource, time, cost, risk, and benefits had a significant effect on the decision making process for CBIS. As for behavior intention to use CBIS,the major determinant was performance expectancy followed by effort expectancy, andsocial influence. All three of these determinants had a significant effect on behavior intention to use CBIS. These determinants explained about 57% of the variance of behavior intention to use CBIS. The results also show that behavior intention to use CBIS had a significant effect on the actual use of CBIS. These determinants explained about 43% of the variance of actual use of CBIS. Finally, the actual use of CBIS had a significant effect on the decision making process for CBIS. The model accounted for approximately 64% of the variance for the decision making process for CBIS. However, the results of the analysis of the final model, including standardized direct (path coefficients), indirect, and total effects; path significances; and variance explained (R^2) values, for each dependent variable are presented in Table 5.21.

Table 5.21: *Maximum Likelihood Parameter Estimates of the Standardized Factor Loadings, Standard Error, and Critical Ratio for the Hypothesized Model (Version2)*

Hypothesis		**Factor Loading**			**S.E.**	**C.R.**	**P value**
H1	PE	→	BI	.316	.051	5.691	***
H2	EE	→	BI	.329	.051	5.858	***
H3	SI	→	BI	.362	.037	7.117	***
H5	BI	→	AUSCBIS	.654	.071	10.763	***
H6	AUSCBIS	→	DMP	.251	.041	5.492	***
H7	Time	→	DMP	.276	.055	4.682	***
H8	Cost	→	DMP	.273	.062	4.525	***
H9	RISK	→	DMP	-.127	.028	-2.736	.006
H10	Benefits	→	DMP	.222	.057	4.005	***
H11	Res	→	DMP	.168	.049	3.000	.003

***significant at p< 0.001

Table 5.22: *Standardized Causal Effects for the Final Structural Model*

Endogenous variables	Determinant	Standardized causal effects			R^2 values
		Direct	**Indirect**	**Total**	
BI	PE	.316	-	.316	0.57
	EE	.329	-	.329	
	SI	.362	-	.362	
AUS	BI	.654	-	.654	0.43
	PE	-	.207	.207	
	SI	-	.237	.237	
	EE	-	.215	.215	
DMP	RES	.168	-	.168	0.64
	EE	-	.054	.054	
	COST	.273	-	.273	
	RISK	-.127	-	-.127	
	TIME	.276	-	.276	
	PE	-	.052	.052	
	SI	-	.059	.059	
	Benefits	.222	-	.222	
	BI	-	.164	.164	
	AUSBI	.251	-	.251	

5.8 Findings for the Moderators

The four moderators (Gender, age, experience, and voluntariness of using CBIS) were hypothesized within four hypotheses to answer the fourth research question of this study in Chapter 1, and here are the findings of each Moderator:

5.8.1 Gender Invariant

Comparisons were carried out to examine invariance, in addition to the unconstrained model comparison (model 1), the structural weights constrained (model 2), the structural covariances constrained (model 3), Structural residuals (model 4), Measurement residuals (model 5), and finally with the measurement residual constrained (model 6).

Table 5.23: *The Relative Chi Square Fit Statistic for the Gender*

Model	**CMIN**	**DF**	**P**	**CMIN/DF**
Unconstrained	1505.908	1212	.000	1.242
Measurement weights	1529.925	1238	.000	1.236
Structural weights	1552.075	1248	.000	1.244
Structural covariances	1602.379	1269	.000	1.263
Structural residuals	1604.122	1272	.000	1.261
Measurement residuals	1665.964	1309	.000	1.273
Saturated model	.000	0		
Independence model	9720.073	1332	.000	7.297

Dividing the chi square value (CMIN) by the degrees of freedom (DF) resulted in a Ratio (CMIN/DF) that, as shown in Table 5.23, fell in the very acceptable range < 3 for all six models by Kline (2005). What this test indicated was that the model in question was acceptably invariant across the two sample groups (gender) for all six models. Regardless of whether or not constraints were imposed, the measurement invariance test reveals that the value of (CMIN/DF) were (1.242, 1.236, 1.244, 1.263, 1.261, 1.273) respectively for (Unconstrained, Measurement weights, Structural weights, Structural covariances, Structural residuals, and Measurement residuals), which result in the invariance between the unconstrained and the constrained model with measurement weights equal, indicating that gender is invariant for this study.

Table 5.24: *Male Vs Female Standardized Regression Weight*

			Estimate	
			female	**male**
BI	<---	EE	0.22	0.39
BI	<---	SI	0.49	0.28
BI	<---	PE	0.34	0.29
AUCBIS	<---	BI	0.72	0.59
DMP	<---	Time	0.30	0.24
DMP	<---	AUCBIS	0.24	0.23
DMP	<---	Benefits	0.18	0.31
DMP	<---	RISK	-0.17	-0.08
DMP	<---	Cost	0.40	0.18
DMP	<---	Res	0.06	0.22
BNFT44	<---	Benefits	0.86	0.77
DMP30	<---	DMP	0.79	0.66
AUS26	<---	AUCBIS	0.86	0.81
AUS27	<---	AUCBIS	0.92	0.86
AUS28	<---	AUCBIS	0.90	0.80
BIU21	<---	BI	0.83	0.75
BIU22	<---	BI	0.78	0.76
BIU23	<---	BI	0.82	0.68
BIU24	<---	BI	0.87	0.77
SI12	<---	SI	0.87	0.83
SI13	<---	SI	0.91	0.84
SI14	<---	SI	0.84	0.73
TIME35	<---	Time	0.84	0.84
RISK42	<---	RISK	0.89	0.81
COST39	<---	Cost	0.90	0.79
COST37	<---	Cost	0.79	0.82
COST38	<---	Cost	0.90	0.80
BNFT45	<---	Benefits	0.91	0.73
BNFT43	<---	Benefits	0.80	0.80
DMP33	<---	DMP	0.79	0.70
DMP31	<---	DMP	0.88	0.77

DMP29	<---	DMP	0.82	0.67
PE1	<---	PE	0.79	0.83
PE2	<---	PE	0.63	0.77
PE4	<---	PE	0.84	0.84
PE3	<---	PE	0.92	0.90
RISK40	<---	RISK	0.87	0.81
RISK41	<---	RISK	0.88	0.81
EE10	<---	EE	0.86	0.85
EE7	<---	EE	0.92	0.86
EE8	<---	EE	0.88	0.89
EE9	<---	EE	0.89	0.88
TIME36	<---	Time	0.84	0.86
TIME34	<---	Time	0.86	0.83
RES47	<---	Res	0.91	0.85
RES48	<---	Res	0.91	0.89
RES46	<---	Res	0.94	0.86

The above Table 5.24 shows the estimation for males compared with females for all the items; from a glance, the same rate of the estimations obtained. Accordingly, the gender factor does not count as a moderator in this study.

5.8.2 Age Invariant

Dividing the chi square value (CMIN) by the degrees of freedom (DF) resulted in a Ratio (CMIN/DF) that, as shown in Table 5.25, fell in the very acceptable range < 3 for all six models (Kline, 2005). What this test indicated was that the model in question was acceptably invariant across the three sample groups (age) for all six models. Regardless of whether or not constraints were imposed, the measurement invariance test reveals that the value of (CMIN/DF) were (1.325, 1.320, 1.318, 1.329, 1.33, 1.34) respectively for (Unconstrained, Measurement weights, Structural weights, Structural covariances, Structural residuals, and Measurement residuals), which resulted in the invariance between unconstrained and the constrained model with measurement weights equal, indicating that the age factor does not count as a moderator in this study.

Table 5.25**:** *The Relative Chi Square Fit Statistic for the Age*

Model	**CMIN**	**DF**	**P**	**CMIN/DF**
Unconstrained	2537.712	1915	.000	1.325
Measurement weights	2561.611	1941	.000	1.320
Structural weights	2571.043	1951	.000	1.318
Structural covariances	2620.554	1972	.000	1.329
Structural residuals	2626.488	1975	.000	1.330
Measurement residuals	2696.163	2012	.000	1.340

Table 5.26: *Standardized Regression Weight Age Groups*

			Estimations		
			Less than 35	**from 35-45**	**46 and over 46**
BI	<---	EE	0.32	0.37	0.32
BI	<---	SI	0.40	0.28	0.40
BI	<---	PE	0.32	0.22	0.32
AUCBIS	<---	BI	0.65	0.62	0.65
DMP	<---	Time	0.33	0.28	0.33
DMP	<---	AUCBIS	0.28	0.21	0.28
DMP	<---	Benefits	0.18	0.30	0.18
DMP	<---	RISK	-0.04	-0.22	-0.04
DMP	<---	Cost	0.29	0.24	0.29
DMP	<---	Res	0.16	0.18	0.16
BNFT44	<---	Benefits	0.84	0.72	0.84
DMP30	<---	DMP	0.73	0.63	0.73
AUS26	<---	AUCBIS	0.83	0.83	0.83

AUS27	<---	AUCBIS	0.86	0.93	0.86
AUS28	<---	AUCBIS	0.87	0.77	0.87
BIU21	<---	BI	0.79	0.73	0.79
BIU22	<---	BI	0.78	0.72	0.78
BIU23	<---	BI	0.72	0.73	0.72
BIU24	<---	BI	0.82	0.75	0.82
SI12	<---	SI	0.86	0.78	0.86
SI13	<---	SI	0.85	0.90	0.85
SI14	<---	SI	0.80	0.73	0.80
TIME35	<---	Time	0.84	0.83	0.84
RISK42	<---	RISK	0.85	0.84	0.85
COST39	<---	Cost	0.83	0.81	0.83
COST37	<---	Cost	0.83	0.72	0.83
COST38	<---	Cost	0.86	0.77	0.86
BNFT45	<---	Benefits	0.76	0.87	0.76
BNFT43	<---	Benefits	0.81	0.77	0.81
DMP33	<---	DMP	0.80	0.57	0.80
DMP31	<---	DMP	0.83	0.66	0.83
DMP29	<---	DMP	0.76	0.69	0.76
PE1	<---	PE	0.82	0.80	0.82
PE2	<---	PE	0.73	0.65	0.73
PE4	<---	PE	0.85	0.77	0.85
PE3	<---	PE	0.89	0.92	0.89
RISK40	<---	RISK	0.80	0.93	0.80
RISK41	<---	RISK	0.89	0.73	0.89
EE10	<---	EE	0.85	0.86	0.85
EE7	<---	EE	0.88	0.86	0.88
EE8	<---	EE	0.91	0.84	0.91
EE9	<---	EE	0.88	0.92	0.88
TIME36	<---	Time	0.85	0.84	0.85
TIME34	<---	Time	0.85	0.79	0.85
RES47	<---	Res	0.89	0.82	0.89
RES48	<---	Res	0.90	0.86	0.90
RES46	<---	Res	0.90	0.84	0.90

Table 5.26, above shows the estimation for first, second, and third periods of Age analysis. Comparison was done between each item of the periods. From the estimations in each item it is indicated that, Age factor does not count as a moderator in this study.

5.8.3 Experience Invariant

Dividing the chi square value (CMIN) by the degrees of freedom (DF) resulted in a Ratio (CMIN/DF) that, as shown in Table 5.27, fell in the very acceptable range < 3 for all six models by (Kline, 2005). What this test indicated was that the model in question was acceptably invariant across the four groups for experiences for all six models. Regardless of whether or not constraints were imposed, the measurement invariance test reveals that the value of (CMIN/DF) were (1.321, 1.316, 1.313, 1.317, 1.319, 1.341) respectively for (Unconstrained, Measurement weights, Structural weights, Structural covariances, Structural residuals, and Measurement residuals), which resulted in the invariance between the unconstrained model and the constrained model with measurement weights equal, indicating that the experience is invariant in this study.

Table 5.27: *The Relative Chi Square Fit Statistic for the Experience*

Model	**CMIN**	**DF**	**P**	**CMIN/DF**
Unconstrained	3457.278	2618	.000	1.321
Measurement weights	3478.281	2644	.000	1.316
Structural weights	3485.188	2654	.000	1.313
Structural covariances	3524.114	2675	.000	1.317
Structural residuals	3531.108	2678	.000	1.319
Measurement residuals	3640.796	2715	.000	1.341

Model	CMIN	DF	P	CMIN/DF
Saturated model	.000	0		
Independence model	11246.534	2664	.000	4.222

Table 5.28: *Standardized Regression Weight Experiences Groups*

			Estimations			
			Exper1	**Exper2**	**Exper3**	**Exper4**
BI	<---	EE	0.37	0.10	0.37	0.37
BI	<---	SI	0.35	0.53	0.35	0.35
BI	<---	PE	0.31	0.29	0.31	0.31
AUCBIS	<---	BI	0.65	0.61	0.65	0.65
DMP	<---	Time	0.31	0.24	0.31	0.31
DMP	<---	AUCBIS	0.28	0.17	0.28	0.28
DMP	<---	Benefits	0.23	0.16	0.23	0.23
DMP	<---	RISK	-0.13	-0.13	-0.13	-0.13
DMP	<---	Cost	0.25	0.31	0.25	0.25
DMP	<---	Res	0.13	0.28	0.13	0.13
BNFT44	<---	Benefits	0.80	0.83	0.80	0.80
DMP30	<---	DMP	0.67	0.78	0.67	0.67
AUS26	<---	AUCBIS	0.83	0.83	0.83	0.83
AUS27	<---	AUCBIS	0.87	0.90	0.87	0.87
AUS28	<---	AUCBIS	0.81	0.93	0.81	0.81
BIU21	<---	BI	0.77	0.77	0.77	0.77
BIU22	<---	BI	0.75	0.76	0.75	0.75
BIU23	<---	BI	0.72	0.74	0.72	0.72
BIU24	<---	BI	0.82	0.73	0.82	0.82
SI12	<---	SI	0.84	0.83	0.84	0.84
SI13	<---	SI	0.88	0.78	0.88	0.88
SI14	<---	SI	0.82	0.66	0.82	0.82
TIME35	<---	Time	0.83	0.85	0.83	0.83
RISK42	<---	RISK	0.87	0.73	0.87	0.87
COST39	<---	Cost	0.79	0.91	0.79	0.79

COST37	<---	Cost	0.80	0.82	0.80	0.80
COST38	<---	Cost	0.80	0.92	0.80	0.80
BNFT45	<---	Benefits	0.76	0.88	0.76	0.76
BNFT43	<---	Benefits	0.81	0.79	0.81	0.81
DMP33	<---	DMP	0.74	0.75	0.74	0.74
DMP31	<---	DMP	0.77	0.83	0.77	0.77
DMP29	<---	DMP	0.74	0.72	0.74	0.74
PE1	<---	PE	0.83	0.78	0.83	0.83
PE2	<---	PE	0.71	0.71	0.71	0.71
PE4	<---	PE	0.84	0.77	0.84	0.84
PE3	<---	PE	0.94	0.72	0.94	0.94
RISK40	<---	RISK	0.85	0.78	0.85	0.85
RISK41	<---	RISK	0.81	0.93	0.81	0.81
EE10	<---	EE	0.87	0.75	0.87	0.87
EE7	<---	EE	0.88	0.84	0.88	0.88
EE8	<---	EE	0.90	0.86	0.90	0.90
EE9	<---	EE	0.89	0.88	0.89	0.89
TIME36	<---	Time	0.87	0.80	0.87	0.87
TIME34	<---	Time	0.84	0.79	0.84	0.84
RES47	<---	Res	0.87	0.85	0.87	0.87
RES48	<---	Res	0.89	0.90	0.89	0.89
RES46	<---	Res	0.86	0.94	0.86	0.86

The above Table 5.28 shows the standardized regression weight estimations for first, second, third, and fourth periods of experience analysis. In addition, comparison was done between each item of the periods. From the estimations it is indicated that, experience factor is not a moderator in this study.

5.8.4 Voluntary Vs Mandatory Invariant

Dividing the chi square value (CMIN) by the degrees of freedom (DF) resulted in a Ratio (CMIN/DF) that, as shown in Table 5.29, fell in the very acceptable range < 3 for all six models by (Kline, 2005). What this test indicated was that the model in question was acceptably invariant across the tow sample groups (work) for all six models. Regardless of whether or not constraints were imposed, the measurement invariance test reveals that the value of (CMIN/DF) were (1.232, 1.229, 1.227, 1.244, 1.243, 1.264) respectively for (Unconstrained, Measurement weights, Structural weights, Structural covariances, Structural residuals, and Measurement residuals), which resulted in the invariance between the constrained and the constrained model with measurement weights equal, indicating that voluntary/mandatory factor is not a moderator in this study.

Table 5.29: *The Relative Chi Square Fit Statistic for the Voluntary VS Mandatory*

Model	**CMIN**	**DF**	**P**	**CMIN/DF**
Unconstrained	1493.296	1212	.000	1.232
Measurement weights	1521.025	1238	.000	1.229
Structural weights	1530.923	1248	.000	1.227
Structural covariances	1578.998	1269	.000	1.244
Structural residuals	1581.535	1272	.000	1.243
Measurement residuals	1654.409	1309	.000	1.264
Independence model	9859.282	1332	.000	7.402

Table 5.30**:** *Standardized Regression Weight Voluntary/ Mandatory Groups*

			Estimations	
			Voluntary	**Mandatory**
BI	<---	EE	0.33	0.29
BI	<---	SI	0.35	0.41
BI	<---	PE	0.33	0.29
AUCBIS	<---	BI	0.65	0.63
DMP	<---	Time	0.27	0.39
DMP	<---	AUCBIS	0.25	0.27
DMP	<---	Benefits	0.29	0.01
DMP	<---	RISK	-0.19	0.06
DMP	<---	Cost	0.26	0.33
DMP	<---	Res	0.17	0.15
BNFT44	<---	Benefits	0.77	0.89
DMP30	<---	DMP	0.68	0.78
AUS26	<---	AUCBIS	0.87	0.74
AUS27	<---	AUCBIS	0.87	0.91
AUS28	<---	AUCBIS	0.82	0.89
BIU21	<---	BI	0.81	0.70
BIU22	<---	BI	0.76	0.77
BIU23	<---	BI	0.77	0.69
BIU24	<---	BI	0.84	0.76
SI12	<---	SI	0.84	0.85
SI13	<---	SI	0.88	0.84
SI14	<---	SI	0.81	0.73
TIME35	<---	Time	0.87	0.80
RISK42	<---	RISK	0.88	0.77
COST39	<---	Cost	0.81	0.88
COST37	<---	Cost	0.81	0.81
COST38	<---	Cost	0.82	0.87
BNFT45	<---	Benefits	0.82	0.75
BNFT43	<---	Benefits	0.80	0.81
DMP33	<---	DMP	0.72	0.72
DMP31	<---	DMP	0.78	0.86

DMP29	<---	DMP	0.71	0.80
PE1	<---	PE	0.81	0.84
PE2	<---	PE	0.73	0.71
PE4	<---	PE	0.82	0.87
PE3	<---	PE	0.89	0.94
RISK40	<---	RISK	0.85	0.81
RISK41	<---	RISK	0.86	0.77
EE10	<---	EE	0.84	0.88
EE7	<---	EE	0.86	0.91
EE8	<---	EE	0.91	0.85
EE9	<---	EE	0.89	0.89
TIME36	<---	Time	0.87	0.83
TIME34	<---	Time	0.80	0.90
RES47	<---	Res	0.88	0.86
RES48	<---	Res	0.90	0.89
RES46	<---	Res	0.85	0.94

The above Table 5.30 shows the standardized regression weight estimations for voluntary and mandatory analysis; In addition, comparison was done between each item of the two periods. From the estimations indicated that voluntary is not a moderator in this study.

5.9 Another Way of Analysis for the Moderators

Another type of analysis was used, in the coming findings for the moderators, the change of CFI of the measurement model (CFA) with each moderator was used, and this test was based on (Byrne, 2010).

Gender Invariant

Testing the invariance for gender moderator, between the two groups namely, male and female from the measurement model (CFA). The differences or change in Comparative Fit Indices (CFI) were by checking based on (Byrne, 2010). From the findings, and based on Figure 5.6, and Figure 5.7, for gender: male the CFI= 0.971 from unconstrained model (model 1). In addition, for the gender: female model, the CFI was = 0.971; the ΔCFI value of 0.00 contends that the measurement model is completely invariant with gender in that this value is less than the 0.01.

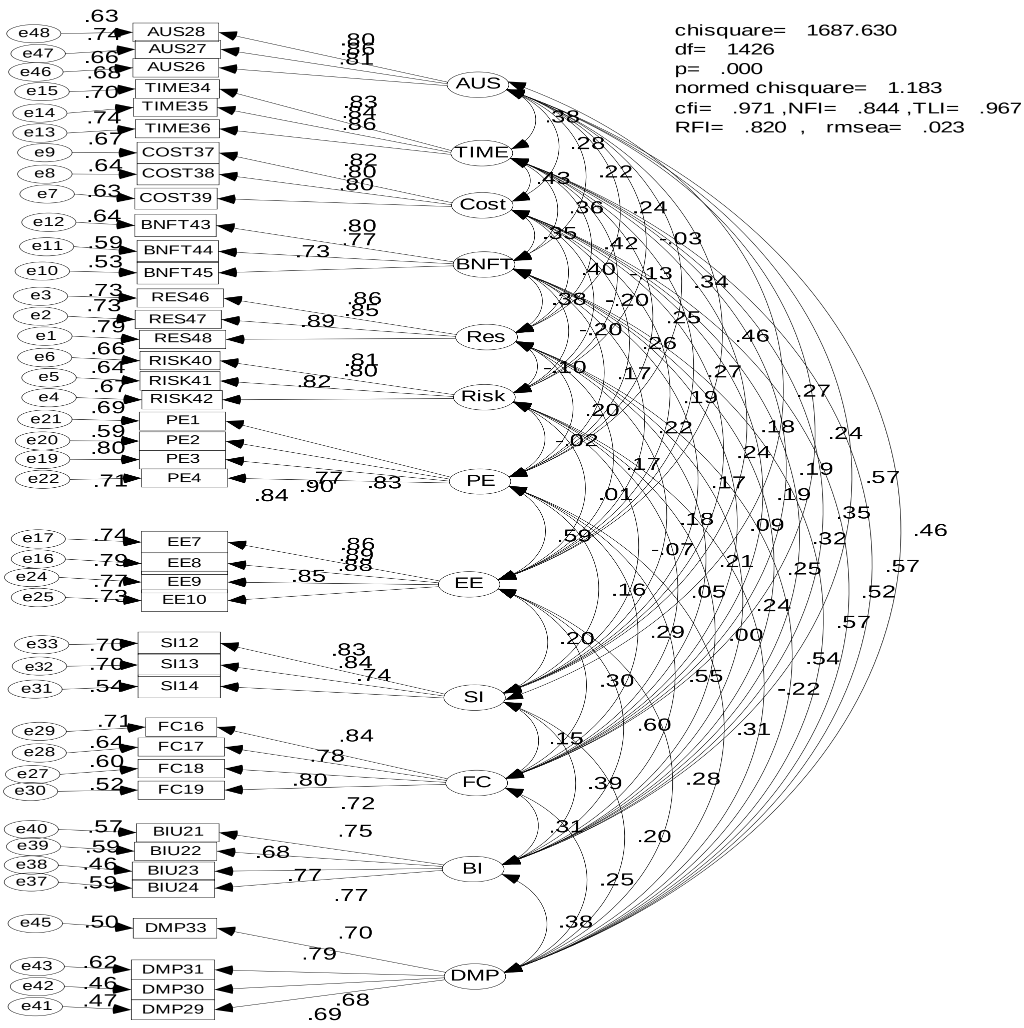


Figure 5.6: Measurement Model of Gender: Male

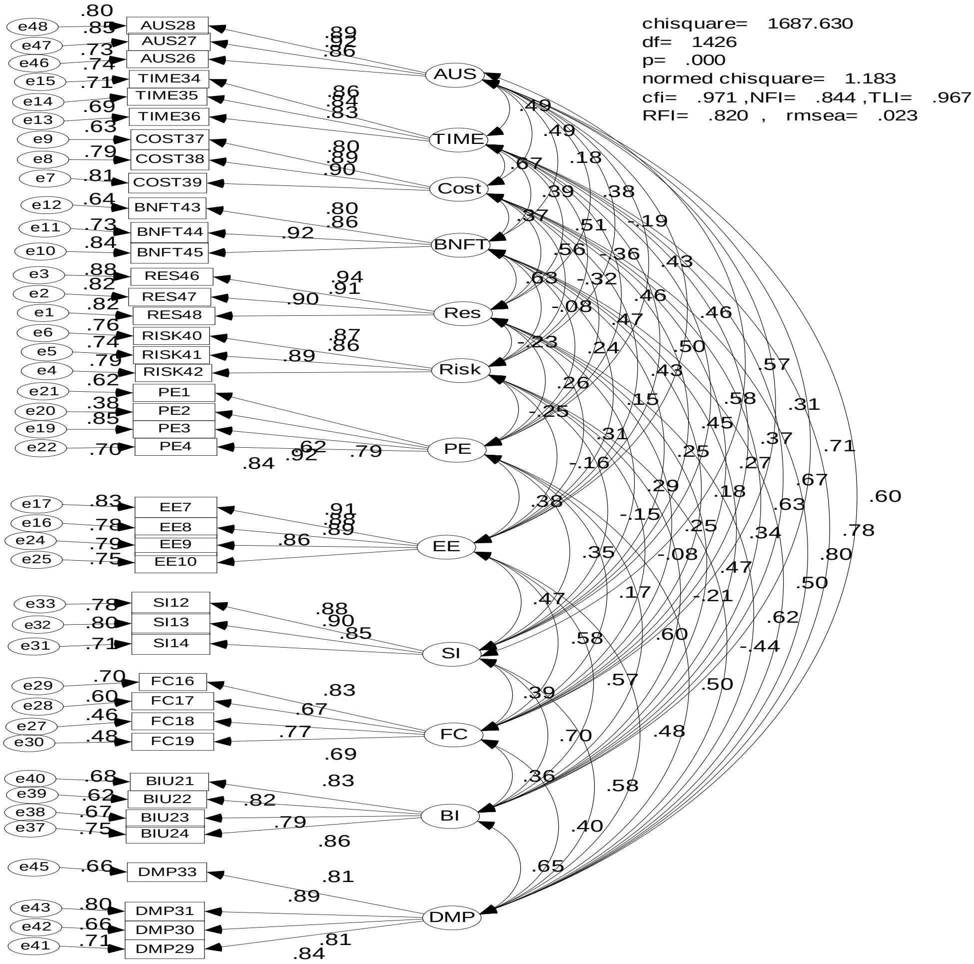


Figure 5.7: Measurement Model of Gender: Female

Age Invariant

Testing the invariance's between age groups 1, 2, 3 from the measurement model (CFA), referring to differences in CFI based on (Byrne, 2010). The differences or change with (CFI)was calculated based on (Byrne, 2010). From the findings, and based on Figures 5.8, 5.9, 5.10, which indicated the CFI= 0.947 for the age; first group, second group, and the last group also, the CFI was = 0.947; the ΔCFI value of 0.00 contends that the measurement model is completely invariant with age in that this value is less than the0.01.

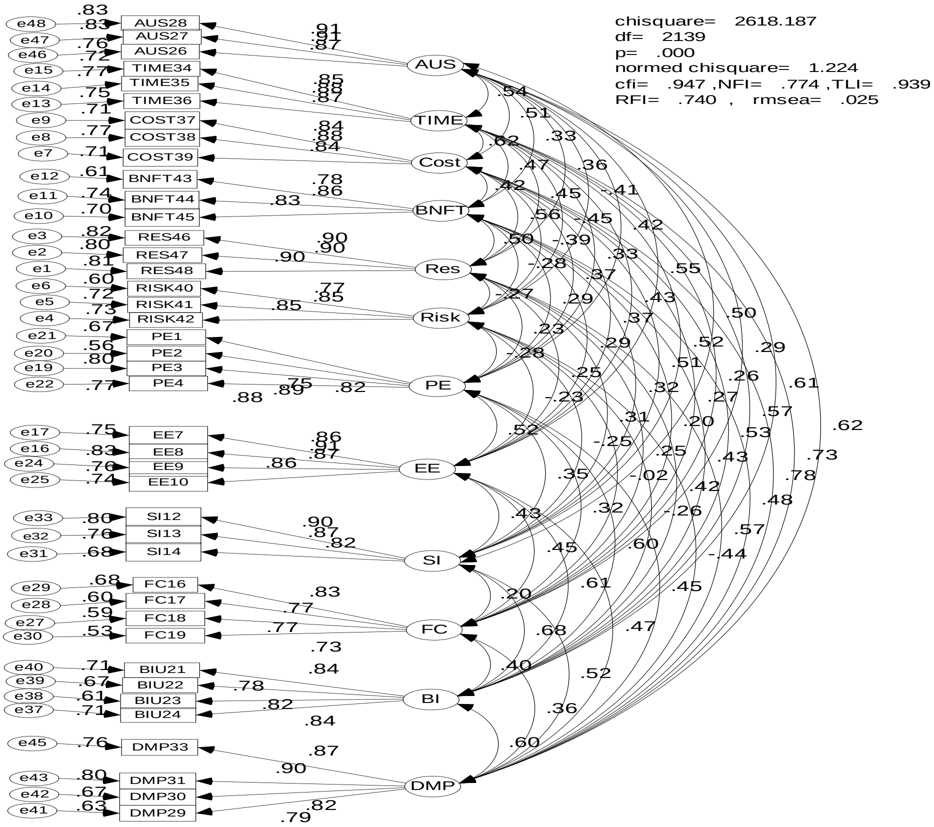


Figure5.8: Measurement Model of Age: Group1

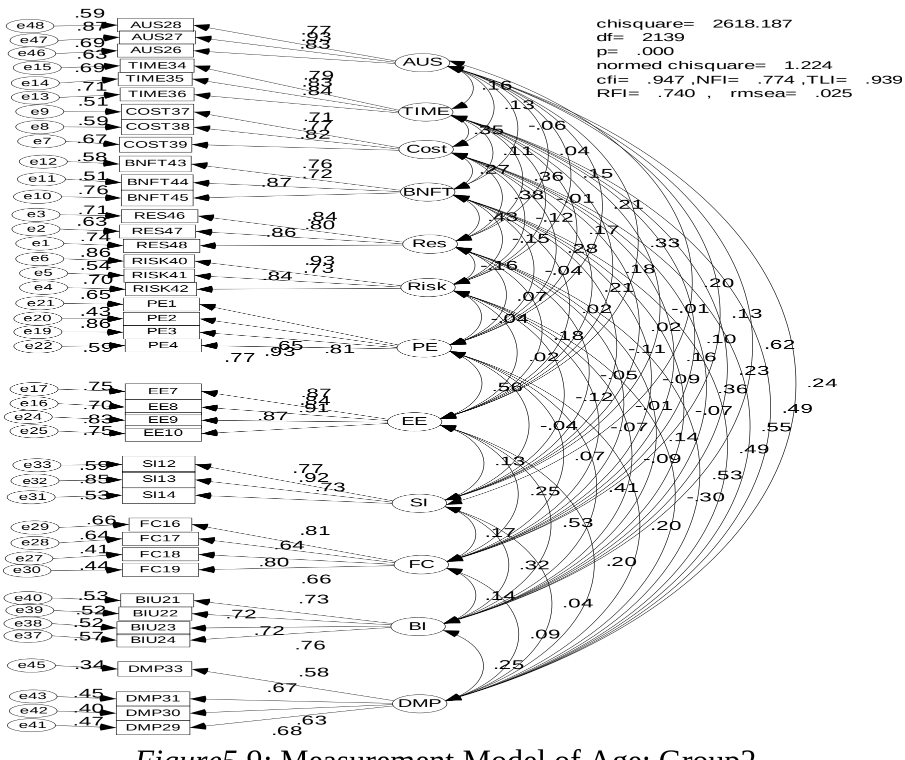


Figure5.9: Measurement Model of Age: Group2

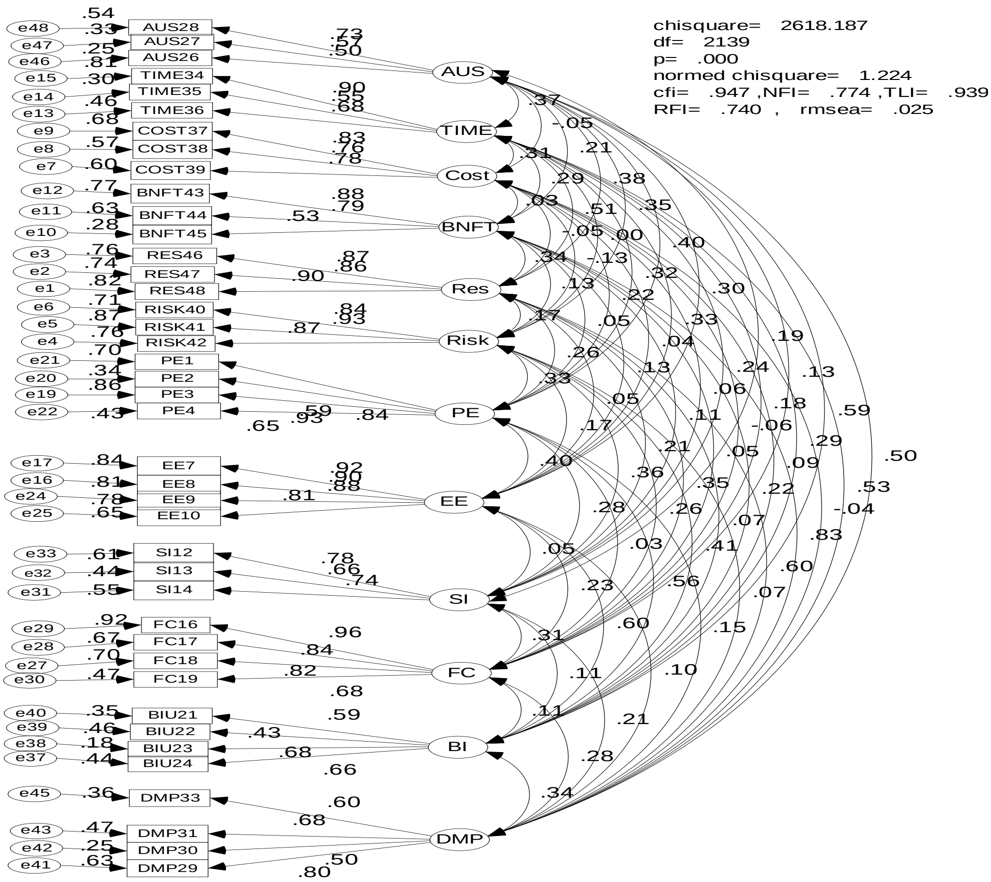


Figure 5.10: Measurement Model of Age: Group3

Experience Invariant

Testing the invariance's between experience groups 1, 2, 3, 4 from the measurement model (CFA), by referring to differences in CFI based on (Byrne, 2010). The differences or change in comparative fit indices (CFI) based on (Byrne, 2010). From the findings, and based on the Figures 5.11, 5.12, 5.13, 5.14. Which indicated the CFI= 0.916 for the experience; first group, second group, third group, thus, the ∆CFI value of 0.00contends that the measurement model is completely invariant with experience in that this value is less than the0.01.

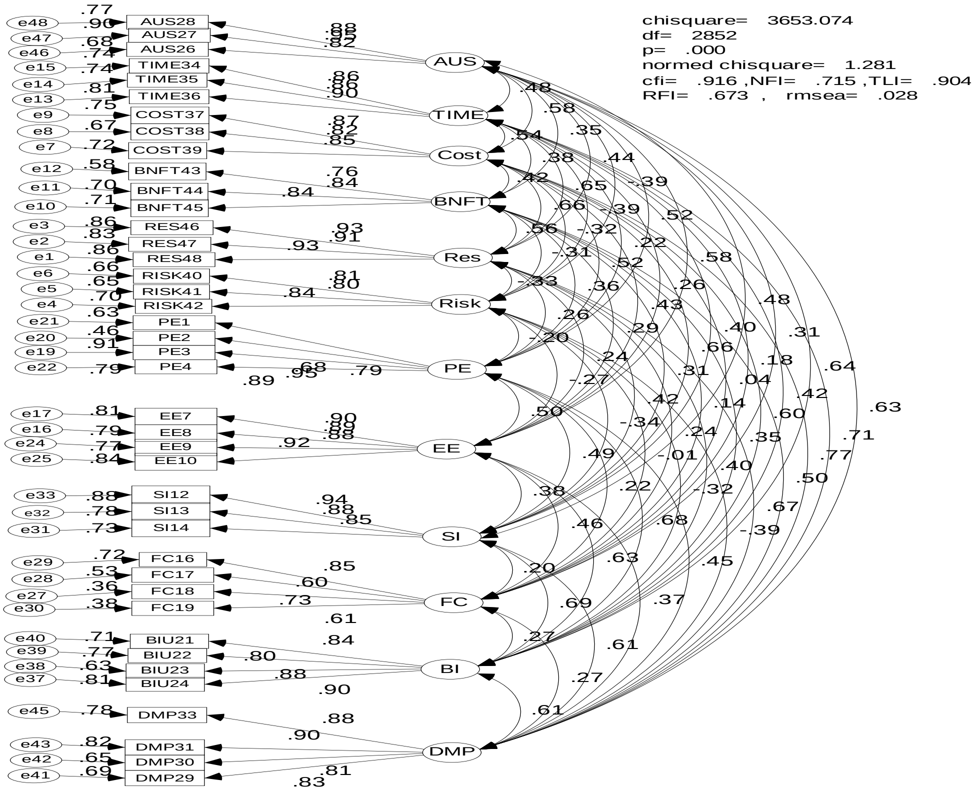


Figure 5.11: Measurement *Model of Experience: Group1*

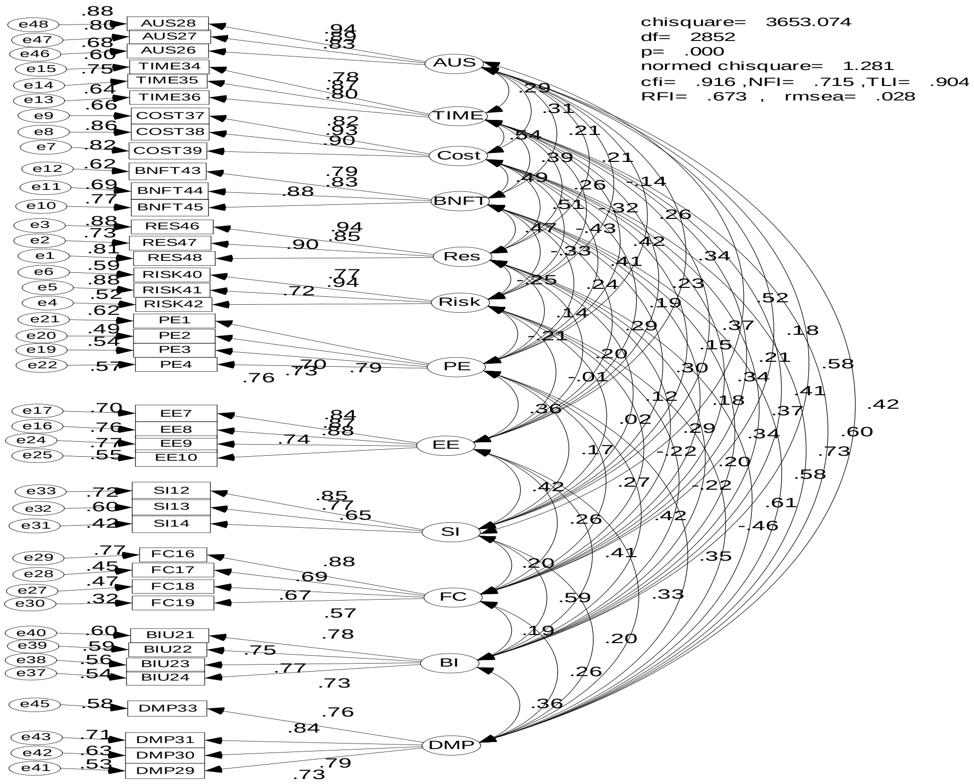


Figure 5.12: Measurement Model of Experience: Group2

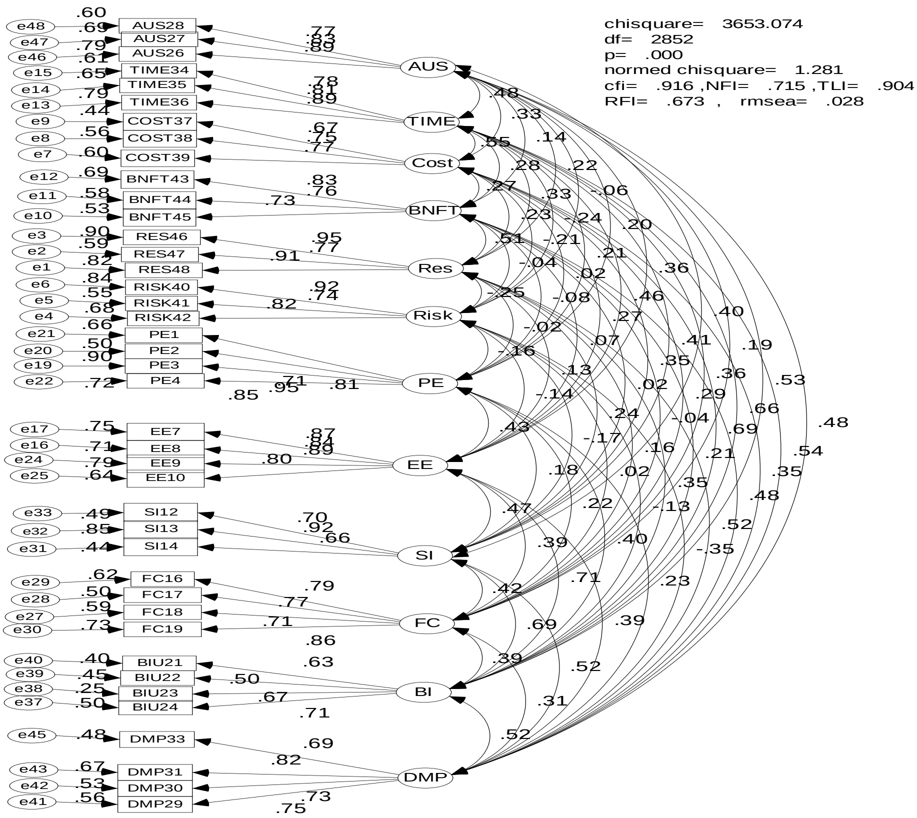


Figure 5.13: Measurement Model of Experience: Group3

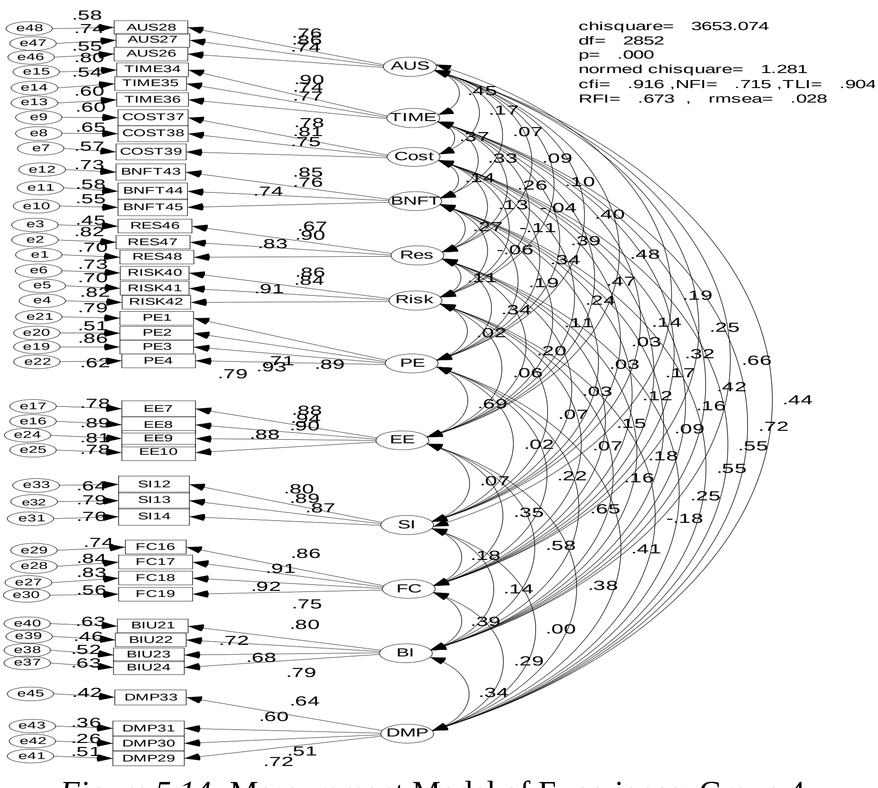


Figure 5.14: Measurement Model of Experience: Group 4

Voluntary/ Mandatory Invariant

Testing the invariance's between voluntary and mandatory groups 1, 2, from the measurement model (CFA), referring to differences in CFI based on (Byrne, 2010). From the voluntary/mandatory first group Figure 5.15, the CFI= 0.974, and from model1 or unconstrained model, the second group Figure 5.16 the CFI= 0.974, also. Thus, the ΔCFI value of 0.00 contends that the measurement model is completely invariant with voluntary or mandatory in that this value is less than the .01.

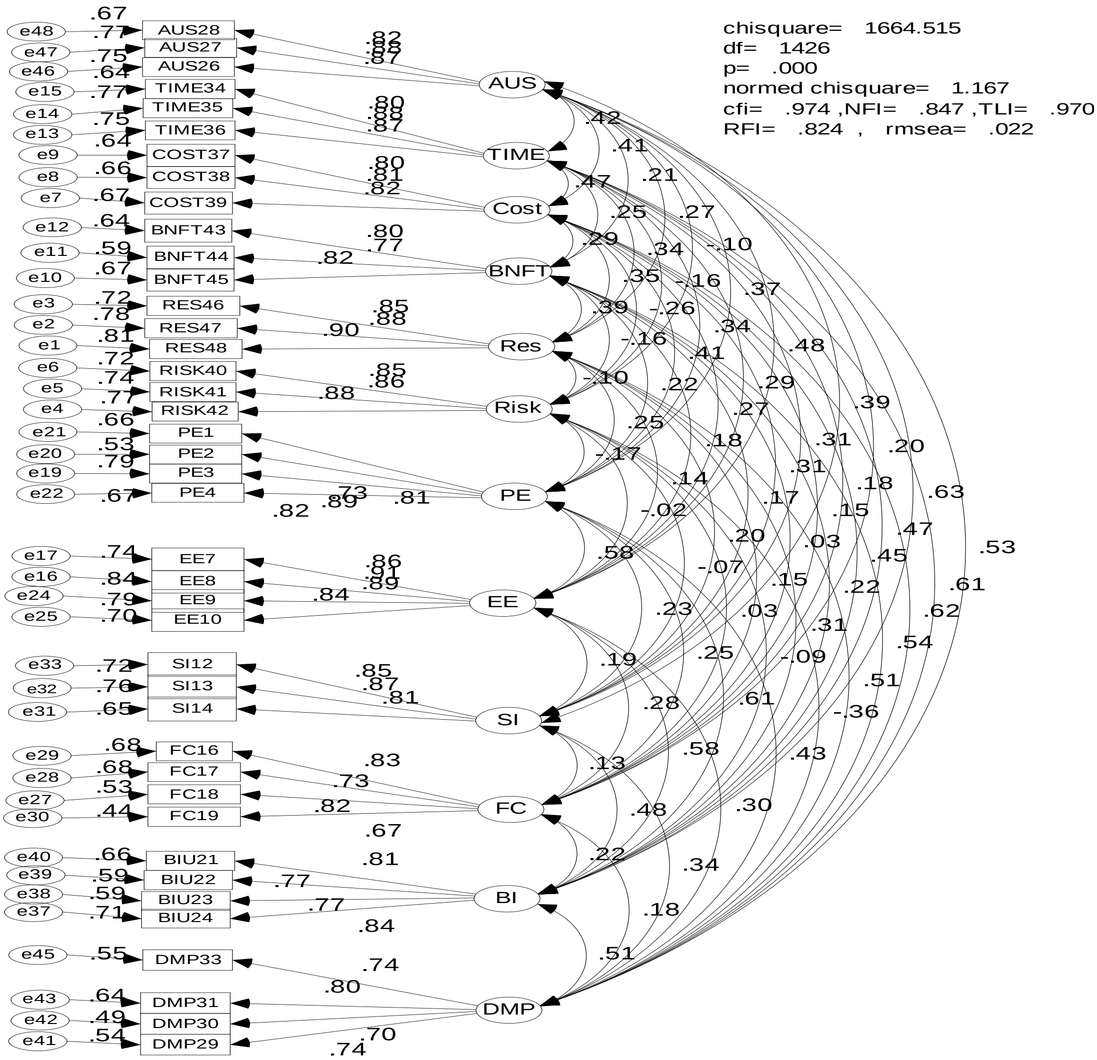


Figure 5.15: Measurement Model of Voluntary (group1)

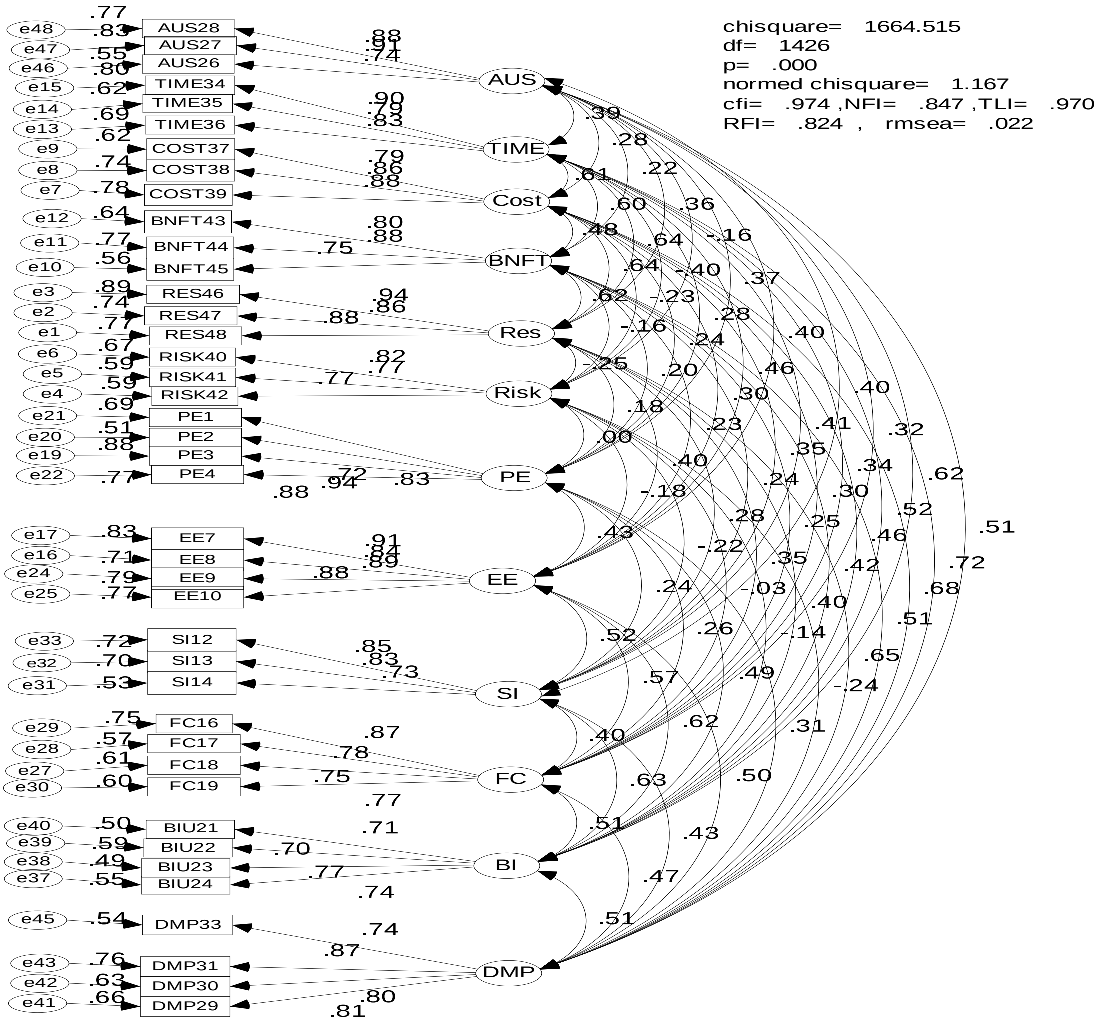


Figure 5.16: Measurement Model of Mandatory (Group2).

5.10 Hypotheses Discussion

From theprevious two tables,Table 5.21 and Table 5.22 the hypotheses were tested and gave the following results:

H1: Performance expectancy (PE) had a significant positive effect on users for intention use CBIS system in decision making process in organizations.

This hypothesis was supported by the final model with the ($P < 0.001$), and the factor loading between PE and behavior intention to use the CBIS in DMP had a direct effect with 0.316 which presented in the final model as 0.32. There was no indirect effect which leads to the total effect with 0.316.

H2*:* Effort expectancy (EE) (had) a significant and positive effect on users for intention use CBIS system in the decision making process in organizations**.**

This hypothesis was supported by the final model with the ($P < 0.001$), and the factor loading between EE and behavior intention to use the CBIS in DMP had a direct effect with 0.329 which was presented in the final model as 0.33. There was no indirect effect which leads to the total effect with 0.329.

H3*:* Social influence (SI) (had) a significant and positive effect on users for intention use CBIS system in the decision making process in organizations.

This hypothesis was supported by the final model with the ($P < 0.001$), and the factor loading between SI and behavior intention to use the CBIS in DMP had a direct effect with 0.362 which was presented in the final model as 0.36. There were no indirect effects which lead to the total effect with 0.362.

H4*:* The Facilitating conditions (FC) (did not have) a significant positive effect on users for the use CBIS system in the decision making process in organizations.

This hypothesis was not supported as mentioned previously in Table 5.18 by model ***(version 1***) with the (P value = 0.194). Which makes it similar to the study by (AL-Gahtani, Hubona, and Wang, 2007) about the acceptance and use of IT in Saudi Arabia.

H5*:* The behavior intention (BI) to use for CBIS system (had) a significant positive effect on the actual use for CBIS system in this study.

This hypothesis was supported by the final model with the ($P < 0.001$), and the factor loading between BI and actual use the CBIS in DMP had a direct effect with 0.654 which was presented in the final model as 0.65. There was no indirect effect which leads to the total effect with 0.654.

H6*:* Actual use for (AUS) CBIS system (had) a significant positive effect on the decision making process (DMP) for users in this study.

This hypothesis was supported by the final model with the ($P < 0.001$), and the factor loading between AUS and DMP had a direct effect with 0.251 which was presented in the final model as 0.25. There was no indirect effect which leads to the total effect with 0.251.

H7*:* Time system (had) a significant positive effect on the decision making process in this study.

This hypothesis was supported by the final model with the ($P < 0.001$), and the factor loading between TIME and DMP had a direct effect with 0.276 which was presented in the final model as 0.28. There was no indirect effect which leads to the total effect with 0.276.

H8*:* Cost (had) a significant and positive effect on the decision making process in this study.

This hypothesis was supported by the final model with the (P < 0.001), and the factor loading between COST and DMP had a direct effect with 0.273 which was presented in the final model as 0.27. There was no indirect effect which leads to the total effect with 0.273.

H9*:* High Risk (had) a significant negative effect on the decision making process in this study.

This hypothesis was supported by the final model with the (P < 0.001), and the factor loading between RISK in the meaning of High Risk and DMP had a direct effect with - 0.127 which was presented in the final model as - 0.13. There was no indirect effect which leads to the total effect with - 0.127.

H10: Benefits (had) a significant and positive effect on the decision making process in this study.

This hypothesis was supported by the final model with the (P < 0.001), and the factor loading between benefits and DMP had a direct effect with 0.222 which was presented in the final model as 0.22. There was no indirect effect which leads to the total effect with 0.222.

H11*:* Resources (had) a significant and positive effect on the decision making process in this study.

This hypothesis was supported by the final model with the (P < 0.001), and the factor loading between Resources and DMP had a direct effect with 0.168 which was presented in the final model as 0.17. There was no indirect effect which leads to the total effect with 0.168.

H12: In this study the four constructs performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) were (tested to be) moderated by: Gender, Age, Experience, and Voluntariness as in the hypotheses:

H12a*:* Gender did not have a significant effect with (PE, EE, and SI) in this study.

H12b*:* Age (did not have) a significant effect with (PE, EE, SI, and FC) in this study.

H12c*:* Experience (did not have) a significant effect with (EE, SI, and FC) in this study.

H12d*:* Voluntariness of use (did not have) a significant effect with social influence (SI) in this study.

As regards the hypothesis (**H12a*)***, and based on the findings it was not supported by the Table 5.23, and Table 5.24. It was shown also, based on the findings of Figures, 5.6, 5.7, based on differences in CFI (Byrne, 2010), that gender was not a moderator, which implies that decision makers in this study for using the CBIS in decision making process in organizations, were not affected by the gender of the decision makers whether male or female. In addition, the hypothesis (**H12b**) was not supported by the Table 5.25, and Table 5.26, and also the another test (**ΔCFI**) in Figures, 5.8, 5.9, 5.10, which showed that age was not moderator, which implies that decision makers in this study for using the CBIS in decision making process in organizations, not affected by the age of decision maker if he/she was from the young age period of less than 35 years, or he/she is from the middle age from 35 to 45 years. The decision makers' age was not even significant even for the subjects above 45 years old.

Furthermore, the hypothesis (**H12c**) was not supported by referring to the Table 5.27.and Table 5.28, and also, Figures, 5.11, 5.12, 5.13, 5.14, showed that experience was not a moderator, which implies that decision makers in this study for using the CBIS in decision making process in organizations, was not affected within if the decision maker's experience was from low experience range of 1-4 years, or if his /her experience was within the period 5-9 years, or from the 10-14 years. The same result was replicated if the decision maker had long experience.

The hypothesis (**H12d**) was not supported by the Table 5.29and Table 5.30, in addition, Figures, 5.15, 5.16, showed that voluntary was not moderator. which implies that decision makers in this study for using the CBIS in decision making process in organizations, either he/she was using the CBIS in voluntary environment or mandatory will not affect the decision making process.

5.11 Summary

The analysis produced an alternative model that comprised all the decision making factors, namely, time, cost, benefit, recourse, and risk, and reported their direct effects on the DMP factor. However, UTAUT factors were namely, performance expectancy followed by effort expectancy, and social influence, while the facilitating conditions factor was not included. As reported, they have had strong direct effect and indirect effect on behavior intention to use CBIS (BI) and actual use of CBIS. It is also noted that AUS have a solid direct effect on DMP. However, transposing the findings into the format of hypothesized model reveals the relationships among the factors in a simpler and neater view for analysis Figure 5.17.

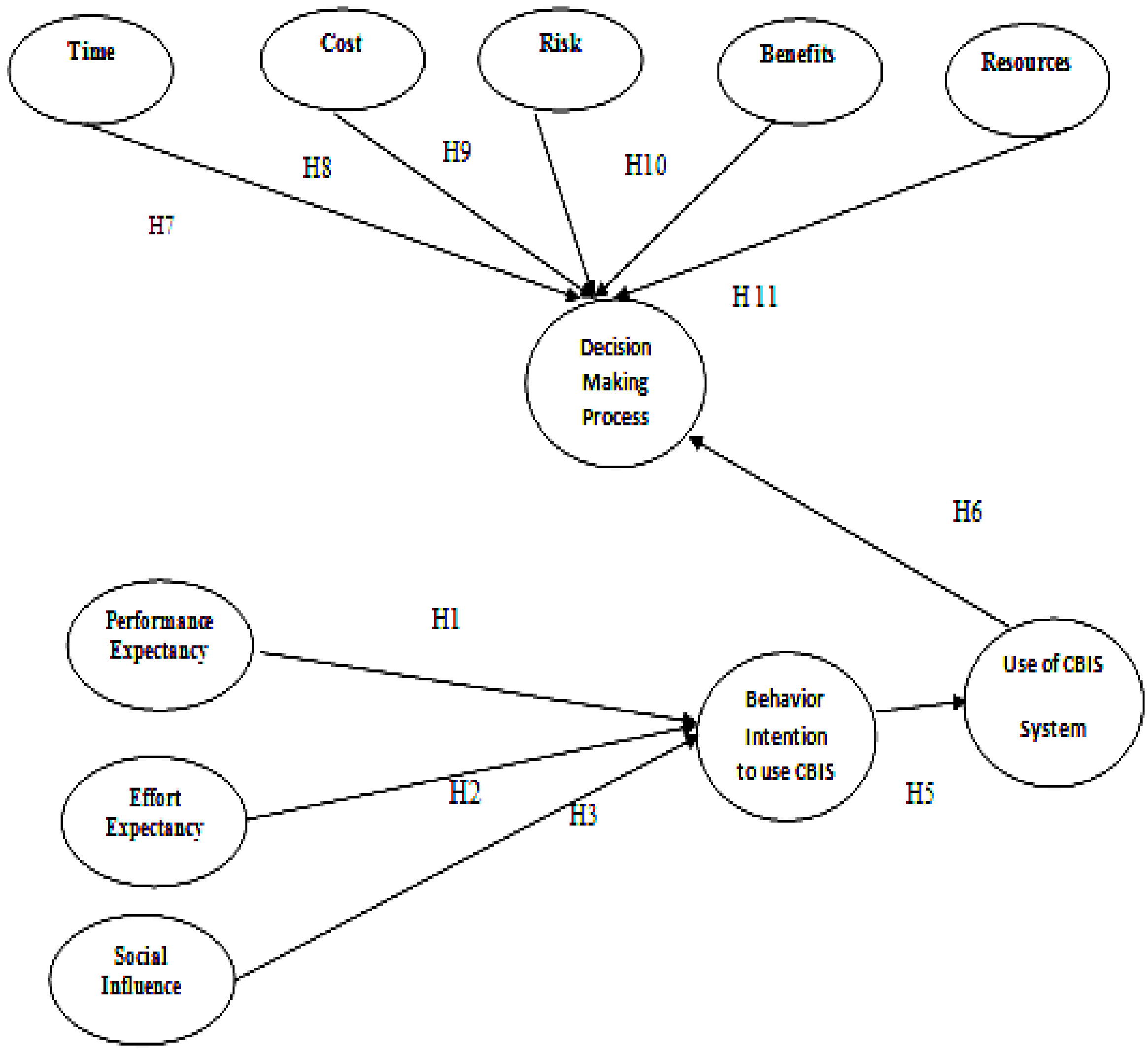


Figure 5.17: The findings following the format of the hypothesized model showing the significant effects.

For ease of reference to findings, below is a summary of the exact findings of the study

1. From the model which was proposed and tested by the hypotheses with structural equation modeling (SEM) techniques with Amos software, the specific results were:

   A. *Decision making factors group****.***

   1. ***Time*** factor was the highest factor of decision making factors group which has estimate standardized regression weight 0.28 (this was test by **H7**) with decision making process; this was a standardized casual effect and has a direct effect on DMP, This served as a helping guide for the decision makers to give this factor the priority in the DMP.

   2. ***Cost*** factor came second in the decision making factors group which has estimate standardized regression weight 0.27 (was test by **H8**) with the decision making process; this was a standardized casual effect and has a direct effect on DMP. This provided the decision makers with a clue to give this factor the same or second priority in the DMP.

   3. The ***Benefits*** factor came in the third place in the decision making factors group which has estimate standardized regression weight 0.22 (was tested by **H10**) with the decision making process; this was a standardized casual effect and has a direct effect on DMP, Again this gives the decision makers a clue to give this factor more consideration ***after time and cost*** in using CBIS in DMP.

4. The **Resources** factor was the fourth factor in the decision making factors group which has estimate standardized regression weight 0.17 (this was tested by **H11**) with the decision making process, this was a standardized casual effect and has a direct effect on DMP. Decision makers are thus encouraged to give this factor more attention after the three mentioned factors in using CBIS in DMP.

5. **Risk** in the meaning of " ***high risk***" factor came last and with a **negative** effect in the decision making factors group which has estimate standardized regression weight - 0.13 (this was test by **H9**) with decision making process: this was a standardized casual effect and has a direct effect on DMP. Together with the other four factors: time, cost, benefits, and resources, this factor should be given importance and be taken into account by the decision makers in using CBIS in DMP in organizations.

B. ***The unified theory of acceptance and use technology (UTAUT) factors group:***

1. Behavior intention to use (**BI**) the CBIS factor has indirect effect on DMP, and direct effect on the actual use of CBIS AUS, though the estimate standardized regression weight was the highest at all factors 0.65 (this was tested by ***H5***).It also has indirect effect which was calculated by multiplying regression weight factor by the actual use estimate regression weight factor (0.654*0.251= 0.164154 and approximately for three digits =0.164. The BI factor in this study was determined by the three determinants PE, EE and SI. It explained 57% of the behavior intention of acceptance of Technology (***CBIS***).

This did not reach the explanation of acceptance by the original UTAUT. Which have been reached to the 70%. In addition, it was above other models which explained over 40% (Venkatesh et al., 2003). One of the ***recommendations*** hopefully will be on how to increase the systematic approach of behavior intention or acceptance for the decision makers to use the technology (CBIS) in processing decisions in organizations; this might be done through three areas as:

i. Trying to increase the loading factors from the three mentioned determinants: PE, EE and SI.

ii. In the final model four of five items remained and those items were denoted as: BIU21, BIU22, BIU23, and BIU24, with the loading factors for the items: 0.60, 0.58, 0.54, and 0.74 respectively, while from the modification indices (MI) suggestions the BIU25 were deleted, for this it is a suggestion to increase those loading factors to enhance the total of the BI acceptance percentage.

iii. Last area may be investigated further by other future research by looking for new factors which affect the BI acceptance technology.

2. ***Performance expectancy*** (***PE***) has direct effect on BI and indirect effect on DMP; the estimate standardized regression weight with direct effect on BI was 0.32 (this was tested by ***H1***), and it also has indirect effect = 0.052 which was calculated by multiplying this regression estimates on the three paths (please see the final model in Figure 5.5) as (0.316 *0.654*0.251= 0.051872664 and approximately for three digits =0.052 (refer to, Table 5.22).

3. ***Effort expectancy (EE)*** has a direct effect on BI and indirect effect on DMP, the estimate standardized regression weight with direct effect on BI was 0.33 (this was tested by H2), and its indirect effect = 0.054 which was calculated by multiplying this estimate on the three paths (see the final model) as (0.329 *0.654*0.251= 0.054006666 and approximately for three digits =0.054 (see Table 5.22).

4. ***Social influence*** **(SI)** has a direct effect on BI and indirect effect on DMP; the estimate standardized regression weight factor with direct effect on BI was 0.36 (this was tested by ***H3***), and its indirect effect = 0.059 which was calculated by multiplying this estimate standardized regression weight on the three paths (refer to the final model) as (0.362*0.654*0.251= 0.059423748 and approximately for three digits =0.059 (refer to Table 5.22). As a recommendation for PE, EE and SI one suggestion is to look for each factor and the deleted items by MI suggestions, or by referring to the low factor loadings of the items to enhance those three factors (determinants) directly and indirectly to enhance the actual use and the DMP of CBIS.

5. ***Facilitating conditions*** **(FC)** failed to have any effect on final model, (this was tested by ***H4***).

6. ***Actual use*** of CBIS in DMP (**AUS**) has a direct effect on DMP, the estimate standardized regression weight was 0.25 (this was tested by ***H6***), and the AUS explained 43% of the actual usage of the CBIS in DMP. AUS was determined directly by the BI with 0.654 and indirectly by PE, EE, and SI, respectively: 0.207, 0.215, and 0.237, and the calculation for this 43% was as: (0.654 *0.207) + (0.654*

0.215) + (0.654* 0.237) = 0.135378+ 0.14061 + 0.154998 = 0.430986 which approximately = 0.43 or 43%. This percentage indicated that other percentages were not explained by this study, which opens the door for new future research, to look for the determinants of the AUS in this study or look for new factors to be used in future. In addition, future research may be directed to experiment with the facilitating conditions items which were discussed previously to be used in the DMP.

7. The ***Decision making process*** (**DMP**) which is meant to be the final outcome (output) in this study was explained with 64%. This outcome resulted from direct and indirect effects of all the previous mentioned factors (refer to Table 5.22, and Figure 5.5).The direct estimates of standardized regression weight within time, cost, benefits, resources, risk (in the meaning High-risk), actual use of CBIS, were respectively with the percentages, 0.28, 0.27, 0.22,0.17, - 0.13 and 0.25 and indirect estimate standardized regression weight of the AUS, PE, EE and SI with regression percentages respectively, 065, 0.032, 0.33 and 0.36.

In essence, all the above 10 mentioned factors directly or indirectly affect the DMP by explaining only 64%. In light of this percentage, other factors may not have been captured in this study and this is left for other future researches.

CHAPTER SIX
DISCUSSION AND CONCLUSION

6.1 Introduction

This is the final chapter of the study, discussions of the findings with the relationships between all the factors, all of the this was done to satisfy the research objectives of the study, limitation and problems mentioned and the value of this research, then recommendations and future work suggestions for other researchers.

6.2 Discussions of the Findings

The research objectives of this study are: (1) to identify the decision making attributes (relevant factors) that affect decision making, (2) to develop a conceptual model of acceptance and use of the CBIS in decision making in organizations, (3) To measure the acceptance of CBIS in decision making for users in organizations, in Jordan, This study extended UTAUT in the context ICT private organizations in Jordan. It measures the adoption and acceptance of behavior intention for the decision makers. Who utilize computer based information system (CBIS) in their organizations. Furthermore, this study used SEM technique in analysis; also, an Arabic instrument (questionnaire)with a 7-likert scale was tested through reliability and validity methods. A conceptual model was developed and tested. After that,a proposed (generated) model was introduced for the decision makers in organizations. In the coming sub-sections the study will answer the study`s objective, throughout the following discussions.

6.2.1 First Objective

With reference to the first objective which was to identify the decision making attributes (relevant factors) that affect decision making. The study supported literature regarding decision making factors, and as a contribution to the body of knowledge; it extended the UTAUT into a new model (see the proposed model in chapter 5). From the literature review, some factors were selected for the conceptual model, five of the factors were supported alsofrom a preliminary study, which was done over the years from 1990-2010 as mentioned in Chapter 4,it was finished on March, 2010. The preliminary study adopted nine factors namely: cost, time, risk, resources, benefits, financial impact, feasibility, intangibles, and ethics by (Lucke, 2006), the relevant factors were: time, cost, risk, resources, and benefits, and those factors were adopted with the conceptual model of this study. The findings of the main quantitative study comes with results, based on the final (proposed) model indicated the significances of all the factors in different levels, and it could be ranked based on the loading factors regression, between the factor and the decision making process (DMP) for each factor as follows: Time then nearly followed by cost, after that benefits then resources, all of those four factors were with a positive effect with the output of the study which was the decision making processing, whereas, the risk in the mean of high risk was significant with negative effect (refer to Figure 5.5).

In addition, similar to this, the preliminary study findings agreed and ensured the importance of those factors with the international studies as mentioned in Chapter 2: previous studies ranged in highlighting the factors, some scholars mentioned some of the factors as: high risk (Adiar, 2007), time and cost (Turban et al., 2007 & 2011), cost, time (Lurie and Swaminathan, 2009**),** benefits, cost, and risk (Standing et al., 2010), Cost, time, and risk (Stair & Reynolds, 2010) while Lucke, (2006) mentioned all. There was no previous study up to the knowledge of the researcher that highlighted or ranked the priorities of importance for each factor.

6.2.2 Second Objective

Based on the second objective which was to develop a conceptual model of acceptance and use of the CBIS in decision making in organizations, in order to satisfy this objective, some procedures were done as follows:

Literature the technology acceptance theories seeking for a theory, which support the context of the study, since the scope of the study was specified for the decision makers in organizations in a private sector, which users were of CBIS in processing decisions, the researcher in Chapter 2 found that from the technology theories, which were included the majority of these theories contained the two factors: Behavior intention to use, and Actual use. For this study, the unified theory of acceptance and use of technology (UTAUT) was a good theory which has some advantages to be adopted, some of these not limited to, but also, as: the UTAUT was established from previous well known technology theories as technology acceptance model (TAM), also there were five advantages with UTAUT over other technology models through the establishment period namely: the technology was studied, participants (students` /workers` data), timing of measurement, nature of measurement, and voluntary/ mandatory context (Venkatesh et al., 2003) and for the validation in different cultures to ensure that it works with different types of users issue, UTAUT was validated in nine countries with different cultures including Arabic culture (Oshlyansky et al., 2007).

The needed factors (constructs) were obtained from literature in Chapter 2 and preliminary work in Chapter 4, after that the hypotheses were forked based on the UTAUT and the new factors that were added, to propose a conceptual model, (refer to Figure 3.2, Chapter 3).

In the reason to develop a model with context of Middle East country **(**Jordan**)**, there was a need to test the conceptual model and this need: Arabic instrument which must be valid and consistent, then data to be analyzed and gain results, and this need methods and techniques. All of the mentioned steps were conducted, in short, the Arabic instrument was checked with referees, translated back and forth method (English to Arabic then Arabic to English) (Brislin, 1976; Abu-Shanab and Pearson, 2009), the piloting was made for the instrument, instrument was reliable and valid to be used in the main survey. Permission was taken from Supervisor to collect data also, permission letters were obtained from organizations in Jordan. Structural equation modeling (SEM) technique was used with AMOS software version 16.0, and the SEM assumptions were satisfied from sample size which was 360 usable cases; data was collected and edited with SPSS software version 17.0, and to ensure having clean data, screening of data was used through dealing with missing data, mahalanobsis (outlieres), normality and multicollinearity.

After that measurement model assessments were used through both: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), reliability and validity issues were conducted again for the main survey, and the results were acceptable and with good levels. From structural equation modeling (SEM) technique five major modification indices (MI) assessment namely X2/df (CMIN/df), CFI, NFI, TLI and RMSEA were used to evaluate the model in all stages, these evaluations were based on scholars in SEM as: (Hu & Bentler, 1999; Kline, 2005; & Hair et al., 2006, 2010). Lastly, to have the generated final model SEM approach was used through specification and re-specification of the model to gain versions and choose the best final model. Hypotheses were tested; the view of the gained final model was similar with the hypothesized model except the moderators (age, gender, experience, and voluntary) and the facilitating conditions (FC) factor which did not give levels of significances.

To sum, the conceptual model of acceptance and use of the (CBIS) system in decision making in organizations was developed and the second objective of this research was satisfied (refer to Figure 5.5).

6.2.3 Third Objective

Referring to the third objective which was measuring the acceptance of CBIS systems in decision making for users in organizations, from the final (proposed) model with the direct and indirect effects of the two mediation factors namely: Behavior intention (BI) to use CBIS in DMP, and Actual use (AUS) the CBIS in DMP the answer will be gained, the exact findings for the Behavior intention to use CBIS in DMP (BI) can be given as:

The Behavior intention to use (**BI**) the CBIS factor has indirect effect on DMP, and direct effect on the actual use of CBIS AUS, though the estimate standardized regression weight was the highest at all factors 0.65 (this was tested by ***H5***). It also has indirect effect which was calculated by multiplying regression weight factor by the actual use estimate regression weight factor (0.654*0.251= 0.164154) and approximately for three digits =0.164. The BI factor in this study was determined by the three determinants PE, EE, SI; and explained 57% of the behavior intention of acceptance of Technology (*CBIS*) which indicated for moderate levels of acceptance which was somewhat closer to the original UTAUT by Venkatesh et al. (2003) that explained nearly 70%.

One of the queries here will be on how to increase the behavior intention or acceptance of technology (CBIS) by the decision makers in processing decisions in organizations; this might be done through three areas as:

i. Trying to increase the loading factors from the three mentioned determinants: PE, EE, and SI. This should be by referring to the questionnaire (Appendix B), and basically to the questions which were used to test each determinant, as example, there were five questions Q1-Q5 namely:

   Q1 (PE1): I would find the CBIS useful in decision making processing in my organization.

   Q2 (PE2): Using the CBIS enables me to accomplish decision processing more quickly.

   Q3 (PE3): Using the CBIS increases my productivity.

   Q4 (PE4): Using the CBIS will significantly increase the quality of my decisions.

   Q5 (PE5): If I use the CBIS, I will increase my chances of getting better decisions.

In the final model the item for q5 did not appear (Q5 interchangeably PE5), this was done based on modification indices suggestions, also, may one assumption can appear here as data did not fit this item, in the same way other justifications can be for the other two determinants (EE, and SI), to end the PE points only, referring to final generated model Figure 5.5 shows from the indicators namely: PE1, PE2, PE3, and PE4. The second indicator (PE2) loading factor was the lowest with 0.72; in short, increasing this percentage will indirectly increase the behavior intention to use CBIS.

ii. In the final (proposed) model, and for the behavior intention (BI) factor, four of five items remained and those items were denoted as: BIU21, BIU22, BIU23, and BIU24, with the loading factors for the items: 0.60, 0.58, 0.54, and 0.74 respectively, while from the modification indices (MI) suggestions the BIU25 were deleted, for this it is a suggestion to increase those loading factors to enhance the total of the BI acceptance percentage.

iii. The last area may be investigated further by other future research by looking for new factors which affect the behavior intention (BI) acceptance technology.

In addition, ***Actual use*** of CBIS in DMP (**AUS**) has a direct effect on DMP, the estimate standardized regression weight was 0.25 (this was tested by ***H6***), and the AUS explained 43% of the actual usage of the CBIS in DMP. The actual use (AUS) was determined directly by the BI with 0.654 and indirectly by PE, EE, and SI, respectively: 0.207, 0.215, and 0.237, and the calculation for this 43% was as: (0.654 *0.207) + (0.654* 0.215) + (0.654* 0.237) = 0.135378+ 0.14061 + 0.154998 = 0.430986, which approximately = 0.43 or 43%. This percentage indicated that other percentages were not explained by this study, which opens the door for new future research, to look for the determinants of the AUS in this study or look for new factors to be used in future. In addition, future research may be directed to experiment with the facilitating conditions items which were discussed previously to be used in the DMP, through this, the last objective was fulfilled and the coming section will be free discussion to obtain the recommendations.

As far as the point of actual use of the findings which was nine Hours per week in this study is concerned, it falls below the rate indicated by the German managers study of (Vlahos et al., 2004), Furthermore, the results of this study in the actual use of CBIS are superior to those in Saudi Arabia as shown by Al-Zahrani (2010) but are inferior to the results pertaining to Hong Kong managers as revealed in the study of Vlahos and Ferrat (1995) .

Also, As a justification for the facilitating conditions (FC), which was not significant through testing the conceptual model, and based on the findings in hypotheses testing from H4, it might be explained through an indicated rejection of facilitating condition to be a determinant of the actual use of CBIS in DMP besides the previous study of (Al-Gahtani, Hubona, and Wang, 2007), a return for the items in the questionnaire which was tested and used (see Appendix B): the facilitating conditions (FC) items were denoted by FC16, FC17, FC18, FC19, and FC20 as:

FC16: I have the resources necessary to use the CBIS.

FC17: I have the knowledge necessary to use the CBIS.

FC18: The CBIS is compatible with other systems I use.

FC19: A specific person (or group) is available for assistance with CBIS difficulties.

FC20: Guidance will be available to me in the usage of CBIS.

One explanation for may be ascribed to a lack in the resources which are necessary for the decision makers as they were asked by FC16, or a lack in the knowledge to use the CBIS as in FC17.Another explanation is that they might have an automated CBIS which is not compatible with other systems as in the case of FC18. In addition, it might be that no specific person (or group) was available for assistance with CBIS difficulties as appeared in FC19. Lastly, decision makers or organizations may lack guidance to lend them support in their use of CBIS as in FC20.

As the study was conducted in Jordan, which is one of the Middle East Arab developing countries, the research has been particularly aimed at the organizations which have the automated or at least, some technologies such as website, internet, telephone; they are computerized organizations in the sense that some of the employees who are decision makers use the CBIS in decision processing,

This study adopted UTAUT model with a questionnaire and a 7-Likert scale similar to a study by (Abu-Shanab and Pearson, 2009), which was in the internet banking environment. The results indicate that there was a need or a question for the facilitating conditions variable which was adapted from the UTAUT instrument. In Abu-Shanab and Pearson’s study, the first three adapted questions were deleted in the first round of factor analysis and the remaining two items for a factor which is not recommended. This is another piece of evidence that Jordan lacks technological aspects in decision making. As this study gives a description of a developing country in the Middle East (Jordan), it gives food for thought for managers to consider the scope of technology and its applicability in this part of the world. Also, the results of this study are in agreement with the study done by (Al-Zhrani, 2010), and it reiterates the importance and need for of CBIS in the decision making process.

This study also agrees with the study of (Ismail, 2011) about marketing information system (MKIS) on decision making. In general, there are positive relationships between the level of utilizing and adopting “decision support system (DSS) & marketing intelligence” on the success of an organizational decision making; it provides the organization with a competitive advantage as it allows the organization to solve problems, since the DSS is part of the CBIS.

The researcher acknowledge the work of the pioneer scholars in the models or approaches of the decision making process, not limited to but, also, as: Vlahos et al. (2004); Lucke (2006); Turban et al. (2007, 2011) and want to introduce decision making process approach as by a combination of four or five steps as: in the same time this research adopt and test the five steps introduced by Vlahos et al. (2004) as the Decision making Process (DMP) consists of several steps as:

1. Identify problem or issue.
2. Generating alternative courses of action.
3. Evaluating the outcomes.
4. Ranking the alternatives and choosing one.
5. Implementing the chosen alternative.

In total, the DMP was explained with 64% which is not low percentages, but this was not from the steps alone, but also, from the five mentioned decision making factors, and the acceptance and use environment, in other words, through processing the decisions by the decision makers, they need to look of the existence of another factors as: Time, cost, risk (high risk), benefits, and resources.

6.3 Limitations of this Study

It should be emphasized that this research is limited to the private registered ICT organizations in Jordan, and other research might be called upon to investigate the study in other countries to be generalized in future. The population of the study was the registered ICT organizations in Jordan, which indicates that other ICT which were not registered under INT@J association were not surveyed. Similarly, organizations in the public sector were not included in the scope of this study. In addition, the tools of the CBIS could not be accessed in a holistic manner because of a few reservations of the organization regarding confidentiality, only from the preliminary work, there was some notes, which mentioned the use of some tools such as: spreadsheets or Dashboards, with the keen of the respondents from the preliminary interviews not to talk about software, the researcher used only the instrument without surveying about the tools. This was done, in order to avoid offending the respondents, because the researcher was afraid of the respondents not to cooperate in the main survey. In the same manner, for the decision makers, they have issue of being too keen for privacy, or the competition issue in the private sector.

6.4 Implications of the Study

On the basis of findings of the study, this study can propose the following implications:

This study can serve as an underlying guide that researchers in the similar academic field can use to further investigate the factors used in the study that significantly impact DMP using CBIS to yield greater explanations of the variances than found in this study. This would help decision makers to ensure a more optimal decision making process through an in-depth investigation of the factors identified in the study. The factors comprise time, cost, risk (high-risk), resources, benefits, performance expectancy, effort expectancy, social influence, behavior intention, and actual use.

The findings of the study would encourage decision makers to take concrete steps to train their employees regarding the use, adoption and ultimately acceptance of CBIS in decision making, provide the required equipment, and update their resources. In particular, they should take into consideration the benefits of using the Automated (CBIS) DMP to save time, money and cut costs and efforts besides, maximizing the profits. This opens the door for future research for the need to look into relationship between using CBIS for DM and profitability to lend decision makers more support and convince other managers to us CBIS in DMP in organizations.

Moreover, this study recommends that: Orientations should be given for managers at all levels in the organizations, Training programs should be organized to ensure proper and adequate use of CBIS facilities in generating and processing decisions, time must be used strategically given the importance of decisions that asserts that more important decisions should be allocated more time, in the risky circumstances, the high risk is good to be identified if possible every time when processing decisions, strategies, policies and practices should be designed that comply with environmental laws and regulations and must support the decision making process for the decision makers, efficient resource utilization and energy consumption throughout the company should be ensured as this is of fundamental importance for the developing economies like Jordan and other countries.

Likewise, the findings of the study imply: that decision makers expect that use of CBIS would assists them in achieving gains in organizational performance, it doesn't require a higher level of effort to use CBIS because of ease of its use, and decision makers felt social pressure/influence to use CBIS. In combination, these factors foster the adoption and acceptance of CBIS in decision making process by influencing the behavioral intentions of the decision makers. The following section entails the contributions of the study.

6.5 Contributions of the Study

Many studies support the Unified Theory of Acceptance and Use of Technology (UTAUT) which came from other eight known models for the researchers` effort over many years with decision making process and its factors. The contribution is thus two-folds:

Theoretical Contributions hopefully will be:

i. The major contribution of this study is providing a proposed model of adoption and acceptance of the behavior intention of the decision makers to use CBIS for decision making in organizations.

ii. Extending UTAUT within the area of decision making will urge other researches to adopt or adapt this model for future research.

Practical Contribution hopefully will be:

i. Add, to the body of knowledge in the Middle East countries and Jordan in particular, a good view about understanding the importance of adopting and accepting the CBIS to use it in the decision making process in organizations to cut the cost and save time and to maximize the profits.

ii. Help in the upcoming development and research in Jordan from the findings basis.

iii. Help decision makers at all levels of organizations, when processing their decisions which are very important to the economy sector growth of every country.

Therefore, the study would persuade the decision makers to adopt CBIS; and expedite its usage and acceptance in their businesses to avail its benefits in terms of saving time and cost, efficient use of resources, coping with high risk situations and resultantly achieving higher performance through better decision making.

6.6 Conclusions and Future Researches

To conclude, the study has revealed that organizations in Jordan, rely on factors such as time, cost, risk, benefits, and resources that significantly impact decision making process (DMP) in organizations in different perspectives as external factors of UTAUT: time, cost, risk, benefits, and resources for the DMP had an impact on decision making process for CBIS in organizations. In particular, time and cost were the major factors for the DMP, the study adopted UTAUT as a suitable tool for the purpose of the study. In addition, all the four moderators were found to be non-significant namely the hypotheses (H12A, H12B, H12C, and H12D) of the proposed model.

This study yielded two acceptable models: version one (refer to Figure 5.4), and version two (refer to Figure 5.5), despite their advantages in explaining decision making process of CBIS for model version1, which was respectively as DMP with 49%, AUS with 36%, and BI with 46%. Some of its modification indices were not at high significance level, namely NFI= 0.854, and for RFI= 0.845. With reference to SEM technique using AMOS software, and by the modification indices suggestions model version1, was further improved to obtain final (proposed) model as represented by model version2. The last one gave an explanation better than the previous model, the percentage for the meant explanations were respectively, DMP with 64%, AUS with 43%, and BI with 57%. These percentages are higher in comparison with model version1. In addition, the modification indices in version2 were all above or equal 0.90. Namely CFI= 0.976, NFI= 0,911, RFI= 0.902, and

TLI= 0.974. Another advantages was for version 2 is that the RMSEA=0.030 which was in version1 =0.049.

The DMP, AUS, and BI percentages mentioned previously, (are thus the answer) to the first research question of this research. In answer to the second research question, five factors namely time, cost, risk, benefits, and resources have been found to be stable (relevant) factors in decision making as were explained by the findings of the main study, and was supported before in the preliminary work.

The study also dealt with the independent factors of UTAUT as predictors of the user intention to use the CBIS. Three independent factors namely performance expectancy, effort expectancy and social influence proved to be significant factors of the users intention to use CBIS as appeared from the hypotheses testing in the previous chapter. Facilitating conditions (FC), however, was not supported as tested by hypothesis H4. The indicators which were used to test the FC in the questionnaire showed lack of helping factors that should facilitate the use of CBIS in DMP for managers. This was dealt with in detail in the discussion of findings in Chapter 5, and this was the answer for the third research question of this thesis.

The four moderators: age, gender, experience, and voluntariness, did not significantly moderate the relationship between perceived expectancy, effort expectancy, social influence, and facilitating conditions with the behavior intention to use the CBIS in this study based on the findings. This gives the study future support as the optimal model should be insensitive to variant environmental factors (the moderators) which will result in unbiased acceptance and use for decision making process models.

In addition, decision making process, which is four or five, steps from: identifying the problem, to implementing the chosen alternative, which was mentioned, need to be not far away of the relevant decision making factors.

Future Research

This study can be replicated in other private and public ICT organizations in Jordan. Furthermore, the study can be applied in the perspective of other developing countries and across different organizational contexts. Varying cultural and environmental contexts may reveal the identification of new factors that can be incorporated in UTAUT.

Also, other developing countries can grasp the benefits from this research from many sides such as the instrument, research process, or the techniques. Although, the facilitating conditions construct was not supported in this study, this can open doors for further investigation of this construct and seek its impact on the actual use of CBIS in decision making in other developing countries with varying organizational contexts. Moreover, longitudinal studies can be conducted by future researchers to have a deeper insight into the issues related to adoption and acceptance of CBIS in decision making.

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Appendix A

The Organizations Names of the Population

	Company	Phone
1.	@Your Service	(6) 581-7796
2.	01 Tracks	(6) 554-1931
3.	4P'S Integrated Marketing Communications	(6) 581-9980
4.	Abu Ghazaleh & Co	(6) 510-0600
5.	Accelerator Technology Holdings	(6) 593-9094
6.	Access to Arabia	(6) 568-6588
7.	Adaptive Techsoft	(6) 516-2001
8.	Al Failq for Information Technology	(6) 567-7664
9.	Al Nasher Technical Services	(6) 569-4861
10.	Al Urdonia Lil Ebda	(2) 739-1529
11.	Anchor for Project Management Consultancy – APMC	(6) 568-7540
12.	Arab Academy for Microsoft Technologies	(6) 581-9554
13.	Arab Advisors Group	(6) 582-8849
14.	Arab Web Directory	(6) 585-4866
15.	Arabia Cell	(6) 581-0201
16.	Arabian Office Automation Company	(6) 552-2298
17.	Arabic Pearl Internet Portal	(6) 569-2232
18.	Aramex International Courier	(6) 551-5111
19.	Arco-TT	(6) 565-4055
20.	Artelco	(6) 464-7062
21.	Aspire Services	(6) 516-3208
22.	Beecell-Al-Mutatwera for Mobile Applications	(6) 586-1730
23.	Beladcom	(6) 554-3143
24.	Believe Soft	(6) 533-5152
25.	Blink Communications	(6) 569-0997
26.	Blue Energy for Advanced Technologies BEAT	(6) 463-7266
27.	Business Plus Plus	(6) 568-5095
28.	Central E-Commerce Co.Ltd - Jormall.com	(6) 582-3961
29.	Cisco Systems International	(6) 460-4400
30.	Code Name\\Pro	(6) 400-2939
31.	CompuBase International	(6) 560-1150
32.	Computer & Communications Systems	(6) 534-4088
33.	Computer Networking Services	(6) 553-5733
34.	Convergence Consulting & Technology	(6) 556-0386
35.	CRM JO	(6) 565-4730
36.	CrysTelCall	(6) 500-1333
37.	Cubic Art Technologies	(6) 515-0160
38.	Dakessian Consulting	(6) 567-6393
39.	Dama Max	(6) 577-7733
40.	Data Consult	(6) 565-2291

41.	Dot.jo	(6) 554-4889
42.	Eastern Networks	(6) 567-9626
43.	Echo Technology	(6) 461-2095
44.	EDATA Technology and Consulting	(6) 551-4014
45.	Electronic Health Solutions	(6) 580-0461
46.	Electronic Source Solutions (eSource)	(6) 533-2705
47.	Elite Information & Systems	(6) 581-7772
48.	Ericsson AB	(6) 554-0787
49.	Esense Software	(6) 535-2211
50.	ESKADENIA Software	(6) 551-0717
51.	Estarta Solutions	(6) 533-0751
52.	E-tech Systems	(6) 515-2172
53.	Extensya	(6) 577-7700
54.	Focus Solutions	(6) 554-4978
55.	Foursan Group	(6) 562-4562
56.	Fourth Dimension Systems	(6) 553-2900
57.	Future Applied Computer Technology	(6) 551-5155
58.	Gate2Play	(6) 550-7887
59.	General Computers & Electronics	(6) 551-3879
60.	Global Technology	(6) 567-8110
61.	Globitel	(6) 530-0130
62.	Grapheast Jordan	(6) 585-2101
63.	High Performance Distribution	(6) 582-1226
64.	Huawei	(6) 554-0280
65.	ibsPoint	(6) 515-3653
66.	Ideation Box	(6) 581-4487
67.	Imagine Technologies	(6) 551-5383
68.	In4ma Software	(6) 583-3783
69.	info2cell	(6) 553-1140
70.	Infograph	(6) 560-3546
71.	Information Technology Planet - ITP	(6) 551-7731
72.	Insight Business Solutions	(6) 461-6025
73.	Integrated Standard Solutions	(6) 551-3581
74.	Integrated Technology Group	(6) 461-8133
75.	International Data Exchange	(6) 551-5333
76.	International Turnkey Systems	(6) 554-5535
77.	Intracom Jordan	(6) 460-3333
78.	Iris Guard	(6) 580-8777
79.	IT Security Training and Solutions (ITS2)	(6) 537-0512
80.	Jabbar Internet Group	(6) 582-1236
81.	JADEER Training	(6) 565-2318

82.	Javna Wireless Software Solutions	(6) 585-8193
83.	Jeeran for Software Development	(6) 582-5593
84.	Jordan Business Systems JBS	(6) 500-0999
85.	Jordan Data Systems	(6) 550-2000
86.	JOSAFE	(6) 552-9340
87.	Ketab Technologies Ltd.	(6) 551-5936
88.	KeySoft	(6) 551-9363
89.	Khalifeh & Partners	(6) 566-4750
90.	Kharabeesh	(6) 568-5922
91.	King Abdullah II Fund for Development	(6) 582-2820
92.	Kinz for Information Technology	(6) 553-2484
93.	Kulacom	(6) 250-0000
94.	LEMS JORDAN	(554) 240-1
95.	Life-Long Medical	(6) 533-5152
96.	Logicom Jordan L.L.C	(6) 551-3400
97.	Luminus Group	(6) 579-9040
98.	Mada Communications	(6) 553-2625
99.	Manaf Soft	(6) 585-3366
100.	MAYSALWARD (MRD)	(6) 470-8899
101.	MediaScope	(5) 534-029
102.	MenalTech	(6) 554-5314
103.	Microsoft	(6) 550-3444
104.	Mirsal	(6) 581-5707
105.	Mixed Dimensions	(6) 533-5152
106.	Mobile Interactive Technologies (MIT)	(6) 552-0750
107.	MobileCom	(6) 460-6722
108.	Modern Scientific & Electronic co	(6) 585-0386
109.	Motorola Jordan	(6) 553-0643
110.	Mstart	(6) 582-7334
111.	National Company for Employment Services (Akhtaboot)	(6) 577-7500
112.	National Health Insurance Administration Co.- Nathealth	(6) 551-1010
113.	National Net Ventures (N2V)	(6) 582-0515
114.	NCR Corporation	(6) 500-2044
115.	NewTek Solutions	(6) 516-5300
116.	Nuqul Group	(6) 465-2688
117.	Oasis 500	(6) 580-5460
118.	Offtec Group	(6) 464-2724
119.	Omniyat for IT and Business Management Solutions	(6) 537-6537
120.	Optimiza Academy	(6) 515-7193

121.	Optimiza Group	(6) 562-9999
122.	Oracle Systems Ltd	(6) 520-0800
123.	Orange	(6) 460-6722
124.	Oriented Solutions	(6) 553-3183
125.	Origin Training & Technical Consultancy (OTrain)	(6) 554-3470
126.	OutSource	(6) 500-7377
127.	Parallel Perspective Management Consulting Company	(6) 592-1851
128.	Pinnacle Business and Marketing Consulting	(6) 554-0856
129.	Pioneers Information Technologies Co	(6) 551-4127
130.	Pixels Media	(77) 777-2050
131.	Practech	(6) 533-5152
132.	Principle Advanced Communication Technology	(6) 560-4783
133.	Pro Technology	(6) 560-6676
134.	ProgressSoft Corporation	(6) 562-3000
135.	Quality Business Solutions (QBS)	(6) 569-4884
136.	Quirkat	(6) 585-8912
137.	Reach Group	(6) 566-3127
138.	RealSoft	(6) 516-0484
139.	Right Pixels	(6) 566-1783
140.	Rubicon Holding	(6) 582-4953
141.	Rubikomm Telecom Solutions	(6) 565-6110
142.	Sanad Law Group	(6) 566-0511
143.	Savvytek	(6) 565-5266
144.	Semantic Intelligent Technology "SIT"	(6) 568-8462
145.	Sermon Business Solutions	(6) 534-5371
146.	Shnoudi Trading Co (STC)	(6) 551-6388
147.	Shoofee TV	(6) 461-0070
148.	Sigma Soft Inc	(6) 551-2921
149.	Signal Communications	(6) 585-4140
150.	Smart Cube Information Technology	(6) 592-5604
151.	Specialized Data Base Technologies (Palco)	(6) 582-6602
152.	Specialized Technical Services	(6) 580-2626
153.	Spring Field	(6) 565-2317
154.	Spring Web Technologies	(6) 462-2536
155.	SSSProcess	(6) 585-7553
156.	Stella Design	(6) 566-3317
157.	Strategic Center for Organizational Performance Improvement (SCOPI)	(6) 551-5993
158.	Sukhtian Group	(6) 568-8888
159.	Synaptic Technologies	(6) 552-3638

160.	Systems And Electronic Development FZCO	(6) 553-3832
161.	TakTek Games	(6) 462-0944
162.	TDM Group	(6) 551-7128
163.	TE Data Jordan	(6) 580-0333
164.	Technology Labs for Software Industry-TEKLABZ	(6) 533-5152
165.	Technosys	(6) 553-8110
166.	TeleFinity	(6) 534-9110
167.	The Online Project - Modern Media	(6) 465-8209
168.	Trans Jordan for informaiton Technology & Development	(6) 5655112
169.	Umniah Mobile Company	(6) 500-5000
170.	Unicom Technology Services	(6) 566-2932
171.	United Technology Solutions	(6) 552-3638
172.	Viacloud Jordan	(6) 585-8711
173.	Virtecha	(6) 552-0750
174.	VTEL Holdings Company	(6) 566-9834
175.	What is Next? for Business Solutions	(6) 533-4478
176.	Wheels Express	(6) 551-5150
177.	Wizards Productions	(6) 464-0648
178.	World Software Co.	(6) 524-0119
179.	Wunderman Digital	(6) 553-0421
180.	Yahoo Arabia	(6) 550-6120
181.	Y-Consult	(6) 585-7720
182.	Zain	(6) 554-6666
183.	Zaki Al Ghul	(6) 516-5632
184.	Zurich for Software Development	

Appendix B

The English Version of the Questionnaire

QUESTIONNAIRE

Research survey

Dear Sir/Madam:

This is a research in the "***Systematic Approach to Measure Computer Based Information System Acceptance in Decision Making for Organizations in Jordan***", for a PhD student. Firstly we would thank you for participating and your time. Please respond to all of the questions. We are grateful with thankful for your collaboration, all responses will be only for academic research.

Part A: Demographic Information

1. Age □ 24-34 □ 35-45 □ 46 and above
2. Gender : □ Male □ Female
3. Education Level : □ Undergraduate □ Postgraduate
4. managerial Level : □ Top □ Middle □ Low
5. your organization size: □ Small □ Middle □ Large
6. Your experience in this organization or other organizations:

   □ 1-4 years □ 5-9 years □ 10- 14 years □ over 14 years
7. Are you using CBIS in processing your decisions in organization? □ Yes □ No
8. Your using the CBIS in your organization is □ voluntary □ Mandatory
9. How many hours per week you are using CBIS in your organization to make

   decisions? □ 1-4 Hs □ 5-9 Hs □ 10- 14 Hs □ over 14 Hs

Part B: Questionnaire

Please, circle the appropriate number since the following guides you:

1= means strongly Disagree **2 = Disagree** **3= Disagree Somewhat**
4 = Undecided (Neutral) **5 Agree Somewhat** **6 Agree**
7= Strongly Agree

	#	Part B: Questionnaire							
PE	1.	I would find the CBIS useful in decision making processing in my organization.	1	**2**	**3**	**4**	**5**	**6**	**7**
	2.	Using the CBIS enables me to accomplish decision processing more quickly..	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	3.	Using the CBIS increases my productivity.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	4.	Using the CBIS will significantly increase the quality of my decisions.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	5.	If I use the CBIS, I will increase my chances of getting better decisions	**1**	**2**	**3**	**4**	**5**	**6**	**7**
EE	6.	I expect my interaction with the CBIS would be clear and understandable.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	7.	It would be easy for me to become skillful at using the (CBIS) system.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	8.	I would find the (CBIS) system easy to use.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	9.	I expect CBIS to be flexible to interact with.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	10.	Learning to operate the CBIS is easy for me.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	11.	Working with the CBIS is not difficult; it is easy to understand how to use it.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
SI	12.	People who influence my behavior think that I should use the CBIS.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	13.	People who are important to me think that I should use the CBIS.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	14.	The senior management of this organization has been helpful in the use of the CBIS.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	15.	In general, the organization has supported the use of the CBIS.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
FC	16.	I have the resources necessary to use the CBIS.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	17.	I have the knowledge necessary to use the CBIS.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	18.	The CBIS is compatible with other systems I use.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	19.	A specific person (or group) is available for assistance with CBIS difficulties.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	20.	Guidance will be available to me in the usage of CBIS.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	21.	I intend to use the CBIS in the next few months.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

BIU	22.	I predict I would use the CBIS in the next 4 months.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	23.	I plan to use the CBIS in the next 3 months.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	24.	Assuming I have access to the CBIS, I intend to use it in decision making process.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	25.	Given that I have access to the CBIS, I predict that I would use it in decision making process.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
AUS	26.	I use the CBIS in processing decisions in my organization.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	27.	I use the CBIS in processing decisions for organizational level and non-organizational level.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	28.	Other users in my organization are using CBIS in processing decisions.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
DMP	29.	Decision making Process consists of several steps. For each of the following steps (a-e) what you consider to be valuable for CBIS a. Identify problem or issue.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	30.	b. Generating alternative courses of action.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	31.	c. Evaluating the outcomes.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	32.	d. Ranking the alternatives and choosing one.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	33.	e. implementing the chosen alternative.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
TIME	34.	Time factor is necessary to be noticed in decision making process.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	35.	Time as a factor in decision making process, will help decision makers to achieve decisions better and faster.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	36.	Including time factor in decision making process brings a lot of benefits.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
COST	37.	Cost factor is necessary to be noticed in decision making process.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	38.	Decision makers, who ignore cost factor for decision making process, normally have problems in their organizations.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	39.	Including cost factor in decision making process brings a lot of benefits.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

RISK	40.	High-risk factor is necessary to be noticed in decision making process.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	41.	Decision makers, who ignore high-risk factor in decision making process, normally have problems in their organizations.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	42.	Including high-risk factor in decision making process brings a lot of benefits.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
BNFT	43.	Benefits factor is necessary to be noticed in decision making process.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	44.	Benefits factor in decision making process results good decisions.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	45.	Including benefits factor in decision making process brings a lot of advantages.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
RES	46.	Resource factor is necessary to be noticed in decision making process.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	47.	Resources as a factor in decision making process results good decisions.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	48.	Including resources factor in decision making process brings a lot of advantages.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Thank you for your cooperation

Appendix C

The Arabic Version of the Questionnaire

الاستبانة

عزيزي السيد/السيدة :-

هذا البحث يختص **بنظرة شموليه لقياس قبول واستعمال المعلومات المحوسبة المرتبطة بعمليات صنع القرار في الشركات في الاردن، لطالب الدكتوراه محمد سليمان الشقاح .** أولاً نود ان نشكركم لمشاركتكم ولوقتكم ، الرجاء الرد على جميع الأسئلة.ونحن ممتنون لتعاونكم مع جزيل الشكر ، وسوف تكون جميع اجابات الاستبانات لأغراض البحث العلمي والاكاديمي فقط .

الجزء الأول : معلومات ديموغرافية

1. العمر: □ 24-34 □ 35-45 □ 46 او أكثر .
2. الجنس: □ ذكر □ أنثى
3. المستوى التعليمي: □ بكالوريوس □ دراسات عليا
4. المستوى الإداري: □ عالي □ متوسط □ منخفض
5. حجم شركتك(توصف بانها) □ صغيرة □ متوسطه □ كبيرة .
6. خبرتك في هذه المنظمة أو في منظمات أخرى:

□ 1-4سنوات □ 5-9 سنوات □ 10-14سنة □ 15 سنة فأكثر

7. استخدم نظم المعلومات المحوسبة في صنع القرارات في شركتك : □ نعم □ لا
8. استخدامك لنظم المعلومات المحوسبه لعمل القرارات هو □ اختياري □ اجباري
9. كم عدد الساعات التي تستخدمها اعتمادا على نظم المعلومات المحوسبة في صنع القرارات بالاسبوع ؟

□ 1-4 ساعات □ 5-9 ساعات □ 10-14 ساعة □ 15 فأكثر ساعة

الجزء الثاني : الاستبانة

الرجاء وضع دائرة حول الرقم المناسب وفق الارشادات والتوضيحات التالية :

1: تعني لا أوافق بشدة 2: لا أوافق 3: لا أوافق الى حد ما

4: ليس لدي قرار (محايد) 5: أوافق الى حد ما 6: أوافق 7: أوافق بشدة .

#	**الجزء الثاني : الاستبانة**							
1	أجد نظم المعلومات المحوسبة مفيدة في عملية صنع القرار في شركتي.	1	2	3	4	5	6	7
2	استخدام نظم المعلومات المحوسبة يمكنني من انجاز عملية صنع القرارات بشكل اسرع.	1	2	3	4	5	6	7
3	أجد استخدام نظم المعلومات المحوسبة يزيد بشكل ملحوظ من انتاجيتي .	1	2	3	4	5	6	7

4	استخدام نظم المعلومات المحوسبة يزيد وبشكل ملحوظ من نوعية و جودة قراراتي.	1	2	3	4	5	6	7
5	اذا استخدمت نظم المعلومات المحوسبة فسوف تزداد فرص الوصول الى قرارات افضل.	1	2	3	4	5	6	7
6	أتوقع أن تفاعلي مع نظم المعلومات المحوسبة سوف يكون بشكل واضح ومفهوم .	1	2	3	4	5	6	7
7	سوف يكون من السهل لي ان أصبح ماهرا في استخدام نظم المعلومات المحوسبة.	1	2	3	4	5	6	7
8	أجد استخدام نظم المعلومات المحوسبة سهل الإستعمال.	1	2	3	4	5	6	7
9	أتوقع أن يكون نظام المعلومات المحوسبة مرنا للتفاعل معه.	1	2	3	4	5	6	7
10	تعَلّم تشغيل نظام المعلومات المحوسبة سهل بالنسبة لي.	1	2	3	4	5	6	7
11	العمل بنظام المعلومات المحوسبة ليس صعبا، ومن السهل فهمه واستخدامه.	1	2	3	4	5	6	7
12	الاشخاص الذين لديهم تأثير على سلوكي يعتقدون أنه يجب أن اسخدم نظم المعلومات المحوسبة .	1	2	3	4	5	6	7
13	الناس المهمون بالنسبة لي يعتقدون أنني يجب أن استخدم نظم المعلومات المحوسبة .	1	2	3	4	5	6	7
14	المدراء ذوو الخبرة لهذه الشركة كانوا وما زالوا يشجعون على استخدام نظم المعلومات المحوسبة .	1	2	3	4	5	6	7
15	بشكل عام الشركة تقوم بدعم استخدام نظم المعلومات المحوسبة .	1	2	3	4	5	6	7
16	لدي المصادر الضرورية لاستخدام نظم المعلومات المحوسبة .	1	2	3	4	5	6	7
17	لدي المعرفة الضرورية لاستخدام نظم المعلومات المحوسبة .	1	2	3	4	5	6	7
18	نظام المعلومات المحوسبة متوافق ومتلائم مع الأنظمة الأخرى التي استخدمها.	1	2	3	4	5	6	7
19	هناك شخص او مجموعة متوفرة للاستعانة بهم مختصون بنظم المعلومات المحوسبة عند مواجهة الصعوبات.	1	2	3	4	5	6	7
20	الارشاد سوف يكون متوفر لدي عند استخدام نظام المعلومات المحوسبة .	1	2	3	4	5	6	7
21	أنوي استخدام نظام المعلومات المحوسبة في الأشهر القليلة القادمة .	1	2	3	4	5	6	7
22	أتوقع أن استخدم نظام المعلومات المحوسبة في الأشهر الأربعة القادمة .	1	2	3	4	5	6	7
23	أنا أخطط لاستخدام نظام المعلومات المحوسبة في الأشهر الثلاثة القادمة .	1	2	3	4	5	6	7
24	على افتراض امكانية الوصول لنظم المعلومات المحوسبة ، أنا أنوي استخدامه في عملية صنع القرار.	1	2	3	4	5	6	7
25	بالنظر الى امكانية الوصول لنظام المعلومات المحوسبة فاني أتوقع أنني سوف أستخدمه في عملية صنع القرار .	1	2	3	4	5	6	7
26	أنا استخدم نظام المعلومات المحوسبة في التعامل مع القرارات في شركتي .	1	2	3	4	5	6	7
27	أنا استخدم نظام المعلومات المحوسبة على مستوى الشركات، وخارج مستوى	1	2	3	4	5	6	7

	الشركات .							
28	صانعو القرار الآخرون في شركتي يستخدمون نظام المعلومات المحوسبة في صنع القرار .	1	2	3	4	5	6	7
29	عملية صنع القرار تتكون من عدة خطوات ومراحل، ولكل من الخطوات (أ- هـ) ما نعتبره مناسبا وذو أهمية في عملية صنع القرار : أ- تحديد المشكلة أو القضية .	1	2	3	4	5	6	7
30	ب- ايجاد عدة بدائل ومسارات للعمل .	1	2	3	4	5	6	7
31	ج- تقييم النتائج .	1	2	3	4	5	6	7
32	د- ترتيب البدائل وتصنيفها واختيار واحدا منها .	1	2	3	4	5	6	7
33	هـ- تطبيق وتنفيذ البديل الذي تم اختياره .	1	2	3	4	5	6	7
34	عامل الوقت ضروري ومهم ملاحظتة في عملية صنع القرار .	1	2	3	4	5	6	7
35	الوقت كعامل في عملية صنع القرار سوف يساعد صناع القرار في انجاز قراراتهم بشكل أفضل وأسرع .	1	2	3	4	5	6	7
36	اعتبار الوقت كعامل في عملية صنع القرار يجلب الكثير من الفوائد .	1	2	3	4	5	6	7
37	من الضروري ملاحظة عامل التكلفة في عملية صنع القرار .	1	2	3	4	5	6	7
38	صانعوا القرار الذين يتجاهلون عامل التكلفة في عملية صنع القرار عادة ما يكون لديهم مشاكل داخل شركاتهم .	1	2	3	4	5	6	7
39	اعتبار التكلفة كعامل في عملية صنع القرار يجلب الكثير من الفوائد .	1	2	3	4	5	6	7
40	من الضروري ملاحظة عامل المخاطرة العاليه في عملية صنع القرار .	1	2	3	4	5	6	7
41	صانعوا القرار الذين يتجاهلون عامل المخاطرة العاليه في عملية صنع القرار عادة ما يكون لديهم مشاكل داخل شركاتهم .	1	2	3	4	5	6	7
42	اعتبار المخاطرة العاليه كعامل في عملية صنع القرار يجلب الكثير من الفوائد .	1	2	3	4	5	6	7
43	من الضروري ملاحظة عامل الفوائد في عملية صنع القرار .	1	2	3	4	5	6	7
44	عامل الفوائد في عملية صنع القرار ينتج عنه فوائد جيده .	1	2	3	4	5	6	7
45	اعتبار الفوائد كعامل في عملية صنع القرار يجلب الكثير من الفوائد .	1	2	3	4	5	6	7
46	من الضروري ملاحظة عامل المصادر في عملية صنع القرار .	1	2	3	4	5	6	7
47	المصادر كعامل في عملية صنع القرار ينتج عنها قرارات جيدة .	1	2	3	4	5	6	7
48	اعتبار عامل المصادر في عملية صنع القرار يجلب الكثير من الايجابيات .	1	2	3	4	5	6	7

شاكرين لكم مشاركتكم وتعاونكم

Appendix D

The Reliability Tables for items per each Construct from the Pilot Study

Time

Time Items questionnaire:		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
TIME34	Time factor is necessary to be noticed in decision making process.	.761	.844
TIME35	Time as a factor in decision making process, will help decision makers to achieve decisions better and faster.	.773	.836
TIME36	Including time factor in decision making process brings a lot of benefits.	.788	.817

Cost

Cost Items questionnaire:		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
COST37	Cost factor is necessary to be noticed in decision making process.	.612	.801
COST38	Decision makers, who ignore cost factor for decision making process, normally have problems in their organizations.	.684	.730
COST39	Including cost factor in decision making process brings a lot of benefits.	.713	.706

Risk (High-Risk)

Risk (High-Risk) items questionnaire:		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RISK40	High-risk factor is necessary to be noticed in decision making process.	.709	.706
RISK41	Decision makers, who ignore high-risk factor in decision making process, normally have problems in their organizations.	.609	.810
RISK42	Including high-risk factor in decision making process brings a lot of benefits.	.690	.725

Benefits

	Benefits items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BNFT43	Benefits factor is necessary to be noticed in decision making process.	.807	.822
BNFT44	Benefits factor in decision making process results good decisions.	.745	.877
BNFT45	Including benefits factor in decision making process brings a lot of advantages.	.801	.829

Resources

	Resources items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RES46	Resource factor is necessary to be noticed in decision making process.	.825	.869
RES47	Resources as a factor in decision making process results good decisions.	.777	.912
RES48	Including resources factor in decision making process brings a lot of advantages.	.866	.834

Performance expectancy

	Performance expectancy items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PE1	I would find the CBIS useful in decision making processing in my organization.	.729	.880
PE2	Using the CBIS enables me to accomplish decision processing more quickly.	.617	.903
PE3	Using the CBIS increases my productivity.	.795	.865
PE4	Using the CBIS will significantly increase the quality of my decisions.	.812	.861
PE5	If I use the CBIS, I will increase my chances of getting better decisions	.790	.866

Effort expectancy

	Effort expectancy items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EE6	I expect my interaction with the CBIS would be clear and understandable.	.683	.933
EE7	It would be easy for me to become skillful at using the (CBIS) system.	.848	.913
EE8	I would find the (CBIS) system easy to use.	.824	.916
EE9	I expect CBIS to be flexible to interact with.	.779	.922
EE10	Learning to operate the CBIS is easy for me.	.874	.910
EE11	Working with the CBIS is not difficult; it is easy to understand how to use it.	.790	.920

Social influence

	Social influence items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SI12	People who influence my behavior think that I should use the CBIS.	.704	.802
SI13	People who are important to me think that I should use the CBIS.	.714	.797
SI14	The senior management of this organization has been helpful in the use of the CBIS.	.681	.811
SI15	In general, the organization has supported the use of the CBIS.	.654	.822

Facilitating conditions

	Facilitating conditions items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FC16	I have the resources necessary to use the CBIS.	.755	.859
FC17	I have the knowledge necessary to use the CBIS.	.722	.870
FC18	The CBIS is compatible with other systems I use.	.800	.850
FC19	A specific person (or group) is available for assistance with CBIS difficulties.	.710	.870
FC20	Guidance will be available to me in the usage of CBIS.	.688	.875

Behavior intention

	Behavior intention items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BIU21	I intend to use the CBIS in the next few months.	.633	.831
BIU22	I predict I would use the CBIS in the next 4 months.	.662	.819
BIU23	I plan to use the CBIS in the next 3 months.	.593	.836
BIU24	Assuming I have access to the CBIS, I intend to use it in decision making process.	.783	.790
BIU25	Given that I have access to the CBIS, I predict that I would use it in decision making process.	.660	.818

Actual use CBIS

	Actual use CBIS items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
AUS26	I use the CBIS in processing decisions in my organization.	.694	.796
AUS27	I use the CBIS in processing decisions for organizational level and non-organizational level.	.766	.728
AUS28	Other users in my organization are using CBIS in processing decisions.	.670	.821

Decision Making Process

	Decision making process items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
DMP29	Decision making Process consists of several steps. For each of the following steps (a-e) what you consider to be valuable for CBIS a. Identify problem or issue.	.726	.853
DMP30	b. Generating alternative courses of action.	.697	.860
DMP31	c. Evaluating the outcomes.	.717	.855
DMP32	d. Ranking the alternatives and choosing one.	.682	.863
DMP33	e. implementing the chosen alternative.	.754	.846

Appendix E

The Reliability Tables for items per each Construct from the Main Study

Time

	Time Items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
TIME34	Time factor is necessary to be noticed in decision making process.	.750	.849
TIME35	Time as a factor in decision making process, will help decision makers to achieve decisions better and faster.	.782	.822
TIME36	Including time factor in decision making process brings a lot of benefits.	.780	.823

Cost

	Cost Items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
COST37	Cost factor is necessary to be noticed in decision making process.	.724	.822
COST38	Decision makers, who ignore cost factor for decision making process, normally have problems in their organizations.	.753	.795
COST39	Including cost factor in decision making process brings a lot of benefits.	.743	.805

Risk (High-Risk)

	Risk (High-Risk) items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RISK40	High-risk factor is necessary to be noticed in decision making process.	.762	.824
RISK41	Decision makers, who ignore high-risk factor in decision making process, normally have problems in their organizations.	.755	.828
RISK42	Including high-risk factor in decision making process brings a lot of benefits.	.765	.819

Benefits

	Benefits items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BNFT43	Benefits factor is necessary to be noticed in decision making process.	.702	.786
BNFT44	Benefits factor in decision making process results good decisions.	.718	.770
BNFT45	Including benefits factor in decision making process brings a lot of advantages.	.702	.786

Resources

	Resources items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RES46	Resource factor is necessary to be noticed in decision making process.	.823	.878
RES47	Resources as a factor in decision making process results good decisions.	.816	.882
RES48	Including resources factor in decision making process brings a lot of advantages.	.837	.865

Performance expectancy

	Performance expectancy items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PE1	I would find the CBIS useful in decision making processing in my organization.	.757	.903
PE2	Using the CBIS enables me to accomplish decision processing more quickly.	.689	.916
PE3	Using the CBIS increases my productivity.	.837	.887
PE4	Using the CBIS will significantly increase the quality of my decisions.	.830	.888
PE5	If I use the CBIS, I will increase my chances of getting better decisions	.813	.891

Effort expectancy

	Effort expectancy items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EE6	I expect my interaction with the CBIS would be clear and understandable.	.770	.939
EE7	It would be easy for me to become skillful at using the (CBIS) system.	.859	.928
EE8	I would find the (CBIS) system easy to use.	.834	.931
EE9	I expect CBIS to be flexible to interact with.	.832	.932
EE10	Learning to operate the CBIS is easy for me.	.865	.928
EE11	Working with the CBIS is not difficult; it is easy to understand how to use it.	.803	.935

Social influence

	Social influence items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SI12	People who influence my behavior think that I should use the CBIS.	.777	.832
SI13	People who are important to me think that I should use the CBIS.	.765	.837
SI14	The senior management of this organization has been helpful in the use of the CBIS.	.739	.847
SI15	In general, the organization has supported the use of the CBIS.	.682	.868

Facilitating conditions

	Facilitating conditions items questionnaire:	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FC16	I have the resources necessary to use the CBIS.	.736	.847
FC17	I have the knowledge necessary to use the CBIS.	.710	.854
FC18	The CBIS is compatible with other systems I use.	.700	.856
FC19	A specific person (or group) is available for assistance with CBIS difficulties.	.714	.853
FC20	Guidance will be available to me in the usage of CBIS.	.699	.856

Behavior intention

Behavior intention items questionnaire:		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BIU21	I intend to use the CBIS in the next few months.	.688	.870
BIU22	I predict I would use the CBIS in the next 4 months.	.717	.861
BIU23	I plan to use the CBIS in the next 3 months.	.687	.868
BIU24	Assuming I have access to the CBIS, I intend to use it in decision making process.	.790	.845
BIU25	Given that I have access to the CBIS, I predict that I would use it in decision making process.	.742	.856

Actual use CBIS

Actual use CBIS items questionnaire:		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
AUS26	I use the CBIS in processing decisions in my organization.	.754	.858
AUS27	I use the CBIS in processing decisions for organizational level and non-organizational level.	.810	.808
AUS28	Other users in my organization are using CBIS in processing decisions.	.769	.845

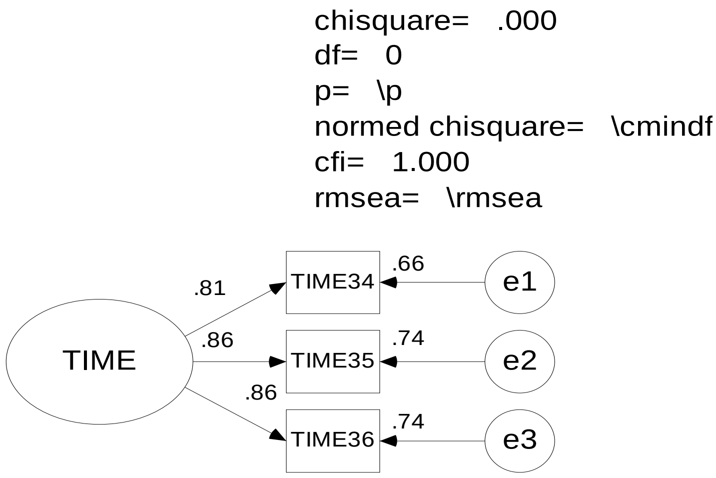
Decision making process

Decision making process items questionnaire:		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
DMP29	Decision making Process consists of several steps. For each of the following steps (a-e) what you consider to be valuable for CBIS a. Identify problem or issue.	.671	.870
DMP30	b. Generating alternative courses of action.	.655	.873
DMP31	c. Evaluating the outcomes.	.758	.850
DMP32	d. Ranking the alternatives and choosing one.	.766	.847
DMP33	e. implementing the chosen alternative.	.751	.851

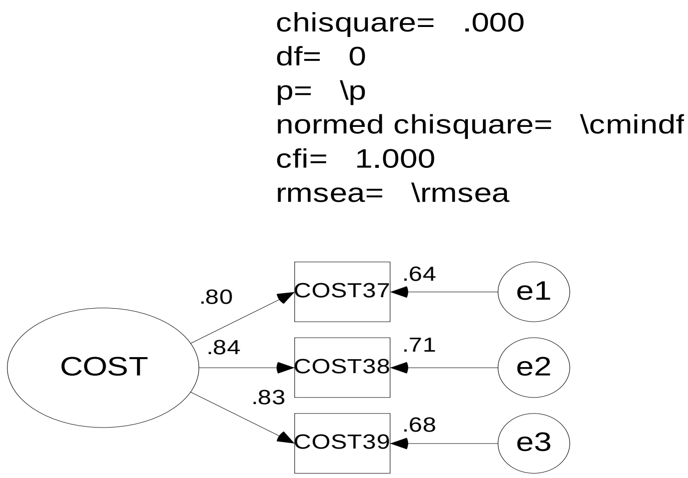
Appendix F

The Confirmatory Factor Analysis (CFA) Stages before the Final Stage

CFA for the constructs each alone:



CFA for TIME



CFA for COST

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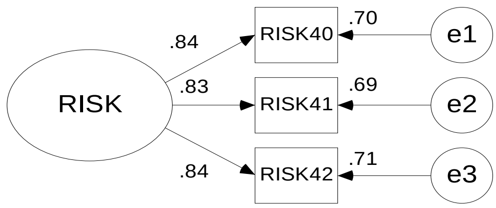
p=   \p
normed chisquare=   \cmindf
cfi=   1.000
rmsea=   \rmsea



CFA for RISK

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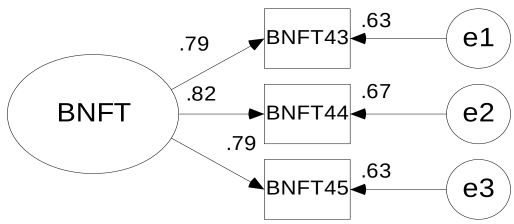
p=   \p
normed chisquare=   \cmindf
cfi=   1.000
rmsea=   \rmsea



CFA for BENEFITS

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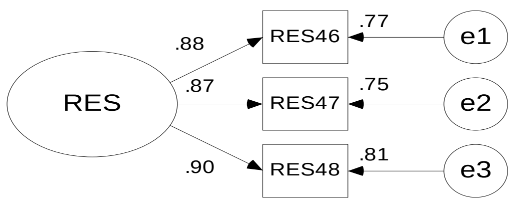
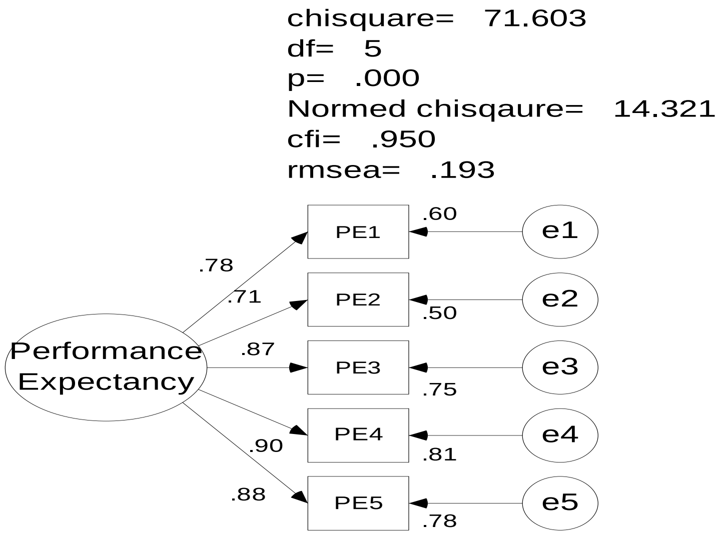
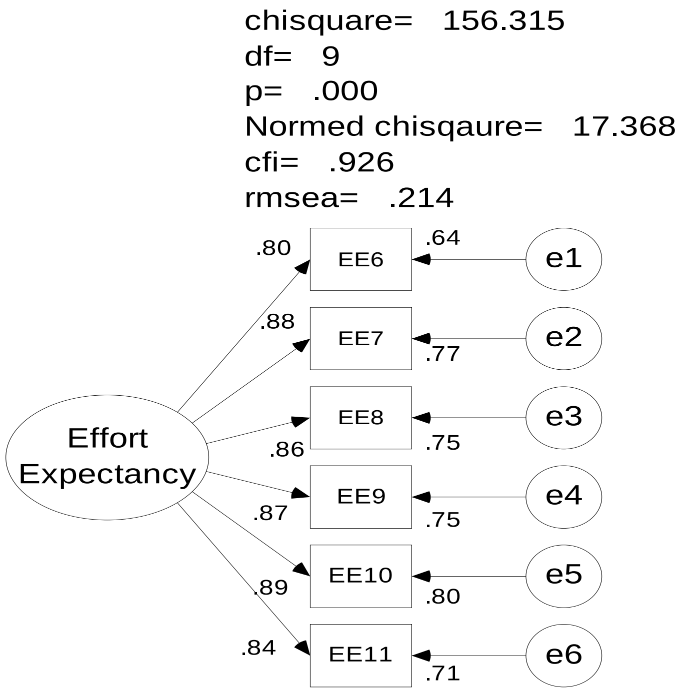
normed chisquare=   \cmindf
cfi=   1.000
rmsea=   \rmsea



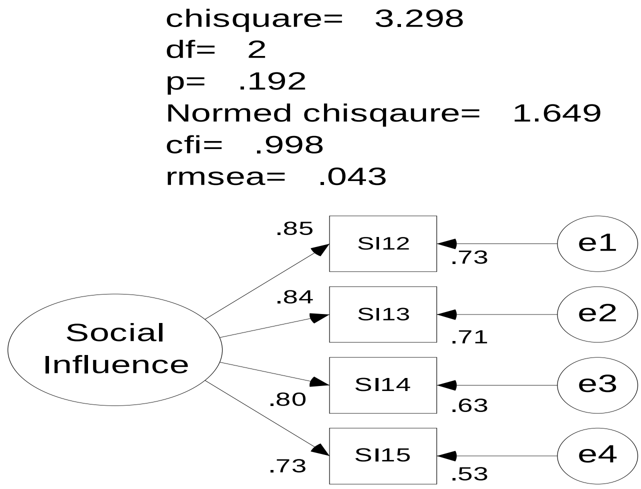
CFA for RESOURCES



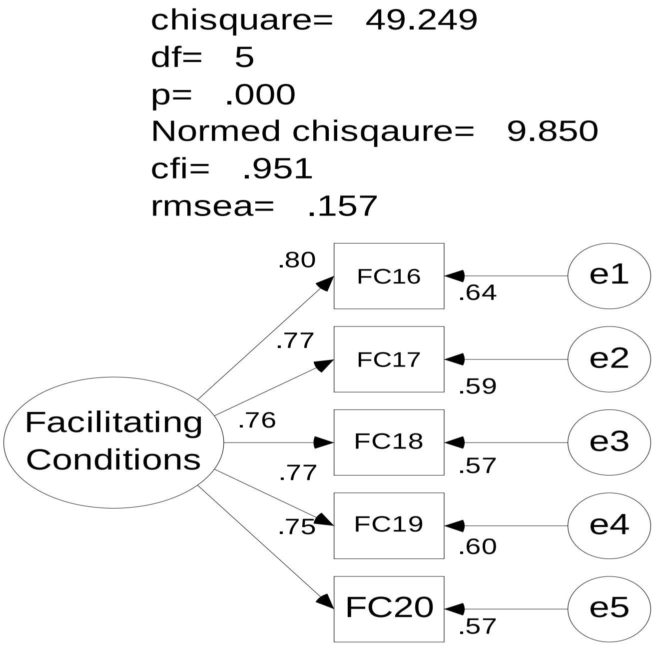
CFA for Performance Expectancy



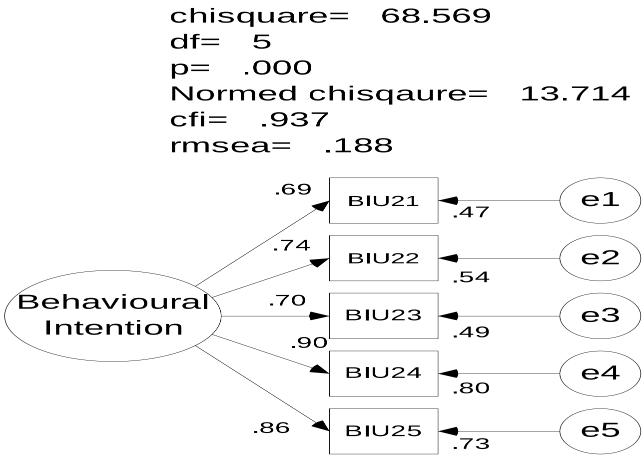
CFA for Effort Expectancy



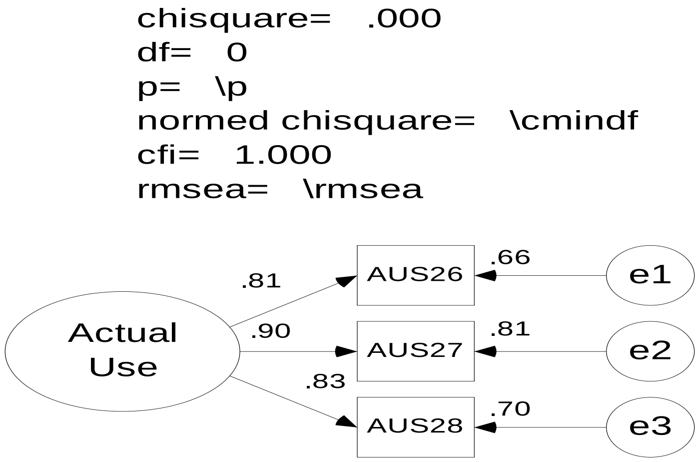
CFA for Social Influence



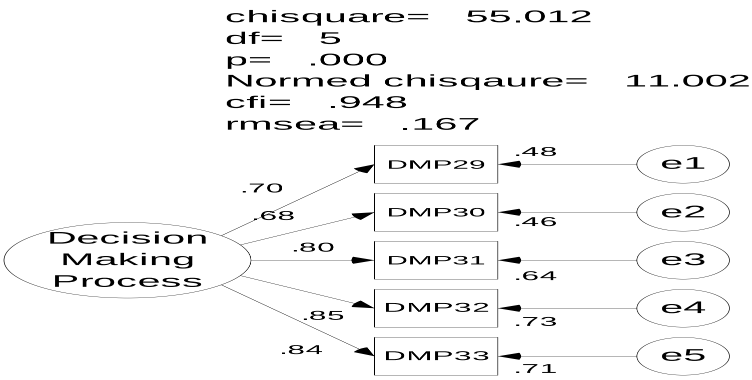
CFA for Facilitating Conditions



CFA for Behavior Intention to use CBIS

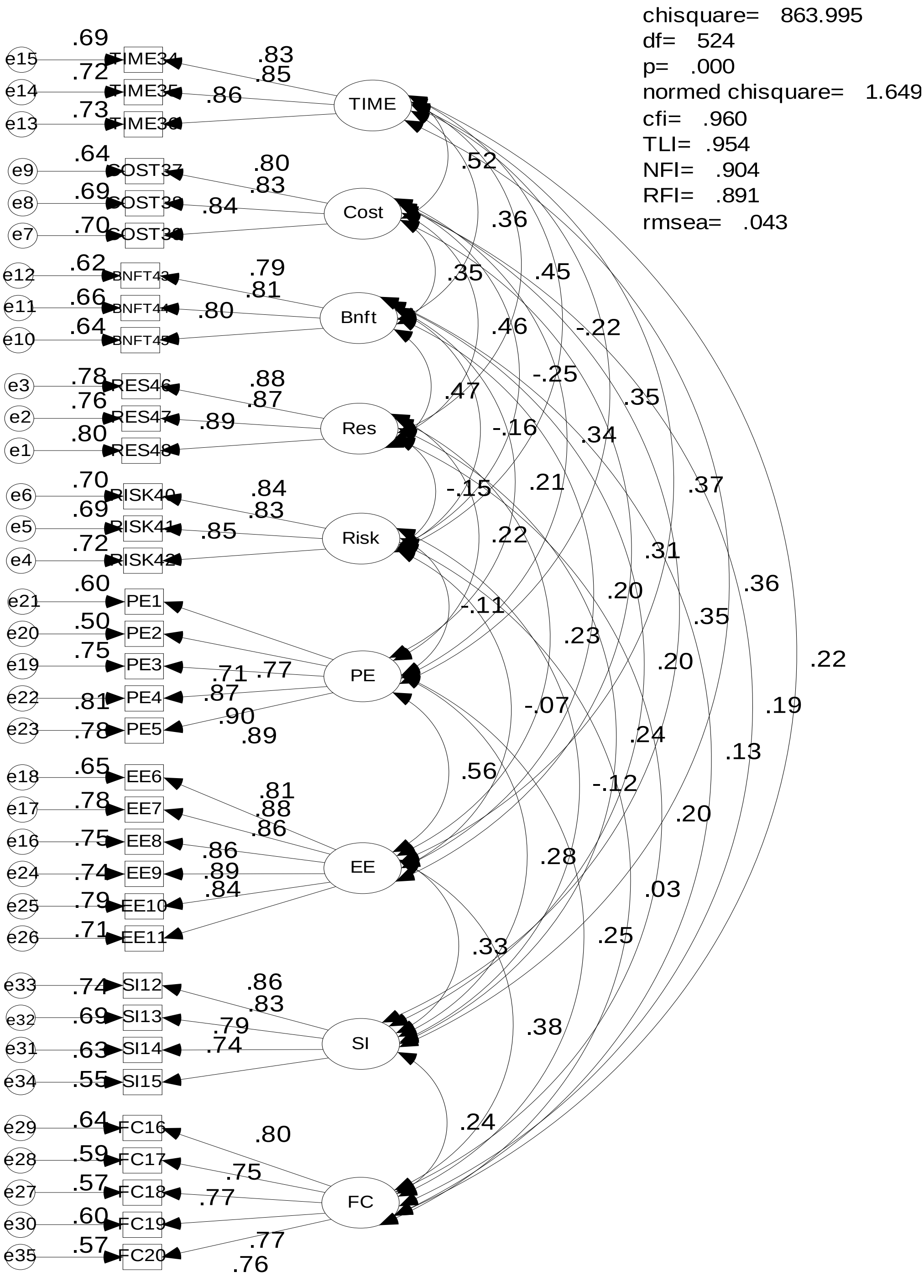


CFA for Actual Use of CBIS



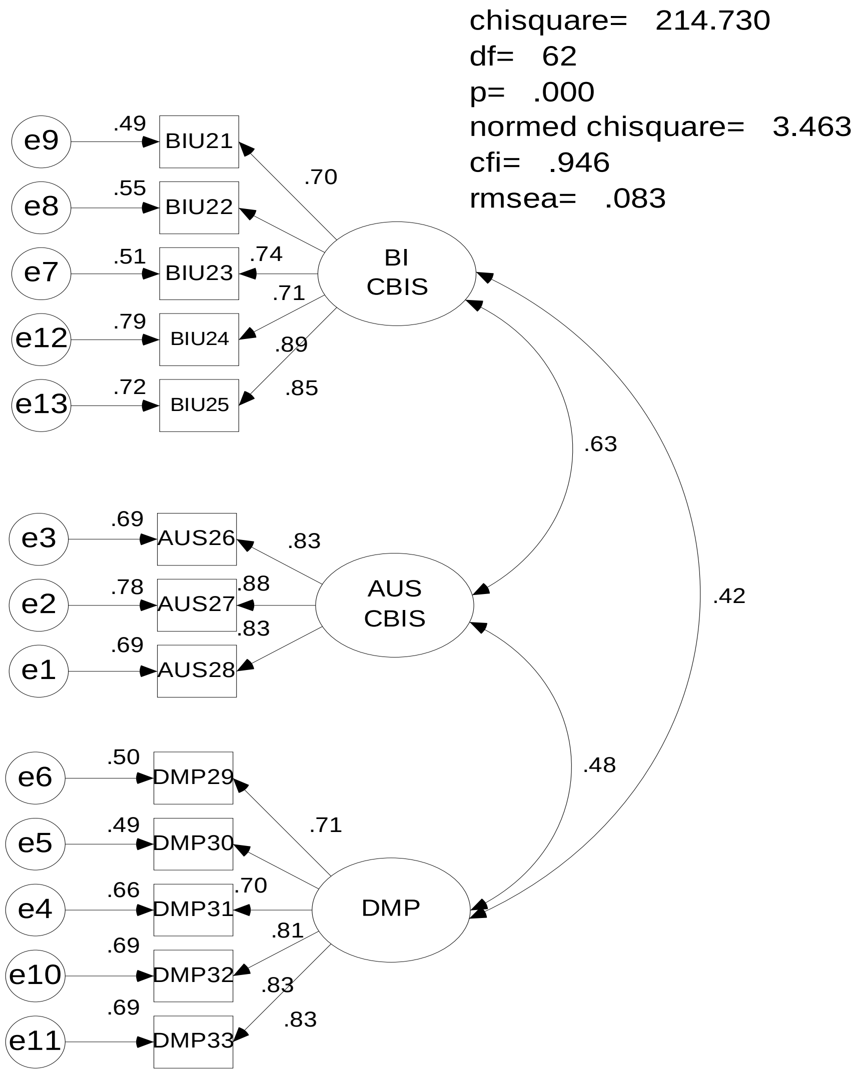
CFA for Decision Making Process of CBIS

CFA for the independent constructs (Exogenous):



CFA for the independent constructs (Exogenous) Factors

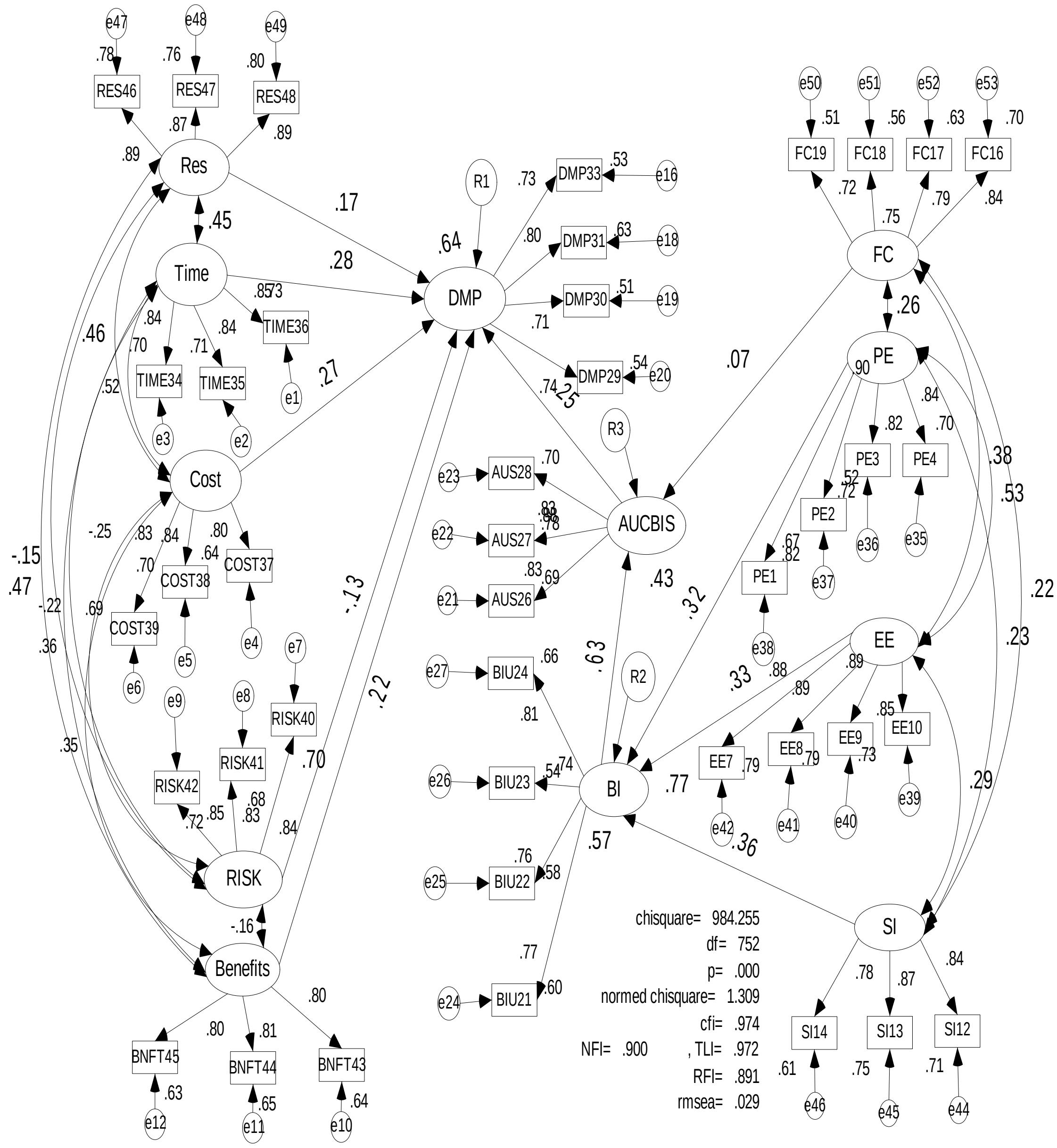
CFA for the dependent constructs (Endogenous) with the mediation constructs:



CFA for the dependent constructs and mediation Factors

Appendix G

The Facilitating Conditions (FC) Factor in the Final Model



The final Model with the Facilitating Conditions (FC) Factor

Appendix H

Other Outputs from SPSS and AMOS for the Study

Other SPSS outputs for this study:

Descriptive statistics of the respondents (Demographics)

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 35	162	45.0	45.0	45.0
	from 35-45	129	35.8	35.8	80.8
	46 and over 46	69	19.2	19.2	100.0
	Total	360	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	247	68.6	68.6	68.6
	female	113	31.4	31.4	100.0
	Total	360	100.0	100.0	

Educational Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	251	69.7	69.7	69.7
	Postgraduate	109	30.3	30.3	100.0
	Total	360	100.0	100.0	

Managerial Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low level	164	45.6	45.6	45.6
	Middle level	112	31.1	31.1	76.7
	Top level	84	23.3	23.3	100.0
	Total	360	100.0	100.0	

Organization Size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	small	145	40.3	40.3	40.3
	meddle	131	36.4	36.4	76.7
	large	84	23.3	23.3	100.0
	Total	360	100.0	100.0	

Experience Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-4 years	83	23.1	23.1	23.1
	5-9	79	21.9	21.9	45.0
	10-14	87	24.2	24.2	69.2
	> 14 years	111	30.8	30.8	100.0
	Total	360	100.0	100.0	

The Actual use Hours of CBIS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-4 hours	46	12.8	12.8	12.8
	5-9	164	45.6	45.6	58.3
	10-14	113	31.4	31.4	89.7
	15-19 or above 14	37	10.3	10.3	100.0
	Total	360	100.0	100.0	

Voluntary/ Mandatory

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	voluntary	243	67.5	67.5	67.5
	mandatory	117	32.5	32.5	100.0
	Total	360	100.0	100.0	

Descriptive statistics of the Variables:

Time

		TIME34	TIME35	TIME36
N	Valid	360	360	360
	Missing	0	0	0
Mean		6.13	6.03	6.03
Std. Error of Mean		.050	.054	.050
Median		6.00	6.00	6.00
Mode		7	6[a]	6
Std. Deviation		.948	1.022	.950
Variance		.899	1.044	.902
Skewness		-1.209	-1.153	-1.174
Std. Error of Skewness		.129	.129	.129
Kurtosis		1.626	1.303	1.623
Std. Error of Kurtosis		.256	.256	.256
Range		5	5	5
Minimum		2	2	2
Maximum		7	7	7
Sum		2207	2169	2170

a. *Multiple modes exist. The smallest value is shown.*

Cost

		COST37	COST38	COST39
N	Valid	360	360	360
	Missing	0	0	0
Mean		5.99	5.98	6.00
Std. Error of Mean		.049	.050	.047
Median		6.00	6.00	6.00
Mode		6	6	6
Std. Deviation		.928	.939	.891
Variance		.861	.882	.794
Skewness		-.973	-1.045	-1.278
Std. Error of Skewness		.129	.129	.129
Kurtosis		1.287	1.591	2.770

Std. Error of Kurtosis	.256	.256	.256
Range	5	5	5
Minimum	2	2	2
Maximum	7	7	7
Sum	2157	2151	2159

Risk (High Risk)

		RISK40	**RISK41**	**RISK42**
N	Valid	360	360	360
	Missing	0	0	0
Mean		2.83	2.74	2.87
Std. Error of Mean		.084	.076	.077
Median		2.00	2.00	2.00
Mode		2	2	2
Std. Deviation		1.587	1.447	1.467
Variance		2.520	2.093	2.153
Skewness		.755	.685	.637
Std. Error of Skewness		.129	.129	.129
Kurtosis		-.193	-.253	-.366
Std. Error of Kurtosis		.256	.256	.256
Range		6	6	6
Minimum		1	1	1
Maximum		7	7	7
Sum		1019	986	1033

Benefits

		BNFT43	BNFT44	BNFT45
N	Valid	360	360	360
	Missing	0	0	0
Mean		6.06	6.06	6.10
Std. Error of Mean		.049	.048	.050
Median		6.00	6.00	6.00

Mode	6	6	7
Std. Deviation	.926	.918	.955
Variance	.857	.843	.913
Skewness	-.806	-.773	-1.005
Std. Error of Skewness	.129	.129	.129
Kurtosis	.031	-.007	.574
Std. Error of Kurtosis	.256	.256	.256
Range	4	4	4
Minimum	3	3	3
Maximum	7	7	7
Sum	2183	2182	2195

Resources

		RES46	**RES47**	**RES48**
N	Valid	360	360	360
	Missing	0	0	0
Mean		6.04	6.02	5.98
Std. Error of Mean		.052	.054	.055
Median		6.00	6.00	6.00
Mode		6	7	6
Std. Deviation		.985	1.030	1.038
Variance		.971	1.061	1.078
Skewness		-1.215	-1.100	-1.133
Std. Error of Skewness		.129	.129	.129
Kurtosis		1.838	1.186	1.285
Std. Error of Kurtosis		.256	.256	.256
Range		5	5	5
Minimum		2	2	2
Maximum		7	7	7
Sum		2173	2167	2153

Performance Expectancy (PE)

		PE1	PE2	PE3	PE4	PE5
N	Valid	360	360	360	360	360
	Missing	0	0	0	0	0
Mean		5.86	5.85	5.91	5.88	5.85
Std. Error of Mean		.051	.049	.049	.050	.050
Median		6.00	6.00	6.00	6.00	6.00
Mode		6	6	6	6	6
Std. Deviation		.969	.924	.930	.947	.947
Variance		.939	.854	.864	.897	.897
Skewness		-1.178	-.970	-1.313	-1.185	-.963
Std. Error of Skewness		.129	.129	.129	.129	.129
Kurtosis		2.246	2.042	3.121	2.499	1.679
Std. Error of Kurtosis		.256	.256	.256	.256	.256
Range		5	5	5	5	5
Minimum		2	2	2	2	2
Maximum		7	7	7	7	7
Sum		2110	2105	2129	2117	2106

Effort expectancy (EE)

		EE6	EE7	EE8	EE9	EE10	EE11
N	Valid	360	360	360	360	360	360
	Missing	0	0	0	0	0	0
Mean		5.85	5.81	5.81	5.73	5.79	5.76
Std. Error of Mean		.050	.051	.054	.052	.050	.051
Median		6.00	6.00	6.00	6.00	6.00	6.00
Mode		6	6	6	6	6	6
Std. Deviation		.947	.974	1.023	.981	.947	.967
Variance		.897	.948	1.047	.962	.897	.934
Skewness		-.963	-.858	-.974	-.679	-.972	-.753
Std. Error of Skewness		.129	.129	.129	.129	.129	.129
Kurtosis		1.763	1.122	1.401	.842	1.758	1.011
Std. Error of Kurtosis		.256	.256	.256	.256	.256	.256

Range	5	5	5	5	5	5
Minimum	2	2	2	2	2	2
Maximum	7	7	7	7	7	7
Sum	2106	2090	2091	2062	2084	2074

Social Influence (SI)

		SI12	SI13	SI14	SI15
N	Valid	360	360	360	360
	Missing	0	0	0	0
Mean		5.62	5.56	5.72	5.58
Std. Error of Mean		.062	.064	.063	.062
Median		6.00	6.00	6.00	6.00
Mode		6	6	6	6
Std. Deviation		1.184	1.223	1.190	1.177
Variance		1.401	1.495	1.416	1.386
Skewness		-1.258	-1.218	-1.455	-1.484
Std. Error of Skewness		.129	.129	.129	.129
Kurtosis		2.556	2.092	3.129	3.480
Std. Error of Kurtosis		.256	.256	.256	.256
Range		6	6	6	6
Minimum		1	1	1	1
Maximum		7	7	7	7
Sum		2022	2002	2060	2010

Facilitating Conditions (FC)

		FC16	FC17	FC18	FC19	FC20
N	Valid	360	360	360	360	360
	Missing	0	0	0	0	0
Mean		5.12	5.04	4.90	5.11	5.15
Std. Error of Mean		.067	.066	.062	.062	.060
Median		5.00	5.00	5.00	5.00	5.00

Mode	6	6	5	6	6
Std. Deviation	1.274	1.247	1.180	1.169	1.130
Variance	1.623	1.556	1.392	1.366	1.277
Skewness	-.662	-.510	-.363	-.360	-.525
Std. Error of Skewness	.129	.129	.129	.129	.129
Kurtosis	.247	.057	-.135	-.568	.189
Std. Error of Kurtosis	.256	.256	.256	.256	.256
Range	6	6	6	5	6
Minimum	1	1	1	2	1
Maximum	7	7	7	7	7
Sum	1844	1813	1765	1841	1855

Behavior Intention to use CBIS

		BIU21	**BIU22**	**BIU23**	**BIU24**	**BIU25**
N	Valid	360	360	360	360	360
	Missing	0	0	0	0	0
Mean		5.93	6.08	6.08	5.90	5.90
Std. Error of Mean		.050	.045	.046	.043	.043
Median		6.00	6.00	6.00	6.00	6.00
Mode		6	6	6	6	6
Std. Deviation		.941	.847	.872	.820	.822
Variance		.886	.717	.760	.672	.675
Skewness		-.621	-.879	-1.008	-.723	-.782
Std. Error of Skewness		.129	.129	.129	.129	.129
Kurtosis		-.022	.811	1.567	.910	1.010
Std. Error of Kurtosis		.256	.256	.256	.256	.256
Range		4	4	5	4	4
Minimum		3	3	2	3	3
Maximum		7	7	7	7	7
Sum		2134	2190	2187	2123	2124

Actual use of CBIS

		AUS26	AUS27	AUS28
N	Valid	360	360	360
	Missing	0	0	0
Mean		6.05	6.08	6.04
Std. Error of Mean		.053	.055	.056
Median		6.00	6.00	6.00
Mode		6	7	7
Std. Deviation		1.014	1.052	1.054
Variance		1.028	1.107	1.110
Skewness		-1.439	-1.509	-1.380
Std. Error of Skewness		.129	.129	.129
Kurtosis		2.836	2.697	2.241
Std. Error of Kurtosis		.256	.256	.256
Range		5	5	5
Minimum		2	2	2
Maximum		7	7	7
Sum		2178	2190	2173

Decision making factor (DMP)

		DMP29	DMP30	DMP31	DMP32	DMP33
N	Valid	360	360	360	360	360
	Missing	0	0	0	0	0
Mean		6.03	6.11	6.14	6.02	5.96
Std. Error of Mean		.051	.051	.053	.056	.058
Median		6.00	6.00	6.00	6.00	6.00
Mode		6	7	7	7	7
Std. Deviation		.971	.964	1.003	1.057	1.091
Variance		.943	.929	1.006	1.117	1.191
Skewness		-1.290	-1.294	-1.348	-1.292	-1.100
Std. Error of Skewness		.129	.129	.129	.129	.129
Kurtosis		2.375	2.189	2.003	2.124	1.380
Std. Error of Kurtosis		.256	.256	.256	.256	.256

Range	5	5	5	6	6
Minimum	2	2	2	1	1
Maximum	7	7	7	7	7
Sum	2171	2200	2210	2167	2146

Other AMOS outputs for this study:

<u>Analysis Summary:</u>

Date and Time:

Date: 16 -9-2011

Time: 09:38:04 م

Title

model_final: 16 -9-2011

AMOS software Version 16.0.

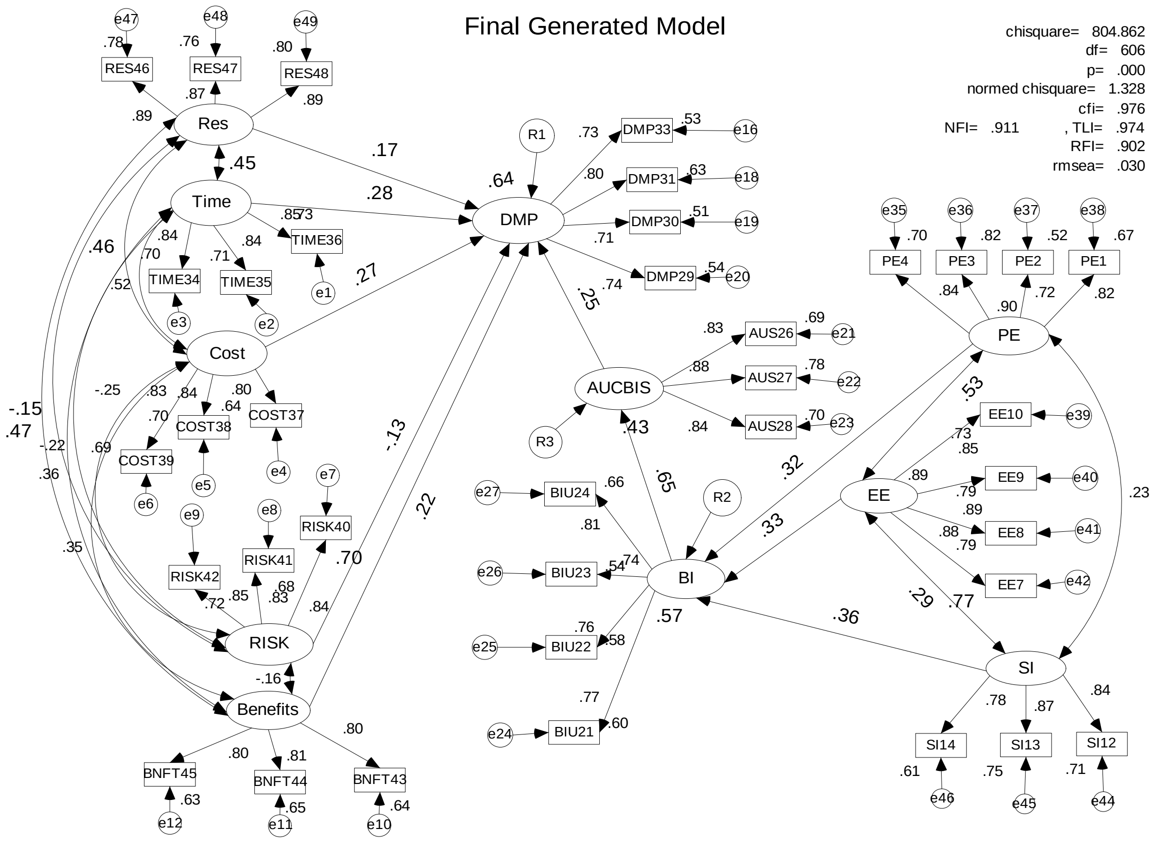
In the beginnings the notes here are from the AMOS software output.

Notes for Group (Group number 1):

Notes refer to single group or group number1 for this model.

The model is recursive. In brief mean no variable in the model has effect on itself

<u>Model Generating (360) with Standardized Estimates</u>



Your model contain the following variables (Group 1)

Your model contains the following variables (Group number 1)

Observed, endogenous variables

TIME36	Observed, endogenous
TIME35	Observed, endogenous
TIME34	Observed, endogenous
COST37	Observed, endogenous
COST38	Observed, endogenous
COST39	Observed, endogenous
BNFT43	Observed, endogenous
BNFT44	Observed, endogenous
BNFT45	Observed, endogenous
DMP33	Observed, endogenous
DMP31	Observed, endogenous
DMP30	Observed, endogenous
DMP29	Observed, endogenous
AUS26	Observed, endogenous
AUS27	Observed, endogenous
AUS28	Observed, endogenous

BIU21	Observed, endogenous
BIU22	Observed, endogenous
BIU23	Observed, endogenous
BIU24	Observed, endogenous
PE4	Observed, endogenous
PE3	Observed, endogenous
PE2	Observed, endogenous
PE1	Observed, endogenous
EE10	Observed, endogenous
EE9	Observed, endogenous
EE8	Observed, endogenous
EE7	Observed, endogenous
SI12	Observed, endogenous
SI13	Observed, endogenous
SI14	Observed, endogenous
RISK42	Observed, endogenous
RISK41	Observed, endogenous
RISK40	Observed, endogenous
RES46	Observed, endogenous
RES47	Observed, endogenous
RES48	Observed, endogenous

Unobserved, endogenous variables

Decision making Process (DMP)	Unobserved, endogenous
Actual use of CBIS (AUCBIS)	Unobserved, endogenous
Behavior Intention to use CBIS (BI)	Unobserved, endogenous

Unobserved, exogenous variables

	e1	Unobserved, exogenous
	e2	Unobserved, exogenous
	e3	Unobserved, exogenous
	e4	Unobserved, exogenous
	e5	Unobserved, exogenous
	e6	Unobserved, exogenous
	e10	Unobserved, exogenous
Benefits		
	e11	Unobserved, exogenous
	e12	Unobserved, exogenous
	e16	Unobserved, exogenous
	e18	Unobserved, exogenous
	e19	Unobserved, exogenous
	e20	Unobserved, exogenous
	e21	Unobserved, exogenous
	e22	Unobserved, exogenous
	e23	Unobserved, exogenous

e24	Unobserved, exogenous
e25	Unobserved, exogenous
e26	Unobserved, exogenous
e27	Unobserved, exogenous
e35	Unobserved, exogenous
e36	Unobserved, exogenous
e37	Unobserved, exogenous
e38	Unobserved, exogenous
e39	Unobserved, exogenous
e40	Unobserved, exogenous
e41	Unobserved, exogenous
e42	Unobserved, exogenous
Social Influence (SI)	
e44	Unobserved, exogenous
e45	Unobserved, exogenous
e46	Unobserved, exogenous
e9	Unobserved, exogenous
R1	Unobserved, exogenous
Performance Expectancy (PE)	
Time	
e8	Unobserved, exogenous
R2	Unobserved, exogenous
R3	Unobserved, exogenous
RISK	
Cost	
Effort Expectancy (EE)	
e7	Unobserved, exogenous
e47	Unobserved, exogenous
e48	Unobserved, exogenous
e49	Unobserved, exogenous
Resources (Res)	

Variable counts (Group number 1)

Number of variables in your model:	88
Number of observed variables:	37
Number of unobserved variables:	51
Number of exogenous variables:	48
Number of endogenous variables:	40

Parameter summary (Group number 1)

	Weights	Covariances	Variances	Means	Intercepts	Total
Fixed	51	0	0	0	0	51
Labeled	0	0	0	0	0	0
Unlabeled	36	13	48	0	0	97
Total	87	13	48	0	0	148

The Competing Model

Sample Size 360

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates (MLE)

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P
BI	<---	EE	.296	.051	5.858	***
BI	<---	SI	.264	.037	7.117	***
BI	<---	PE	.290	.051	5.691	***
AUCBIS	<---	BI	.759	.071	10.763	***
DMP	<---	Time	.260	.055	4.682	***
DMP	<---	AUCBIS	.226	.041	5.492	***
DMP	<---	Benefits	.229	.057	4.005	***
DMP	<---	RISK	-.078	.028	-2.736	.006
DMP	<---	Cost	.280	.062	4.525	***
DMP	<---	Res	.147	.049	3.000	.003
BNFT44	<---	Benefits	1.000	.067	14.887	***
DMP30	<---	DMP	.869	.069	12.518	***
AUS26	<---	AUCBIS	1.000			
AUS27	<---	AUCBIS	1.098	.057	19.263	***
AUS28	<---	AUCBIS	1.043	.057	18.211	***
BIU21	<---	BI	1.000			
BIU22	<---	BI	.890	.061	14.650	***
BIU23	<---	BI	.883	.063	14.061	***
BIU24	<---	BI	.915	.058	15.644	***
SI12	<---	SI	1.000			
SI13	<---	SI	1.062	.060	17.761	***
SI14	<---	SI	.928	.057	16.157	***
TIME35	<---	Time	1.062	.057	18.596	***
RISK42	<---	RISK	1.000			
COST39	<---	Cost	.997	.061	16.401	***
COST37	<---	Cost	1.000			
COST38	<---	Cost	1.058	.064	16.486	***
BNFT45	<---	Benefits	1.029	.070	14.768	***
BNFT43	<---	Benefits	1.000			
DMP33	<---	DMP	1.000			
DMP31	<---	DMP	1.000	.072	13.848	***
DMP29	<---	DMP	.902	.070	12.906	***
PE1	<---	PE	1.002	.055	18.351	***
PE2	<---	PE	.842	.055	15.318	***
PE4	<---	PE	1.000			

			Estimate	S.E.	C.R.	P
PE3	<---	PE	1.061	.051	20.909	***
RISK40	<---	RISK	1.072	.061	17.486	***
RISK41	<---	RISK	.963	.056	17.280	***
EE10	<---	EE	1.000			
EE7	<---	EE	1.059	.049	21.778	***
EE8	<---	EE	1.127	.051	22.285	***
EE9	<---	EE	1.077	.049	22.170	***
TIME36	<---	Time	1.000			
TIME34	<---	Time	.978	.053	18.433	***
RES47	<---	Res	1.026	.046	22.139	***
RES48	<---	Res	1.061	.046	22.995	***
RES46	<---	Res	1.000			

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
BI	<---	EE	.329
BI	<---	SI	.362
BI	<---	PE	.316
AUCBIS	<---	BI	.654
DMP	<---	Time	.276
DMP	<---	AUCBIS	.251
DMP	<---	Benefits	.222
DMP	<---	RISK	-.127
DMP	<---	Cost	.273
DMP	<---	Res	.168
BNFT44	<---	Benefits	.806
DMP30	<---	DMP	.713
AUS26	<---	AUCBIS	.833
AUS27	<---	AUCBIS	.882
AUS28	<---	AUCBIS	.836
BIU21	<---	BI	.772
BIU22	<---	BI	.764
BIU23	<---	BI	.737
BIU24	<---	BI	.811
SI12	<---	SI	.843
SI13	<---	SI	.866
SI14	<---	SI	.778
TIME35	<---	Time	.843
RISK42	<---	RISK	.847
COST39	<---	Cost	.832
COST37	<---	Cost	.801
COST38	<---	Cost	.837

			Estimate
BNFT45	<---	Benefits	.796
BNFT43	<---	Benefits	.799
DMP33	<---	DMP	.726
DMP31	<---	DMP	.795
DMP29	<---	DMP	.736
PE1	<---	PE	.820
PE2	<---	PE	.722
PE4	<---	PE	.837
PE3	<---	PE	.904
RISK40	<---	RISK	.839
RISK41	<---	RISK	.827
EE10	<---	EE	.853
EE7	<---	EE	.878
EE8	<---	EE	.889
EE9	<---	EE	.887
TIME36	<---	Time	.854
TIME34	<---	Time	.837
RES47	<---	Res	.870
RES48	<---	Res	.892
RES46	<---	Res	.886

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P
SI	<-->	PE	.183	.048	3.786	***
Time	<-->	RISK	-.226	.062	-3.623	***
RISK	<-->	Cost	-.229	.058	-3.928	***
Benefits	<-->	Cost	.194	.037	5.243	***
SI	<-->	EE	.236	.050	4.743	***
PE	<-->	EE	.336	.043	7.743	***
Benefits	<-->	Time	.218	.040	5.476	***
Time	<-->	Cost	.316	.043	7.373	***
Cost	<-->	Res	.295	.044	6.774	***
RISK	<-->	Res	-.166	.065	-2.559	.011
Benefits	<-->	Res	.300	.044	6.805	***
Time	<-->	Res	.317	.046	6.836	***
Benefits	<-->	RISK	-.143	.057	-2.502	.012

Correlations: (Group number 1 - Default model)

			Estimate
SI	<-->	PE	.233
Time	<-->	RISK	-.225
RISK	<-->	Cost	-.249

			Estimate
Benefits	<-->	Cost	.354
SI	<-->	EE	.294
PE	<-->	EE	.527
Benefits	<-->	Time	.365
Time	<-->	Cost	.525
Cost	<-->	Res	.457
RISK	<-->	Res	-.153
Benefits	<-->	Res	.466
Time	<-->	Res	.450
Benefits	<-->	RISK	-.156

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P
Benefits	.545	.065	8.431	***
SI	.992	.107	9.286	***
PE	.626	.066	9.496	***
Time	.656	.068	9.627	***
RISK	1.539	.164	9.359	***
Cost	.551	.064	8.666	***
EE	.650	.066	9.908	***
Res	.759	.073	10.410	***
R2	.226	.031	7.289	***
R3	.407	.049	8.390	***
R1	.208	.033	6.236	***
e1	.243	.028	8.621	***
e2	.301	.033	9.036	***
e3	.269	.029	9.271	***
e4	.307	.031	9.763	***
e5	.263	.031	8.603	***
e6	.244	.028	8.793	***
e10	.309	.034	8.986	***
e11	.295	.034	8.770	***
e12	.333	.037	9.069	***
e16	.521	.047	11.065	***
e18	.337	.034	9.766	***
e19	.424	.038	11.237	***
e20	.399	.037	10.919	***
e21	.314	.033	9.646	***
e22	.246	.032	7.666	***
e23	.334	.035	9.555	***
e24	.357	.033	10.791	***
e25	.298	.027	10.925	***
e26	.347	.031	11.315	***
e27	.229	.023	9.991	***

	Estimate	S.E.	C.R.	P
e35	.268	.026	10.176	***
e36	.157	.021	7.358	***
e37	.408	.034	11.965	***
e38	.307	.029	10.608	***
e39	.244	.023	10.782	***
e40	.205	.021	9.746	***
e41	.218	.023	9.642	***
e42	.217	.022	10.075	***
e44	.405	.049	8.327	***
e45	.372	.051	7.313	***
e46	.557	.054	10.376	***
e9	.607	.074	8.199	***
e8	.661	.073	8.991	***
e7	.744	.087	8.516	***
e47	.209	.024	8.637	***
e48	.258	.028	9.373	***
e49	.220	.026	8.324	***

Squared Multiple Correlations(SMC): (Group number 1 - Default model)

	Estimate
BI	.572
AUCBIS	.427
DMP	.641
RES48	.795
RES47	.756
RES46	.784
RISK40	.704
RISK41	.683
RISK42	.717
SI14	.605
SI13	.750
SI12	.710
EE7	.770
EE8	.791
EE9	.786
EE10	.727
PE1	.672
PE2	.521
PE3	.818
PE4	.700
BIU24	.658
BIU23	.543
BIU22	.584

	Estimate
BIU21	.597
AUS28	.698
AUS27	.777
AUS26	.694
DMP29	.541
DMP30	.508
DMP31	.632
DMP33	.527
BNFT45	.634
BNFT44	.649
BNFT43	.638
COST39	.692
COST38	.701
COST37	.642
TIME34	.700
TIME35	.711
TIME36	.729

Matrices (Group number 1 - Default model):

Total Effects (Group number 1 - Default model)

	Res	EE	Cost	RISK	Time	PE	SI	Benefits	BI	AUCBIS	DMP
BI	.000	.296	.000	.000	.000	.290	.264	.000	.000	.000	.000
AUCBIS	.000	.225	.000	.000	.000	.220	.200	.000	.759	.000	.000
DMP	.147	.051	.280	-.078	.260	.050	.045	.229	.172	.226	.000

Standardized Total Effects (Group number 1 - Default model)

	Res	EE	Cost	RISK	Time	PE	SI	Benefits	BI	AUCBIS	DMP
BI	.000	.329	.000	.000	.000	.316	.362	.000	.000	.000	.000
AUCBIS	.000	.215	.000	.000	.000	.207	.237	.000	.654	.000	.000
DMP	.168	.054	.273	-.127	.276	.052	.059	.222	.164	.251	.000

Direct Effects (Group number 1 - Default model)

	Res	EE	Cost	RISK	Time	PE	SI	Benefits	BI	AUCBIS	DMP
BI	.000	.296	.000	.000	.000	.290	.264	.000	.000	.000	.000
AUCBIS	.000	.000	.000	.000	.000	.000	.000	.000	.759	.000	.000
DMP	.147	.000	.280	-.078	.260	.000	.000	.229	.000	.226	.000

Standardized Direct Effects (Group number 1 - Default model)

	Res	EE	Cost	RISK	Time	PE	SI	Benefits	BI	AUCBIS	DMP
BI	.000	.329	.000	.000	.000	.316	.362	.000	.000	.000	.000

	Res	EE	Cost	RISK	Time	PE	SI	Benefits	BI	AUCBIS	DMP
AUCBIS	.000	.000	.000	.000	.000	.000	.000	.000	.654	.000	.000
DMP	.168	.000	.273	-.127	.276	.000	.000	.222	.000	.251	.000

Indirect Effects (Group number 1 - Default model)

	Res	**EE**	**Cost**	**RISK**	**Time**	**PE**	**SI**	**Benefits**	**BI**	**AUCBIS**	**DMP**
BI	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
AUCBIS	.000	.225	.000	.000	.000	.220	.200	.000	.000	.000	.000
DMP	.000	.051	.000	.000	.000	.050	.045	.000	.172	.000	.000

Standardized Indirect Effects (Group number 1 - Default model)

	Res	**EE**	**Cost**	**RISK**	**Time**	**PE**	**SI**	**Benefits**	**BI**	**AUCBIS**	**DMP**
BI	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
AUCBIS	.000	.215	.000	.000	.000	.207	.237	.000	.000	.000	.000
DMP	.000	.054	.000	.000	.000	.052	.059	.000	.164	.000	.000

Model Fit Summary of the Generated model:

CMIN

Model	**NPAR**	**CMIN**	**DF**	**P**	**CMIN/DF**
Default model	97	804.862	606	.000	1.328
Saturated model	703	.000	0		
Independence model	37	9024.892	666	.000	13.551

RMR, GFI

Model	**RMR**	**GFI**	**AGFI**	**PGFI**
Default model	.139	.897	.880	.773
Saturated model	.000	1.000		
Independence model	.314	.219	.175	.207

Baseline Comparisons

Model	**NFI Delta1**	**RFI rho1**	**IFI Delta2**	**TLI rho2**	**CFI**
Default model	.911	.902	.976	.974	.976
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	**PRATIO**	**PNFI**	**PCFI**
Default model	.910	.829	.888
Saturated model	.000	.000	.000

Model	PRATIO	PNFI	PCFI
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	198.862	129.184	276.630
Saturated model	.000	.000	.000
Independence model	8358.892	8055.422	8668.804

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	2.242	.554	.360	.771
Saturated model	.000	.000	.000	.000
Independence model	25.139	23.284	22.439	24.147

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.030	.024	.036	1.000
Independence model	.187	.184	.190	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	998.862	1021.828	1375.814	1472.814
Saturated model	1406.000	1572.442	4137.931	4840.931
Independence model	9098.892	9107.652	9242.678	9279.678

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	2.782	2.588	2.999	2.846
Saturated model	3.916	3.916	3.916	4.380
Independence model	25.345	24.500	26.208	25.370

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	297	308
Independence model	29	30

Appendix I

The Preliminary Work Including Interviews in Jordan

(Published Paper)

Computer Based Information System Functions for Decision Makers in Organizations.

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***Abstract*— Computer Based Information System (CBIS) was discussed by many scholars. In this paper a review was conducted for the CBIS types from different point views' scholars. CBIS is important for decision makers (managers) to make decisions at their different levels. Eighteen managers from five organizations were interviewed with structural interviews. The findings showed that only six managers with 33% only are using CBIS in decision making process (DMP). Thus, this indicates the need for future research in Jordan to find out, why CBIS is still not fully adopted by decision makers.**

Keywords- Computer Based Information System, CBIS, Components, Types, Decision making, Manager, Interview.

I. INTRODUCTION

Due to changing environment for organizations, competition, convergence, networked, and costs. Levels of decision makers decreased in flatted organizations. In this paper the researchers want to know how the Computer Based Information System (CBIS) plays a role. CBIS which is an information system that uses computers (automated-IS), consists of: hardware, software, databases, people, telecommunications and procedures, configured to collect, manipulate, store, and process data into information become so important and highly needed [1, 2]. Most types of work require a high number of people, time and effort to accomplish. All jobs that were done manually a century ago have now become easier to do, as a lot of time and cost are now saved with the development of technology. Similarly, seeking data and information especially from manual reports and studies is tedious to scan through to find the necessary information. Thus, to solve the problem and to find a suitable solution, in particular for an urgent issue could take a very long time. Later, organizing and indexing were introduced to help to retrieve these reports easily. With the advancement in technology, huge information could be organized very well and easily referred to whenever required. The information system can be categorized into two groups: (1) manual systems: the old style that deals with papers and reports, (2) automated systems: where computerizing system is used. There are many types of CBIS, where the transaction processing system (TPS) is the system used at the operations level of organizations for routine process. TPS was introduced in 1950 to support the sudden and unexpected needs, hence, CBIS was required in many organizational levels such as management information system (MIS), decision support system (DSS), group decision support system (GDSS), expert system (ES), office information system (OIS), executive information system (EIS), and intelligence organizational information system (IOIS) [3, 4]. Another way of classification described by Mentzas on the CBIS activities which is: (1) Information reporting where the best example here is MIS, (2) communication and negotiation activities (GDSS), and (3) decision activities (DSS, ES), which support selection from the available alternatives, which is the main focus of this research on decision making [3].

CBIS which is information processing systems have components as follows: hardware, software, data, people, and procedures. These components are organized for specific purposes [5].

This paper will answer the following two questions:

Q1: What are the roles (functions) of CBIS in decision making in organizations?

Q2: Are the CBIS used in the Jordanian organizations by their decision makers?

II. PREVIOUS WORK

Scholars looked for the components and types of CBIS from different perspectives as follows:

In 1985, according to [6], the users of CBIS must have common knowledge of such systems. Due to the fact that computers have become more available and much easier to use, this flexibility helps in getting information that is needed, the components of CBIS viewed are: hardware, software, data, models, procedures, and users. In addition, the CBIS consists of four components: hardware; software; people, and data storage. The purpose of CBIS as an information system with computers was used to store and process data in 1988 [7]. Also, in 1987 and referring to [8], the problem of end-users contributed to the lack of success in the integration of the CBIS system of the organizations. Hence, they presented a quick and powerful solution by means of training the end users to use the IT (CBIS) system. After analyzing several different types of organizational conflicts, in 1990 scholars as [9] suggested that the group decision support system (GDSS) is an essential tool to resolve conflicts. They also perceived that CBIS has evolved from focusing data such as TPS, information such as MIS and decision such as GDSS and DSS. Hence, CBIS and its components are necessary in supporting decision.

In 1994, the components of information processing systems were noted as follows: hardware, software, data, people, and procedures. These components are organized for specific purposes, Furthermore, the researcher mentioned five types of CBIS, from the oldest to the newest, or from more structured to less structure such as; transaction processing systems (TPS), management information systems (MIS), decision support systems (DSS), expert systems (ES) as major type of artificial intelligence (AI) and executive information systems (EIS). Transforming process for data can be classified into three steps such as converting data into information (refining), converting information into decision (interpreting), and installing decisions and changes in the organization (implementing) with some tools as word processing report [5].

In 1995, CBIS was more valuable for manager's mental model for guiding planning, controlling, and operating decisions, than forming or revising the manager's mental model of the corporation. The researchers also added that the tools in several studies have shown the most used computer softwares which were spreadsheets, word-processing and data base management. The amount of use was from 1.8 Hr per week to 14Hr or more per week. The lowest use was in Saudi Arabia, while the highest use rate was in Taiwan [10].

However, in 1994 [3] mentioned that from specific types of CBIS (e.g. DSS, GDSS, ES) are powerful tools in certain aspects of the decision making process in the modern organizations, but they have limitations. For example, none of them provide an integrated support. The researcher also made comparison between the ten types of CBIS (MIS, EIS, ESS, DSS, GDSS, EMS ODSS, ES, OIS, and IOIS) to establish and promote for using the IOIS system in organizations. For the roles of these types of CBIS see Table 1.

TABLE I. TYPES OF COMPUTER-BASED INFORMATION SYSTEM.

Types of CBIS System	Roles of CBIS Types
Management Information System (MIS)	Analysis of information, generation of requested reports, solving of structured problems.
Executive Information System (EIS)	Evaluation of information in timely information analysis for top-level managerial levels in an intelligent manner.
Executive Support Systems (ESS)	Extension of EIS capabilities to include support for electronic communications and organizing facilities.
Decision Support System (DSS)	Use of data, models and decision aids in the analysis of semi-structured problems for individuals.
Group Decision Support System (GDSS)	Extension of DSS with negotiation and communication facilities for group.
Electronic Meeting Systems (EMS)	Provision of information systems infrastructure to support group work and the activities of participants in meetings
Organizational Decision Support Systems (ODSS)	Support of organizational tasks or decision-making activities that affect several organizational units
Expert systems (ES)	Capturing and organizing corporate knowledge about an application domain and translating it into expert advice.
Office Information System (OIS)	Support of the office worker in the effective and timely management of office objects. The goal-oriented and ill-defined office processes and the control of information flow in the office.
Intelligence Organizational Information System (IOIS)	Assistance (and independent action) in all phases of decision making and support in multi participant organizations.

Source: Mentzas (1994).

Mentzas promoted the using of IOIS, and considered it as a perfect solution for supporting decisions in organizations, which was the only type of CBIS that give a high support in three dimensions to (individuals, groups and organizations) as an integration support which is not available in the other nine types mentioned earlier[3].

In 1997, the types of CBIS were in five subsystems comprising data processing (DP), office automation (OA), expert system (ES), decision support system (DSS), and management information system (MIS). Whereas, the researcher promoted for the MIS type to solve the problem in decisions of organizations [11]. In the beginning of this Century (in 2003), the CBIS was considered a vital tool for managers in making decisions. They also, encouraged CBIS courses to be given to the undergraduate students in business administration (BA) in the U.S system through the second year to help them in future. In addition, some of the benefits of CBIS include learning the system design and analysis and improving the problem solving skills [12].

In the same year 2003 and according to [4], the CBIS is one unit in which a computer plays the basic role. She presented five components for the CBIS systems namely: Hardware which refers to machines part with input, storages and output parts, software which is a computer programs that helps in processing data to useful information, data in which facts are used by programs to produce useful information, procedures which are the rules for the operations of a computer system, and people or users for the CBIS which are also called end users.

In 2004, scholars as: Vlahos, Ferrat, and Knoepfle found that the CBIS were accepted i.e. (adopted and used) by German managers. Besides, results from their survey have shown that those managers were heavily CBIS users with more than 10 Hr per week. The researchers encouraged using the CBIS system as: it helps in planning, assisting in decision making budgeting, forecasting, and solving problems. As researchers wanted to know how German managers use the CBIS systems, they built a survey questionnaire to collect data. Likert scale with 7-point scale was used; whereas, Cornbach Alpha was 0.77. This study provides a new updated knowledge on CBIS use by German managers, together with looking into the perceived value and satisfaction obtained from CBIS, in helping managers and normal users and supporting them to carry out better decision making [13]

In 2005, according to [14], many decision makers have lack of knowledge in using the automated CBIS. They gave an example where a corporate chief executive has to learn how to use an automated CBIS while his senior managers have limited computer knowledge and so they prefer only extremely easy to use systems. This scenario shows that decision makers want to learn how to use the CBIS to process better decision but they do not know how. In the same year, some scholars as [15] used the term CBIS and IS interchangeably. He also argued for the success of CBIS so as to gain benefits by using information systems (IS) and information technology (IT) in organizations. There is a need to deal with the important needed information with the CBIS to support decision makers.

from the two different years, in 2007 and 2011, Turban, Aronson, Liang, and Sharda decided that the CBIS are required to support decisions in organizations for many reasons such as: works in organizations to rapidly change because of the economy needs to follow the case with the automated systems, to support the decision making process and to have accurate information as required, the management mandates the computerized decision support, high quality of decision is required, the company prefers improved communication and customer and employee satisfaction; timely information is necessary, the organization seeks cost reduction, the organization wants improved productivity, and the information system department of the organization is usually too busy to address all the management's inquiries [16, 17].

In 2007, scholars as [18], noticed that many types of CBIS developed to support decision making are: decision support systems (DSS), group decision support systems (GDSS) and executive information systems (EIS). In their study, they used IS interchangeably with CBIS, and discussed the difference between USA and other Asian countries holding that success depends on how well IT (CBIS) application is adapted to the decision style of their users.

In 2008, a recommendation was by [19], to look for the recommendation systems which are another face for CBIS to support decisions. In his study, he focused on decision DSS, and how they evolved from aiding decision makers to perform analysis to provide automated intelligent support.

In 2009, a promotion to adopt and use after well-understanding of the ICT- in the meaning of CBIS- sector support to give support for the decision making processing by discussing the ICT environment in industrial house construction for six Swedish companies. The interest here was in processing data in a systematic way as organizing the resources for collecting, storage, process, and display information. In these six companies, different ICT support decision tools as (ERP, CAD, Excel, and VB-Scripts seawares) were used. Organizations which did not use ERP system had problems in information management. Again, using ICT models with automated systems (tools) will be a good way to systemize information to reduce cost and save time for the decision makers [20]. In the same year also (2009), scholars as [21] argued that the combinations of two types of CBIS as (DSS with ES) will be a guidance in the process of grading wool for the decision makers in this field. They also added that the DSS has the following advantages. DSS supports decision making activities for the area businesses and organizations, designed to help decision-makers to get useful information after processing raw data. DSS which is an interactive CBIS system was developed to support solving unstructured problems to improve decision-making. Moreover, DSS uses intelligent agents to collect data related to online as auctions which improve decision-making and lastly DSS utilizes statistical analyses that provide the specific and relevant information. In addition, combining DSS with ES will complement the two systems and help decision makers in the decision making process. This will be carried out through a systematic way and will not replace humans as decision makers by the machine or any complex systems.

In 2009, other scholars as [22] argued that it is good to integrate the decision support systems (DSS) which is one type of the CBIS as IDSS as a development system. They discussed more than 100 papers and software systems, and recommended that IDSS will be a better support for decision makers in the decision making process. By looking at literature review, integration of DSS as a tool for users' decision makers was On-Line Analytical Processing (OLAP) as a powerful tool that helps decision makers in processing decisions. Also, in 2009, Fogarty and Armostrong surveyed 171 organizations in Australia for the CBIS or the Automated- IS success which is important for organizations in small business sector and a model for the following factors: organization characteristics, the Chief Executive Officer (CEO) characteristics, decision (Decision Criteria), and user satisfaction. They used the term "small business" to mean a "small and medium enterprise" (SME). This calls for more attention and interest in computer based information systems (CBIS) in organizations to help in the decision making process [23].

Management support systems (MSS) which is another face for CBIS support different managerial roles i.e. the development of MSS that supports managerial cognition, decision, and action. While CBIS types include: decision support systems DSS), group support systems (GSS), executive information systems (EIS), knowledge management systems (KMS), and business intelligence (BI) systems developed to support the decision making process for managers. On the other hand, MSS have other features such as modeling capabilities, electronic communications, and organizing tools. The researchers here refer to the MSS system as ICT-enabled IS in order to support managers to process decisions which was in 2009 by [24].

In 2010, a comparison by [25] for the traditional-IS with automated-IS (CBIS) system, where they referred to the CBIS system as information system auditing that gives support to the decision makers in their businesses. Computer-based information system is expected to help businesses achieve their goals and objectives, and to lend support for making good decisions by decision makers. They refer to the components of CBIS such as: hardware, software, database, networks, procedures, and people. In the same view, also in the same year (2010), [26] argued that automated system of Customer Relationship Management (CRM) will help not only in the decision making process, but also in reducing costs, and time. In addition, CRM known as software which helps in integration of resources, also helps in sharing knowledge between customers, supports daily decisions, and improves the users' performance.

Other scholars in the same year (2010) as [2], declared that there is a need for CBIS:

"High quality, up-to-date, and well maintained computer-based information systems (CBIS) since they are the heart of today's most successful corporations" (P. 3).

In addition, they gather the components for CBIS system as a single set of hardware, software, database, telecommunications, people and procedures. They also identified the major role software tool of CBIS which consists of input, processing output, and feedback. The aim is to collect and process data to provide users as decision makers with needed information to help them in the decision making process. One of the examples they gave was SAP software.

In 2010 also, the CBIS can be used to help in industrial process-plants which are important for the economy. A proposed model for determining the financial losses resulting from cyber attacks on CBIS systems was used. The CBIS system here was Supervisory Control and Data Acquisition (SCADA) system. Managers using the SCADA system were helped with estimation about their financial damages. Here, the researchers focus on the risk, cost, resources, and benefits as factors from the decision making to interest with using the CBIS (SCADA) by decision makers [27].

To sum up, the previous components of CBIS, Please, see the following in Table. 2.

TABLE 2. CBIS COMPONENTS.

CBIS components	Researchers
Hardware	[1, 2, 3, 4, 5, 6 & 7]
Software	[1, 2, 4, 5, 6 & 7]
Data storages	[1, 2, 4, 5, 6 & 7]
Models	[3, 6]
Procedure	[1, 2, 4, 5 & 6]
Users	[1, 2, 4, 5, 6 & 7]
Knowledge	[3]
Cooperation	[3]
Support Man-Machine Interaction	[3]
Telecommunications	[1, 2]

In light of the previous discussion, researchers considered the components of CBIS from different points of view with emphasis on, the integration of all to be presented as hardware, software, people, data storage, model and procedures. Besides , they consider how CBIS helps in decision making or solving problems by using CBIS in the decision making process in organizations, which evolved from TPS, MIS, DSS, GDSS, ES, ERP, SCADA and MMS. For the first research question the previous scholars emphasized the importance and necessity of CBIS for decision makers. The researcher is interested to find weather decision makers use CBIS in organizations in Jordan. The preliminary study was done and interviews were conducted in Jordan in October 2009.

III. INTERVIEW PART

The aim of this interview is only to help the researcher to identify the use of CBIS of his research in Jordan, and to test factors for the decision making process of CBIS. A face to face interview was used as a tool to collect preliminary data only. The scope for this interview was limited to decision makers at different levels in the organizations, in using information communication technology in their work in Jordan. Structured interview or what known also as standardized interview is a qualitative approach method, which ensures each interview is done with exactly the same questions in the same order. For this structured interview was considered to be more reliability and validity from the un-structured interviews [28, 29, 30, 31 & 44]. Also, structured interview method was used in a study conducted in five Arab countries [32].

The lack of use of CBIS was observed in many countries in decision making. A study held in Saudi Arabia by [36] confirmed the lack of CBIS use and the need for heavily use for MIS which is one type of CBIS in decision process. Up to the knowledge, no exist for researches done to explore or identify CBIS use for decision makers in organizations in Jordan.

A. The Instrument (Interviews).

Face-to-face interviews were conducted, each starting with greeting and enveloped with politeness. An introduction was given about the research for 3-5 minutes. The researcher took notes without biasing the interviewees to any answer and made sure that the time was not too long i.e. each interview lasted between 10-15 minutes and ended with thanking the participants. After one paragraph of the topic title and the researcher name and university, two parts were asked to the interviewees, firstly demographic information, and then followed by four open ended questions; see Appendixes A, B please.

B. Population and Sampling

The researcher tried to do the interview through ten organizations, from the framed population registered ICT organizations which were 170 organizations, after calling the human resources in each organization from the sample, only five of them agreed. Agreement by telephone calling was resulted from five organizations. For non-probability design, it is recognized for two categories: Convenience sampling and purposive sampling and the purposive sampling has two major types: judgment and quota sampling. In this interview a judgment sampling was used [44].

C. Methodology

Face-to-face interviews were conducted, structured interviews as mentioned before have more reliability and validity over the un-structured interviews, and qualitative approach with a judgment type from purposive sampling technique was used for the specific respondents i.e. decision maker using CBIS in organization. Notes were taken by the researcher; this issue was discussed by Sekaran [44] she mentioned:

"The interviews can be recorded in tape if the respondent has no objection. However, taped interviews might bias the respondents' answers because they know their voices are being recorded" (P. 231).

The interview technique was used for each starting with greeting and enveloped with politeness. An introduction was given about the research for 3-5 minutes. The researcher took notes without biasing the interviewees; each interview lasted between 10-15 minutes and ended with thanking the participants.

Translation process was after confirming the questions from specialist from the Computing School from UUM University as follows:

- An academic translation center in Irbid - City in north part of Jordan from English to Arabic and checked for understandability of meaning.
- Translation was then made from Arabic to English and was compared for possible differences.
- Finally, the corrections needed were made to have the final version in Arabic to insure the reliability and validity [33, 34 & 35].

D. Data collection and Analysis

Despite the richness information that can be collected from qualitative methods, there are some issues and problems to deal with qualitative data [45]. Gathering (association) same answered-questions, after that tabulating data in table was made [42, 44], data was grouped and tabulated to make a sense. A simple descriptive analysis was made for the frequencies of the participants' answers. For the demographic and actual use it is good to be analyzed within descriptive analysis. Whereas, rest of the questions, was good to look out for them nearly from the point of views of Morgan and Smircich in [46] as ontologies or epistemologies i.e. keywords in the beginning of papers or common frequent words in content analysis after tabulating the same answers.

E. Findings

1) Demographic information:
From 18 respondents only 2 were females with (11%) and 16 males with (89%), the youngest respondents age was 29, while the eldest age was 55 with Age-Average age 39.8 years for the respondents. The respondents managerial levels was 8 low-level with (33%) and 9 middle-levels with (50%), while, only 3(17%) only were from top-levels.

2) Computer-based information system Use:
From 18 participants only 6 with (33.3%) of them declared they are using the CBIS in processing their decisions in their organizations, which means 12 with (66.7%) of the managers are not using CBIS in decision processing in those five organizations.

3) Advantages of CBIS:
For the third question, the answers of the CBIS-Users (managers), they mentioned the following words: "Easily, help, fast, useful, and integrated". While, for the managers who did not use CBIS, they mentioned words as: "no need, do not know about, think will be good in future, and good to use future".

4) Decision making factors:
The associated answers words for this question were "time, reduce cost, risk, benefits, and resource", and less appearance for "rules, customer, and data".

5) Softwares and tools of CBIS:
For the managers who are using CBIS the appearance was for "Spreadsheets, dashboard, business object, integrated system, oracle, and service oriented architecture".

A summary of the demographic information and the answers for the use part are categorized in the following table. 3. It is important to mention here that the interviews were in Arabic and what is mentioned in English the language of publication. In addition, based on Talji [43] the findings were categorized.

TABLE 3. DEMOGRAPHIC INFORMATION AND CBIS USE.

Participants of organizations	Gender	Age	Managerial Level	CBIS Use
Participant 1	male	34	Middle	Yes
Participant 2	male	40	Middle	No
Participant 3	female	39	Low	No
Participant 4	male	33	Low	No
Participant 5	male	45	Middle	Yes
Participant 6	male	46	Top	Yes
Participant 7	male	43	Low	No
Participant 8	male	45	Middle	N0
Participant 9	Male	32	Low	Yes
Participant 10	Male	37	Middle	No
Participant 11	Male	36	Low	No
Participant 12	Male	29	Low	Yes
Participant 13	Male	55	Top	N0
Participant 14	Female	34	Low	N0
Participant 15	Male	39	Middle	Yes
Participant 16	Male	41	Low	N0
Participant 17	Male	46	Top	N0
Participant 18	Male	41	Middle	N0

F. *Results and Discussion*

The purpose of these interviews was to identify the Use of CBIS in decision making in organizations in Jordan, and to test some factors in a proposed model. The researcher ensured that all the participants are decision makers (managers) at any level, and that, all the randomly selected organizations are inclined towards information and communication technology (ICT) i.e. they are using the facility of the technology or have the lowest level of technology. For example, the organization has a website, or uses the internet, and /or the employees have Pc`s in their workplace.

Decision making factors as: time, cost, risk, benefits, and resources are wanted in any try to introduce model for the decision makers, these factors were review by Ashakkah and Rozaini [37]. In addition, the appearance of these factors was recognized with the decision makers whom are users of CBIS answers. CBIS is encouraged to be adopted and used for its benefits as cutting cost, saving time, and making the work easier. And for the tools of CBIS, spreadsheets appeared as a low level while dashboard was for top levels of decision makers. Returning back to the aim of this paper, the CBIS adoption and use need future researches to explore its roles for decision makers, up to the knowledge of the researcher no previous reaches was done in the CBIS in decision making in organization in Jordan. Whereas, for the ICT area asserted that ICT in Jordan need more interest, in order to develop country like Jordan, there is an increasing need to give more interest in ICT development area [38]. Which implies the CBIS use for the decision makers in Jordan interest also is needed, since the CBIS need ICT infrastructure availability as a basic root in organizations.

IV. CONCLUSION AND FUTURE RESEARCH

From the Interviews conducted in five organizations in Jordan with the decision makers (managers) in different managerial levels, the aim was to collect a Preliminary data to find issues about CBIS in decision making in organizations in Jordan, and to help the researcher to test some factors in the proposed model. The researcher conducted 18 face-to face interviews in five ICT organizations through which he was keen not to be biased with the participants in any answer. All along, the participants were assured that their answers would only be used for the research purposes, including names of people and organizations that were promised not to be declared. Lastly, many factors were found to affect the CBIS in decision making from the results of the 18 interviewees, only 6 of them were using the CBIS. Which mean the adoption and use of the CBIS system in decision making in Jordanian organizations still needs more focus and further research.

These interviews have some limitations as the sample size and the self reporting, in all, other view by Delone and Mclean [40, 41] for the updated IS success model, it was a revised for the "Use" to be "intention to use and use" and to put the "benefits" as an output, so it is good to adapt a technology theory which involves the Use and Intention to Use in a future research model, this open the door for researchers to do more researches with this view.

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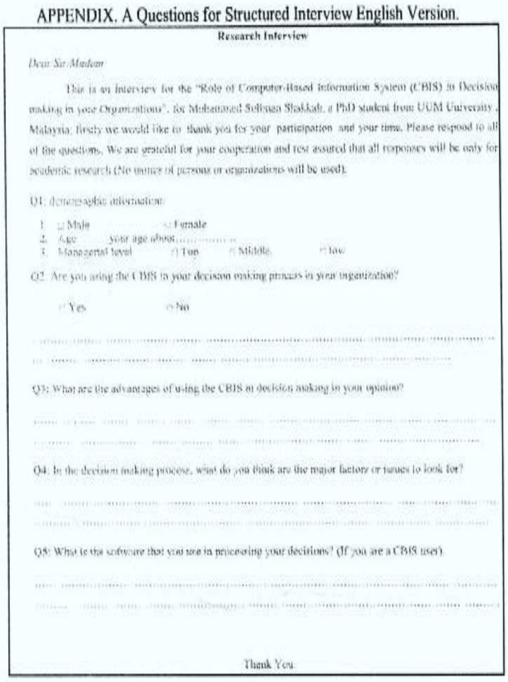
APPENDIXES

APPENDIX. A Questions for Structured Interview English Version.



Research Interview

Dear Sir/Madam

This is an Interview for the "Role of Computer-Based Information System (CBIS) in Decision making in your Organizations", for Mohammed Soliman Shakkah, a PhD student from UUM University, Malaysia; firstly we would like to thank you for your participation and your time. Please respond to all of the questions. We are grateful for your cooperation and rest assured that all responses will be only for academic research (No names of persons or organizations will be used).

Q1: demographic information:

1. □ Male □ Female
2. Age your age about..................
3. Managerial level □ Top □ Middle □ low

Q2. Are you using the CBIS in your decision making process in your organization?

□ Yes □ No

....

Q3: What are the advantages of using the CBIS in decision making in your opinion?

....

Q4: In the decision making process, what do you think are the major factors or issues to look for?

....

Q5: What is the software that you use in processing your decisions? (If you are a CBIS user)

....

Thank You.

APPENDIX B. Questions for Structured Interview Arabic Version

مقابلة لبحث دكتوراه

السيد / السيدة المحترم

هذه المقابلة لبحث حول دور نظم المعلومات المحوسبه في عمل القرارات في شركتك، لطالب الدكتوراه محمد سليمان الشقاح من جامعه الشمال الماليزيه بماليزيا ، اولا نود ان نشكركم على مشاركتكم ووقتكم. نود منكم الاجابه على جميع الفقرات ان امكن، نحن ممتنون لتعاونكم.

جميع الاجابات ستستخدم فقط لاغراض البحث العلمي بمعنى الاسماء للاشخاص والشركات لن تذكر

س1: معلومات شخصيه:

اولا: الجنس : 1- ذكر 2- انثى

ثانيا: كم العمر ؟ ....

ثالثا: المستوى الاداري: 1- عالي 2- متوسط 3- منخفض

س2 : هل تستخدم نظم المعلومات المحوسبه في عمل القرارات في شركتك؟

1- نعم 2- لا

....

س3: ما هي الفوائد من استخدام نظم المعلومات المحوسبه في عمل القرارات في شركتك برأيك؟

....

س4: عند معالجه عمل القرارات، ما هي العوامل او الاشياء التي يجب ان تؤخذ بالحسبان؟

....

س5 : ما هي البرامج التي تستخدمها عند عمل القرارات؟(اذا كنت ممن تستخدم نظم المعلومات المحوسبه).

....

شاكرين لكم تعاونكم.

AUTHORS PROFILE

Mohammed Suliman Al-Shakkah Received the B.Sc degrees in Maths from yarmouk university in 1998, MSc in Information Technology (IT) from Universiti Sins Malaysia (USM) in 2007, he is vice-dean and lecturer from (2009-2011) in Alghad International Colleges for Health and Medical Sciences in Kingdom of Saudi Arabia. He is a candidate PhD student in the final stage, started in 2007 Universiti Utara Malaysia (UUM), interested in decision support system (DSS), decision processing for managers in organizations with structuaral equation modeling (SEM) technique, adoption, acceptance and barriers use of computer-based information system (CBIS) in developing countries.

Dr. Wan Rozaini Received the B.Sc degrees in Physics from Universiti Sins Malaysia (USM) in 1982, PG Diploma in Systems Analysis for public Sector from Universiti of Aston in 1983 in UK. She received MSc, ORSA at UK in 1984. PHD, MIS from Universiti of Salge in UK 1996. Now she Associate professor in Universiti Utara Malaysia and Director of ITU- UUM, ASP COE for Rural ICT development

Appendix J

The Preliminary Work for study of Decision making Factors with the years 1990-2010

(Published Paper)

Empirical Study of Evolution of Decision Making Factors from 1990-2010.

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***Abstract*—The intense competition make DM process important for their survival. There are many factors that affect DM in all types of organizations, especially business. In this qualitative study the result has come out with new view for the decision making processing through (observing) analyzing the nine decision making factors from 1990-2010 from 210 papers which were selected randomly from the available resources. Seven partitions were made for the time period of three years and 30 papers for each period. Qualitative method was used here. By analyzing figures and chart with Microsoft excel, the nine decision making factors were categorized into two groups. The main group consists of five factors: time, cost, risk, benefits, and resources. While the second group of the factors consists of four: financial impact, feasibility, intangibles, and ethics. However, time was the most relevant factor at all. More researches in decision making are needed to solve the problems in organizations and in different scopes related to decisions.**

Keywords- Decision making (DM); decision making process (DMP); decision support system (DSS).

I. INTRODUCTION

Decisions affect a lot of life activities and they are needed by many people in different levels [1]. Information System (IS) is an important area, a review in IS research showed its effect on decision making and the success of organizations [7], [8]. In addition to, IS has several subsets such as Decision Support Systems (DSS). A DSS is a computer based system (an application program) capable of analyzing an organizational data and then presents it in a way that helps the decision makers to make business decisions more efficiently and effectively. Besides that, organizations are so dependent on IS, that is urgent attention are focus on those factors that can help decision makers in processing their decisions efficiently and effectively [9].

This importance of decisions gave motivation to see how to improve decision making in organizations. The purpose of this study is to shed a light on what affects decision making process. Studying decision making factors will increase the understanding of this process of making decisions. In this paper, the frequency of decision making factors is counted over a period of twenty years. More clear vision of decision making will presented through answering the following two questions: follow.

- What are the factors that are important in decision making processing which previously?
- What are the relevant factors in decision making for the period 1990-2010?

Before we start discussing these questions, it is good to know that in the perspective of information system management field, the programmers and researchers had created the decision support system (DSS) to help in making decisions without consultant or detailed analysis [2], DSS firstly created to support decision makers in organizations. However, in the large context such as organization, technology would become a good enabler to support distributed decision making [3].

II. DECISION MAKING

A. Decision Making Factors

Many examples of bad decisions cost organizations a lot of money [4]. A suggestion for instructions and steps that improves the quality of decisions, hence results in better decisions. Also [4] asserted nine decision making factors that were presented as: Time, cost, risk, benefits, resources, financial impact, intangibles, ethics and feasibility. For this the researcher reviewed other researches for these factors in the following section.

B. Previous work

In the beginning from the previous factors, it is good to start by time which was intended as time for implementing the alternative and the effect of delay [4]. This factor is very important and is needed in dynamic decision making [10]. In addition, time is so important for managers through their singular decision making, they face unstructured problems which need to be processed quickly [11].

Cost meant to be cost of the alternatives and its suitability to the budget [4]. Other researcher as [12] proposed algorithm to make the optimal decision making with intelligent decision making systems, cost-benefit analysis was used and trials was done to reduce cost with the same benefit. In the same meaning of lowest cost was by [13] in automation 2.0. Also, a case study was applied for the decision support system courses on documentation of the web-based cost estimator for application Al-Sawaf Trading Center [14].

Risk is related to this alternative [4], where risk is inherent in every activity made by the person, and risk insight with to help decision makers in their decision making process [15]. A affect which is as a feeling-state that from good to bad help in decision making for the manager to care with their choices [16]. For the benefit factor which is the profits from implementing this alternative [4], some of the recommendation systems can modalize the customer decision making with high level of decision variable benefits for in the decision making process [17]. Also, using question answering which is related with ontology technique and the data warehousing through application business intelligence bring a lot of benefits for the decision makers [18].

Resources which is for each alternative, the required resources are available [4], In the other hand, using analytical hieratical process (AHP) in decision making process through the available resources help decision makers for better decisions [19]. Also, discussing the key concepts of the IT process management will centralize and control the available resources in organizations [20].

Financial impact which mean the effect of costs with time [4]. In the other hand, financial impact of data accuracy on an inventory system is very important. This will lead through using technology to quantify investment in tracking system and many benefits will be gained in decision making process [21]. Also, some other examples of the computer- based information system as enterprise resource planning (ERP) and supply chain management (SCM) are useful in information technology investment for IT managers to reduce time and cost within processing decisions i.e. which give a strong financial impact for decision makers [22].

Ethics factor is to see if this legal or not [4]. Other researcher revealed the ethical side of using internet technology [23], for human values as ethics, they are increasingly used and still in use as a concept in different fields [24]. Also, the ethical multiplicity for different code of ethic through organizations was discussed [25].

Intangible is for what other unrecognized or sudden variables [4]. In addition, intangible and tangible financial resources operated by organizations are very important [26], for helping decision makers, creating many alternatives can help in processing decisions, even these options related to tangible or intangible resources [27]. Also, enterprise information technology costs a lot of money and risky, so information technology asset for this set of tangible and intangible for operation considered [28].

Feasibility which in the mean those alternatives can be implemented realistically [4]. In addition, there is one method of DSS as multi-alternative decision making properties the alternatives, and the feasibility of applying objective technique in order to maximize numbers of alternatives which help in DMP [29]. Also, the benefit-cost deficit model was proposed to explain and predict barrier removal was feasibility; this will help decision makers in their DMP [30]. To sum up, for the nine factors mentioned it will be worthy if the decision makers in organizations look for in their DMP.

The first question done, now for the second research question: What are the most important factors in decision making for any field? This and all these same meaning questions will be answered in this paper with a qualitative empirical study. The study was carried out on all the available resources to study the decision making factors and how they change with time, from the year 1990 until 2010.

C. *Processing the Decision Making*

Researchers as [5] studied the old decision making methods. They found that in the old method, the decision making was art of the managers and it requires talents, experiences and intuitions, rather than a systematic method. While, in the modern method, there are four steps in decision making: (1) Define the problem (difficulty or opportunity). (2) Construct a model that describes the real-world problem. (3) Identify the possible solutions to model the problem and evaluate the solutions. (4) Compare, choose and recommend potential solutions to a problem. It has to be ensured that sufficient alternative solutions are considered. Also in this book Simon`s steps were presented in four steps to process decision making as: (1) Intelligence. (2) Design. (3) Choice. (4) Implementation. While, [4] gave five steps of decision making process are stated as: (1) Establish a context for success. (2) Frame the issue properly. (3) Generate alternatives. (4) Evaluate the alternatives. (5) Choose the best alternative.

In addition to, [6] clarified steps to the decision-making process also by other researches were as: (1) Identify the problem or issue. (2) Generate alternatives. (3) Ranking the alternatives and select one of them. (4) Implement the selected alternative. (5) Evaluate the outcomes.

However many researchers call for using the systematic way and they browse different steps, either if it is three, four, or five steps the focus in all is the choosing stage which is the meaning of decision, with this also the need become more and more to understand the important attributes (factors) from the nine attributes mentioned previously in the processing decision making to help all types of decision makers to better decisions. for this paper intend to reveal these important an more interested in factors and how it changes with time, in the next section more details about how the work done.

III. METHODOLOGY

Since the interest is to count each factor is its frequency in each year the qualitative method used in this paper, now the important thing appear how this will be done? The systematic way for this comes in the next sub-sections.

A. *Implementation of the Methodology*

Here some steps were followed in this study as follows: Firstly in this study papers related for decision making factors were selected randomly from the available resources, after that specify the search (advance search) from the year 1990 until

This work is *sponsored by* University Utara Malaysia

2010, since technology change faster, the periods were divided to seven periods and every period three years as follows:

First period will be as [1990, 1991, 1992], for the second period will be as [1993, 1994, 1995], for the third period will be as [1996, 1997, 1998], for the fourth period will be as [1999, 2000, 2001], for the fifth period will be as [2002, 2003, 2004], for the sixth period will be as [2005, 2006, 2007], and for the last period will be [2008, 2009, 2010].

Secondly from the related work in section 1.1 the nine factors stated, after that tables prepared and from counting the times for the frequency for each factor, the randomly chosen samples were thirty for each period, data was resulted for each period and the range was from zero to thirty for each factors in every period.

TABLE I. YEARS FOR THE PERIOD : [, ,]

#	Title	Author	Time	Cost	Benefits	Financial l impact	Risk	Resource	Intangible	Ethic	Feasibility
1	...										
2	...										
	:	:	:	:	:	:	:	:	:	:	:
Total											

Thirdly after tabulating data we go for representation the data in an understandable, easy effective way, here we use Microsoft excel to represent data by columns, lines, and sectors here are the results: The data for nine factors and the seven periods were inserted.

In brief all the work in section two was to get the data which is the basic thing needed from the resources for the decision makers to process to support their decisions, after that the analysis by any simple tool can analyze the data which is followed in the next section.

IV. ANALYSIS

Through the descriptive analysis a lot of figures were resulted since the work has seven periods with nine factors; so simple calculation it will be 63 figures if we want to browse at least in two different chart types it will be 126 figures in taking each variable alone, for the beneficial better to compare the factors together to judge which is the more important for this from the initial work some relevant figures will be browse here for the purpose of this work, the comment about the figures will in the next section.

V. RESULTS AND DISCUSSION

As mentioned previously we will browse and comment on the important figures; for that will put it in the following sub-sections:

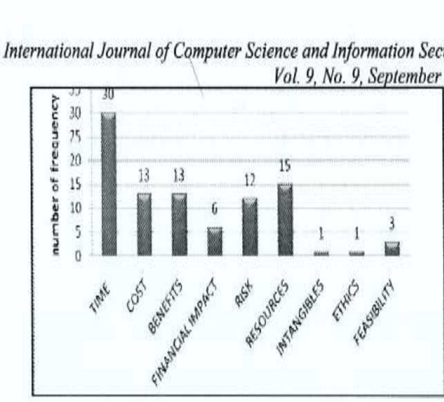

Figure 1.The nine decision making factors in the first period 1990-1992.

Based on Figure 1 the factors for decision making take vary. The number of frequency for time is highest than other factors followed by resources, until lowest number of frequency such as ethics and intangibles. Therefore the first five factors with higher number of frequencies can be considered as: time, cost, benefits, risk, and resources.

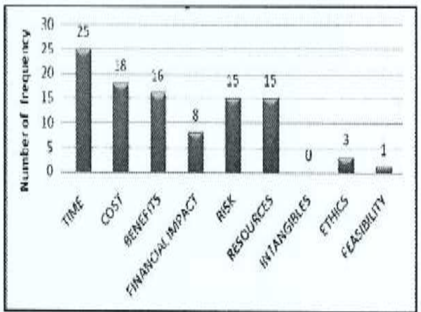

Figure 2. The nine decisions making factors for the year from 1993-1995.

From Figure 2 to rank descending the factors of decision making related to their frequencies it will be as: time, cost, benefits, while risk and resources equal in the fifth position, then the rest of factors.

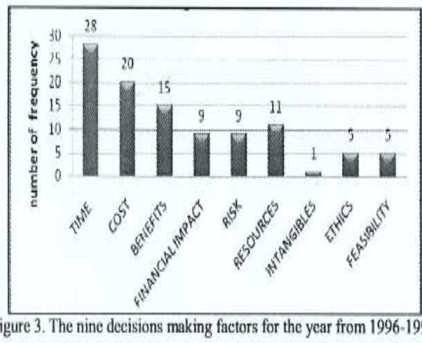

Figure 3. The nine decisions making factors for the year from 1996-1998.

Here in Figure 3 the factors representation obvious as the previous results taking steps shape from time followed by cost then benefits, then the rest of the attributes.

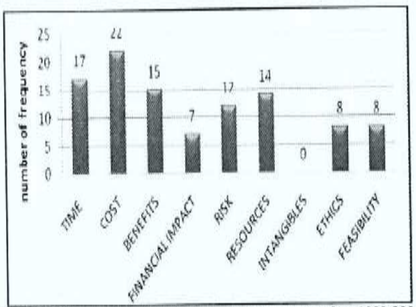

Figure 4: The nine decision making factors for the year from1999-2001.

Based to Figure 4 the time became as second factors while the cost is the first one, in common the same style the first five frequencies still to the following factors: cost, time, benefits, resources, and risk.

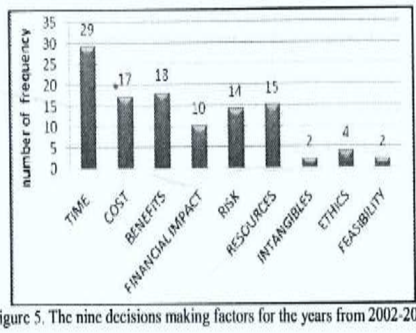

Figure 5. The nine decisions making factors for the years from 2002-2004.

Another support to the near conclusion here by Figure 5 the rank descending for the factors comes out as: time, benefits, cost, resources, risk, financial impact, ethics, feasibility, and intangibles. Also it can be noticed here the same five factors appear again; which is the same results from the following Figure 6 for the period with years from 2005-2007.

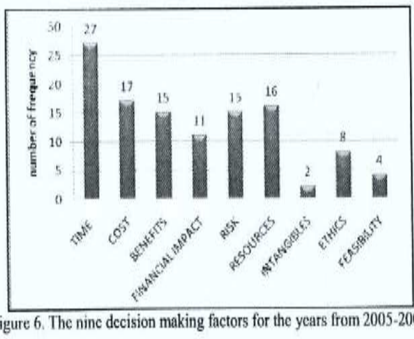

Figure 6. The nine decision making factors for the years from 2005-2007.

For the last period 30 papers will be selected from the available resources for the decision making factors survey.

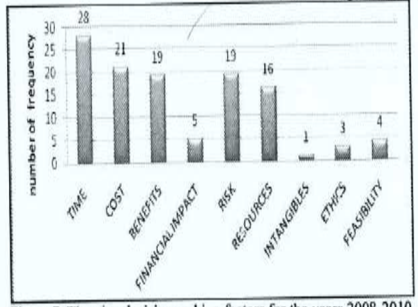

Figure 7. The nine decision making factors for the years 2008-2010.

Descriptive analysis for papers for the years [2008,2009, 2010], in addition to what mentioned previously the same result appeared again one look to the previous figures will conclude the same five factors appear again and this will be a powerful guide to the conclusion in this research paper.

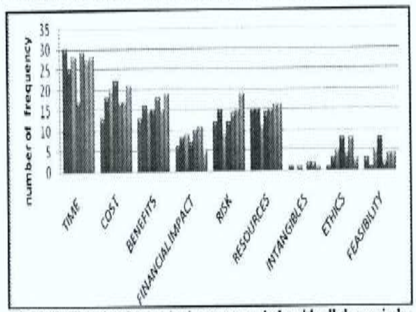

Figure 8: The nine factors in the seven periods with all the periods.

Based on Figure 8 which is considered a comprehensive figure, for each factor seven columns which represent the seven periods for the years from 1990 until 2010, which indicates also to another support for the previous result the descending rank for the factors still grouping the previous five factors as the more interested and wanted to the decision makers from the other factors. Another representation may be preferred to give it in bars some like to see things while comparing in (many views) horizontal view followed here in Figure 9.

More easily view in the following figure to the previous Figure 9 and as a good result the representation in averages for the nine factors for the seven periods as follows in Figure 10.

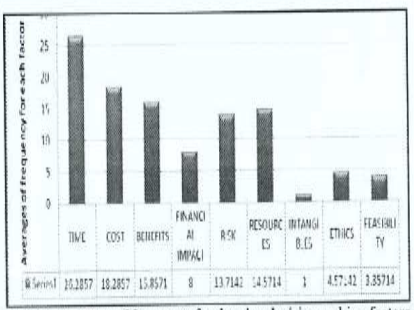

Figure 10. The average of frequency for the nine decision making factors from 1990-2010.

From the figures presented previously and discussion the factors of decision making can be categorized into two groups: the major group one which consists of five factors: cost, time, risk, resources, and benefits, while the second group consists of four factors: financial impact, feasibility, intangibles, and ethics.

For anyone who will wonder from these five factors which is the more frequently and more redundant with all the years from 1990 until 2010. To give the answer for this wondering we need restart the previous work with partial data from the previous data for the five factors in group one.

However, as mentioned before, no meaning from analyzing the time alone or any other factors, for that the comparison will be between the five factors all in every period from the seven previously mentioned periods then lastly all together.

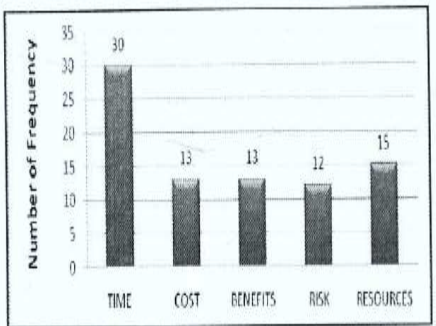

Figure 11. The five decision making factors from 1990-1992.

Based to Figure 11 it represents the first period (1990-1992) clearly time with the most frequency from all the five presented factors, then comes resources, follows by two attributes in the same level: cost and benefits, and at last one is the risk factors.

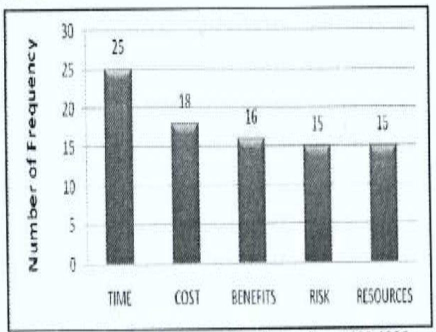

Figure 12. The five decision making factors from 1993-1995.

Here in the second period (1993-1995) based to figure 12, it is easy to notice them as they look like steps, time is the highest, fellows by cost, then benefits, and lastly risk same level as resources.

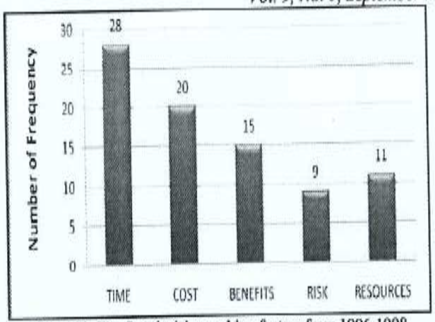

Figure 13. The five decision making factors from 1996-1998.

In the third period (1996-1998) based to Figure 13 time is the highest frequency, the second factors cost, then the third the benefits factors, the resources here is the fourth, and the lowest factor is the risk.

In the following figure has change from the previous style. A fast look for Figure 14 you will see time didn't come in the first stage, so the cost factors come with the highest frequency, but followed by time in the next stage, then the benefits factor after that the resources, and at the end came the risk, see Figure 14.

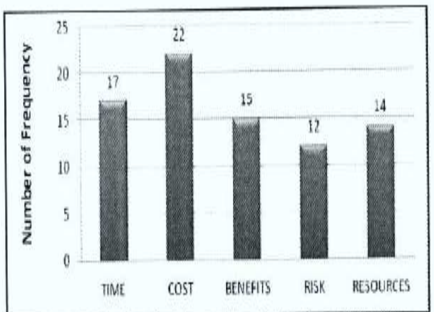

Figure 14. The five decision making factors from 1999-2001.

To reach to meaningful result from the coming figure the focus will be for time to verify is it still the highest, whereas for risk is it still the last one, see Figure 15 the following one, and for the other three factors they varies in different ways.

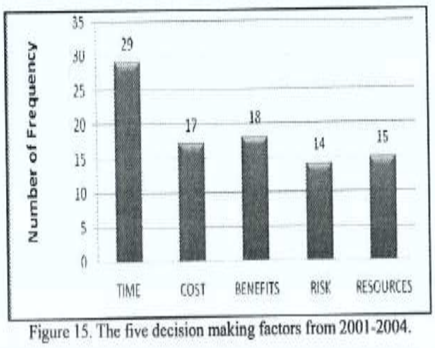

Figure 15. The five decision making factors from 2001-2004.

For the sixth period with the years (2005-2007) the time factor return back to be the highest of all the fifth factors, and the other four factors in different high representation for their frequencies, in the last period the important to track the time factors behavior and ignore the other factors to avoid misleading the issue to come with beneficial result. See the following Figure 16

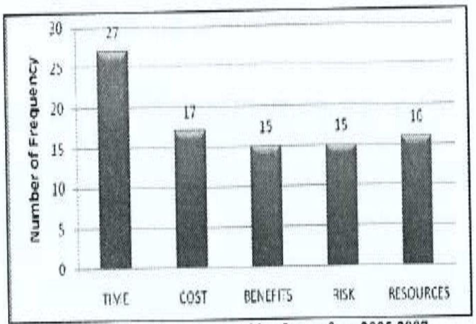

Figure 16. The five decision making factors from 2005-2007.

For the last period for the years 2008-2010, it is obvious the time is the highest column which represents the frequency from the based to the following figure, see Figure 17

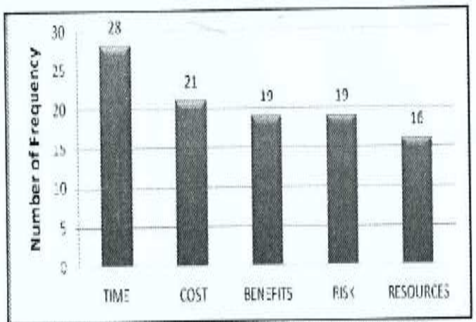

Figure 17. The five decision making factors from 2005-2007.

It is good before coming out with conclusion to have another support, for which is the highest factors or the more relevant one from the five resulted attributes from the initial nine factors , for that the following will be representation to the five factors together in all the seven periods. For this see the following Figure 18

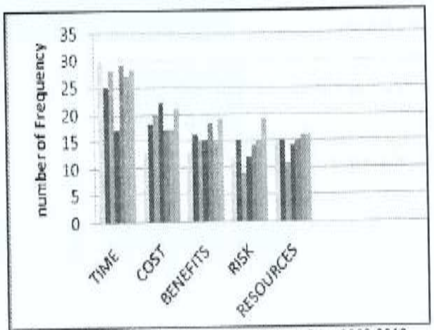

Figure 18. The five decision making factors from 2008-2010.

Based to Figure 18 in looking to the seven columns time obviously is the highest factor. In sum, from all the mentioned and presented here the time is the more important factors, but before we go to the final conclusion it is more better and powerful to present this in a small model since one look equal thousand (a lot of words) this followed in the next section.

For the seven periods from 1990-2010 time and cost factors appeared to be more significant of the DMP, there is a say "*Time is Gold*". Whereas, for looking for all the DM factors: Time, cost, benefits, risk and resources, were the more important than other factors, which give the decision makers a good idea about inserting and not ignoring those relevant factors in DMP. This will not mean forgetting the other factors, if the decision makers can look for all nine factors it will be better, but if they want to process their decision with the relevant ones only, they can choose what mentioned before and presented in the figures 11,12,13,14,15,16,17 and 18.

VI. PROPOSED MODEL FOR THE DECISION MAKING FACTORS

From all the previous sections a proposed model can be presented for the nine attributes, while this needs other researches to insure it. The model will be in two groups for the factors as independent variables relating to the process of decision making, which is another issue that will help the decision makers in different levels to support them to come with better decisions.

Note: the important group for the five decision making factors linked with normal row, while the second group linked in discrete row in the following Figure 19.

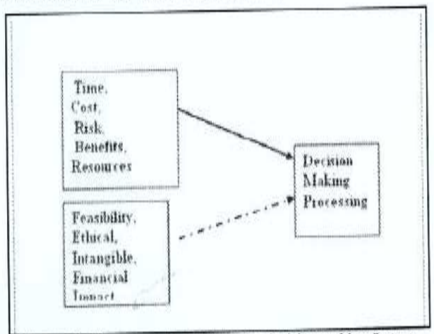

Figure 19. The proposed model for the decision making factors.

VII. CONCLUSION AND FUTURE RESEARCH

Basically researchers help decision makers in decision support systems (DSSs) and had noticed that the decision making processing is the gap in making bad decisions in organizations, for that they presented different ways in processing decisions and referring it to the use of systematic way. Before the processing, this research focus the light on the decision making factors in order to come out with better decisions for multi-decision makers (different level of management and normal users).

Firstly from this qualitative study the factors of decision making are very important in decision making processing, and valuable to the decision makers.

Secondly the factors of decision making can be categorized into two groups: the major (important) group which consists of five factors: cost, time, risk, resources, and benefits, whereby the second group consists of four factors: financial impact, feasibility, intangibles, and ethics.

However the most important factors in is the time, but to rank these factors is not easy here and need other researches which can lead us to end this work with the future researches.

Decision making factors still need more research to be conducted, a comprehensive model verifying all the factors as it help in decision making processing and produce more powerful results, beside using the technology systems as the computer-based information systems (CBIS) in decision making in organizations which will help all humanity to adapt the solution to another areas.

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