UNIVERSITY OF SOUTHAMPTON

FACULTY OF BUSINESS AND LAW

SCHOOL OF MANAGEMENT

The effect of some contingent variables on Universities' Accounting Systems and Performance Management

by

Abbas Alimoradi Sharifabadi

Thesis for the degree of Doctor of Philosophy

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In the Name of Allah

To my dear wife Fatemeh and my sweetheart sons,
Hossein and Hassan

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

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Many external factors have affected Governmental Universities of Iran in the past six years. Decentralization in terms of delegation of authority, budget constraint and competitive position for better quality and higher performance in teaching and research are the main factors. According to Contingency Theory in accounting, there is no identical management accounting system or control system to fulfil the needs of all organizations in every situation (Chenhall, 2003, Otley, 1980).This study investigates the effects of the aforementioned variables on the accounting systems and performance management of Iran's state Higher Education Institutions. Based on the Contingency Theory literature a theoretical model has been developed and empirically tested. Data were collected from the Governmental Universities in Iran during the latter part of 2009 through a postal questionnaire. All 126 Governmental Universities in Iran were sent the questionnaire and responses were obtained from Financial, Education, and Research Departments in each university. Fully completed questionnaires were collected from 246 Departments (65.1 per cent response rate) and Structural Equation Modelling (SEM) was used as the main data analysing technique to provide an understanding of the proposed model used in Iranian universities for Accounting Systems and Performance Management Systems. The results confirm most of the related propositions of Contingency Theory, however the priority of budgeting practices, particularly participative budgeting, over other accounting aspects is supported. In addition, importance of employing comprehensive performance measures as well as use of accounting information in PM was revealed, although amendment and improvement in their reward system is not at expected level.

List of Contents

List of Tables

List of Figures

DECLARATION OF AUTHORSHIP

I ABBAS ALIMORADI SHARIFABADI declare that the thesis entitled "The Effect of some Contingent Variables on Universities' Accounting System and Performance Management" and the work presented in the thesis are both my own, and have been done by me as the result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such questions, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this has been published before submission.

Signed: ……

Date: ……

Presentations and publications

- Sixth International Conference of Accounting and Management Information System (AMIS), Bucharest Academy of Economic Studies, Romania, June 2011.

- Management Accounting Research Group Conference, Aston Business School, Birmingham, UK, November 2010.

- School Accounting Seminar, University of Southampton, Southampton, UK, June 2010.

- Sixth Annual LASS Conference, University of Southampton, Southampton, UK, April 2010 (poster presentation).

- ICAS Research Development Event, the Institute of Chartered Accountants of Scotland, Edinburgh, UK, March 2010.

- Fifth Annual LASS Conference, University of Southampton, Southampton, UK, July 2009.

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Abbreviations

ACS	Accounting Control System
AD	Anno Domini (After Christ)
AGFI	Adjusted Goodness of Fit Index
AIC	Akaike Information Criterion
AIS	Accounting Information System
Amos	Analysis of Moment Structure (an SEM software)
AMT	Advanced Manufacturing Technology
ANCOV	Analysis of Covariance
ANOVA	Analysis of Variances
BC	Before Christ
BSC	Balanced Scorecard
BUDEMP	Budget Emphasis (a latent variable of the study)
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMIN	Chi-square Minimum
COMADV	Competitive Advantage (a latent variable of the study)
COMPER	Comprehensive Performance Measures (a latent variable of the study)
COMPOS	Competitive Position (a latent variable of the study)
CR	Critical Ratio
DF	Degree of Freedom
DECENT	Decentralization (a latent variable of the study)
DEPPER	Departmental Performance (a latent variable of the study)
EFA	Exploratory Factor Analysis
EQS	Equations (a software for SEM)
FINPRE	Financial Pressure
FREWSYS	Faculty Members' Reward System (a latent variable of the study)
GDP	Gross Domestic Product
GFI	Goodness of Fit Index
GLS	General Least Square
HE	Higher Education
HEFCE	Higher Education Funding Council of England

IFI	Incremental Fit Index
IMPACC	Improved Accounting System (a latent variable of the study)
JIT	Just In Time
KMO	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
LISREL	Linear Structural Relationships (a software for SEM)
MACS	Management Accounting and Control System
MANOVA	Multivariate Analysis of Variance
MAR	Missing At Random
MCAR	Missing Completely At Random
MAS	Management Accounting System
MCS	Management Control System
MHME	Ministry of Health and Medical Education
ML	Maximum Likelihood
MSQ	Minnesota Satisfaction Questionnaire
MSRT	Ministry of Science, Research, and Technology
NFI	Normed Fit Index
NIE	New Institutional Economics
NIOC	National Iranian Oil Company
NPM	New Public Management
OECD	Organization of Economic Co-operation and Development
PARBUD	Participative Budgeting (a latent variable of the study)
PB	Participative Budgeting
PGFI	Parsimony Goodness of Fit Index
PLS	Partial Least Square
PM	Performance Management
PRATIO	Parsimony Ratio
RAPM	Reliance on Accounting Performance Measures
RAMONA	Retailer Action Model or Near Approximation (a software for SEM)
REWSYS	Improved Reward System (a latent variable of the study)
RFI	Relative Fit Index
ROA	Return On Assets
RMR	Root Mean Square Residual
RMSEA	Root Mean Square Error of Approximation
SATBUD	Satisfaction with Budgets (a latent variable of the study)
SE	Standard Error

SEM	Structural Equation Modelling
SEPATH	Structural Equation Modelling and Path Analysis (a software for SEM)
SMA	Special Memorandum Account
SMC	Squared Multiple Correlations
SPSS	Statistical Package for the Social Sciences
SREWSYS	Other Staff's Reward System (a latent variable of the study)
TCE	Transaction Cost Economic Theory
TQM	Total Quality Management
UK	United Kingdom
US	United States of America
USACPM	Use of Accounting Information in PM (a latent variable of the study)
USSR	Union of Soviet Socialist Republics

Chapter One
Introduction

1-1. Preamble

It is believed that the most important base for performing management tasks is knowledge and information that will help managers to carry out all aspects of their jobs including planning, organizing, decision-making and controlling. Accounting systems are assumed to be one of the main information providers for managers in organizations, particularly in the areas of decision-making and control as well as the key part of the control system (Chenhall, 2003). Although the role of accounting information and systems in private companies may be perceived as more important (Bromwich, 1990), that role cannot be ignored in public organizations either. During the past two decades, under the titles of New Public Management and Good Governance (Hood, 1995, Aguilera and Cuervo-Cazurra, 2004), the principles and procedures of management and accounting used in private companies have been recommended for use in the public sector. It seems needless to prove that there are still many lags and gaps between developed and developing countries regarding the implementation and use of many techniques and initiatives, including management and accounting practices. Although accounting research in less developed countries has been growing in recent years the direction has been mostly towards finance and, to some extent, auditing, but less towards management accounting (Hopper et al., 2008).

This study attempts to look at possible improvements in different aspects of accounting systems and performance management of one of the main areas of the public sector in a developing country. Performance management in all areas of the public sector including Higher Education has been absorbing too much attention in recent years. The primary question raised by most of those studies is whether performance management practices are appropriate for public organisations and whether they are able to enhance their performance or not (Verbeeten, 2008). According to the literature on performance management, clear objectives and measurable outcomes should be defined to prevent organisations wasting their efforts and energy (Kaplan, 2001); however, the measurement of performance in public

organisations is problematic even if their goals are well-defined (Johnes, 1992). It is also very important for any organisation to have an accounting system which is harmonious with the control needs of new situations (Chenhall, 2003). Therefore, this study endeavours to assess the impact of three external factors - including decentralization, financial pressure and competitive position - on Accounting Systems and Performance Management of Governmental Universities in Iran, and consequently on their performances.

1-2. Motivations for Undertaking this Study

Several incentives have encouraged the researcher to undertake this research. For someone who has been working for more than 12 years in an academic area simultaneously as a lecturer in Accounting and in a number of executive positions such as Accountant, Financial Manager and Deputy Chancellor in Administration and Finance, a certain curiosity about why Iranian universities' performances are not at a plausible level compared to other universities in developed countries could be considered reasonable. It may lead the inquiring mind to think about the roots of this problem and find some answers or solutions to it.

Moreover, to improve the universities' performance and quality, within the Fourth Five-year Development Plan Act which was approved by Iran's Parliament in 2004, some basic reforms were introduced regarding the governmental universities, mostly to give them more autonomy and freedom from restrictive governmental regulations. In addition, Iran's universities have been facing several new situations, some pleasant and some cumbersome, such as having more authority to make their own decisions, more demand for better quality and greater capacity for new entrants, initial phase of competition with non-governmental universities and universities in regional countries, and financial pressure on their budgets (Mehralizadeh, 2005, Gharun, 2007). It seems reasonable to suppose that those who are closely involved in Iran's universities, as well as the researcher, might be curious to know what has happened to the universities' performance since this reform and to what extent the dreams of policy-makers and government have come true.

Finally, for the researcher as an accountant, in theory and practice, it is very interesting to assess the effect of the above-mentioned factors on the universities' accounting system, especially after seeing the emergence of certain changes in accounting practices such as no longer having an agent from the Central Treasury to directly supervise the universities' fiscal transactions on a daily basis as well as switching from a cash basis to an accrual basis in some big universities. Further explanation of the new situations which Iranian governmental universities are now confronting can be found in the next chapter.

1-3. Research Objectives

The main objective of this study is to explore the effects of a number of relevant contingent factors on the accounting system and performance management as well as the performance of Iran's Higher Education Institutions. This key objective could be broken down into the following targets which are important from different points of view; so the intention is to:

1- Investigate the consequences of recent reform in Iran's Higher Education system, resulting from the Fourth Five-year Development Plan Act (2004), on the accounting system, performance management, and performance of the universities.

2- Assess the reality and extent of perceived contingent variables which Iran's governmental universities are believed to have been confronting since 2004.

3- Model and empirically test the new situations of universities in the light of contingency theory in accounting to discover to what extent the accepted (relatively) findings and results of contingency-based studies are compatible with those situations.

4- Discover more compatible and important features of accounting systems and performance management for Iran's universities in their new current positions to better meet the managers' needs for information and control in improving their performance.

5- Find and propose a credible path of links between three aspects of an accounting system (improvement in the system, participative budgeting, and budget emphasis) and performance of the universities by using a vigorous statistical technique, namely Structural Equation Modelling (SEM).

6- Find and propose a credible path of links between two dimensions of performance management (performance measures and reward systems) and performance as well as interactions between accounting information and performance management of the universities with the aid of SEM.
7- Highlight some possible discrepancies between different types of Departments including Education, Research and Financial Departments regarding the above-mentioned models of Accounting System and Performance Management.

1-4. Research Questions

To achieve the aforementioned objectives, several questions need to be answered, so this study attempts to discover some plausible answers to them. These questions, which will shape the research hypotheses later on in the Methodology Chapter, are as follows:

1- To what extent does Contingency Theory shape the design and development of Accounting Systems in Iranian Governmental universities?
2- To what extent can Contingency Theory explain the design and development of Performance Management in Iranian Governmental universities?
3- What are the consequences of change and improvement in the universities' Accounting Systems and Performance Management for their performances?
4- To what extent can Contingency Theory predict the different reactions of various types of departments in the universities regarding the changes in their Accounting Systems and Performance Management?

1-5. Research Methodology

This study will employ a quantitative research methodology. The suitable philosophy and paradigm for this study is positivism and functionalism and, as was mentioned earlier, Contingency Theory was adopted as the underlying theory for it. Choosing cross-sectional surveys as a research strategy, data are collected from all of the Governmental Universities in Iran through a postal questionnaire. Three main divisions of activity, namely Research Department, Education Department, and Financial Department of all 126 Governmental Universities in Iran, comprise the

participants of this research. Therefore, the population of this study is 378 departments of Iranian State Universities.

To analyse the data, the Structural Equation Modelling (SEM) technique is employed as the main tool, and it will be run by a computer programme called Amos, version 17. SEM is a systematic approach that is employed to test models' fit by using factor analysis and linear regression simultaneously (Williams et al., 2009). This technique takes the measures directly from the questionnaire as indicators or observed variables to estimate the relevant concepts or latent variables (Hoyle, 1995). By using this technique, a combination of moderating and intervening models can also be tested. Chapters 4 and 5 present the research methodology and data-analysing procedures in more detail.

1-6. Perceived Benefits of the Study

Several theoretical, methodological and practical contributions are perceived to have been achieved by conducting this research as this is the first study to use Contingency Theory with SEM to understand the changes in accounting system and performance management of the governmental universities in Iran. Moreover, it extends and replicates some of the propositions of contingency theory in the context of the public sector of a developing country. Concisely, the significant aspects of this study can be outlined as below:

1- Adds insights and understanding to the general knowledge of Accounting Contingency Theory.

2- Provides an understanding of the relationships between Accounting System, Performance Management, and performance of Governmental Universities in Iran.

3- Conducts a nationwide survey-based investigation into performance management - most of the previous studies in this area have been qualitative and interview-based (Verbeeten, 2008).

4- Adds to the use of Structural Equation Modelling as a more vigorous and sophisticated statistical technique (Kline, 2005) in accounting and performance management studies.

5- Proposes and tests the effects of "financial pressure" as a new contingent variable in the contingency literature.

6- Contributes to the knowledge of performance management regarding Higher Education, especially in developing countries.

7- Investigates the results and consequences of recent reforms in Iran's Higher Education system on their Accounting Systems and Performance Management, and provides some insights and feedback for the responsible authorities, university managers, and practitioners in that area.

1-7. Structure of the Thesis

The remainder of this thesis includes seven other chapters, namely Chapters Two to Eight. Context and Background of the Study, Literature Review, Methodology and Hypotheses, Bases and Behaviours of SEM, Descriptive Data Analysis, SEM Data Analysis and Hypotheses Testing, and Discussion and Conclusion are the titles of these chapters. A brief explanation is provided here regarding the content of each chapter.

1-7-1. Context and Background of the Study

Chapter Two presents a wide and general overview regarding the background and context of the study, ranging from brief traits of the whole country to Higher Education and Universities, narrowing down to the particular situations which Iranian governmental universities are facing at the present time. Some points and figures are provided regarding geography and climate, history, structure of government and politics, religion and culture, and economy as general features of the context of the study. The history and classification of Higher Education and universities in Iran, Higher Education in the ancient era and modern period until today, governmental and non-governmental universities, and the mechanism of students' entrance to the universities are all explained. Finally, some contingent variables such as "recent reform in Higher Education for decentralization and autonomy", "changes in accounting rules and practices", "expectation for enhancement in capacity and quality", "competitive positions" and "budget constraints" that are assumed to have been influential for Iran's governmental universities since 2004 are explored.

1-7-2. Literature Review

Chapter Three reviews previous studies which are perceived to be related to the different aspects of the present study in three main sections. In the first section, contingency-based studies are explored to cover different proposed contingent variables, relationships between contingent variables, accounting and control systems, and performance, as well as negative consequences of accounting and control systems. This is followed by a review of the contingency-oriented research in the public sector covering use of contingency postulates of private companies in public organizations and special contingency theory for Governmental Accounting.

The second section of Chapter Three is about studies in the area of performance management ranging from private organizations to public organizations and narrowing down to studies on performance management in Higher Education. Traditional and new approaches to performance management, the Balanced Scorecards notion, different bases for performance measurement, implementation of performance management, results of performance management, role of accounting and strategy, and performance indicators are the most important topics to be discussed in this section. The final section of Chapter Three reviews several papers on the related issues of Iran's Higher Education system. Finally, in the conclusions section of the chapter several gaps in the literature are highlighted and these become the focus of this thesis.

1-7-3. Methodology and Hypotheses

In Chapter Four the research philosophy, underlying theory, research approach and strategy are introduced. Then, the theoretical model and related evidence from the literature are presented to support 15 suggested hypotheses of this study. These hypotheses are actually the expanded forms of the research questions and shape two separate models regarding the Accounting System and Performance Management. Data collection method, population of the study, questionnaire design and explanations regarding the variable measurement, as well as a brief introduction to the data-analysing technique, shape the other sections of the fourth Chapter.

1-7-4. Bases and Behaviours of SEM

Chapter Five includes three main sections. In the first section, commonly-used statistical techniques in contingency-based studies are explored and different approaches regarding the fit concept in those kinds of studies are introduced. Section two of that chapter concisely explains those commonly-used multivariate data-analysing techniques including correlation, regression, analysis of variance (ANOVA), and cluster analysis as well as factor analysis. In the final section of that chapter, which is the major part of it, different principles and concepts of Structural Equation Modelling (SEM) such as model specification and identification, characteristics of the data needed for SEM, concepts and criteria of model fit, estimations in SEM, and some available computer programmes to run SEM are explored. In the final part of that section, priorities of SEM over other techniques and the reasons for choosing SEM for this study are presented.

1-7-5. Descriptive Data Analysis

Chapter Six reports the results of descriptive data analysis with the aid of the SPSS programme. Some general information about responses and respondents, descriptive presentation and statistics regarding the main variables of the study, producing a correlation matrix and conducting exploratory factor analysis are the key parts of that chapter. It is stated that the final usable response rate is 65.1 per cent; some statistics relating to distribution of responses among universities in the capital, big cities, and small cities as well as several findings based on open-ended questions are also provided. In the descriptive statistics section, categorizing 66 indicators as bases for measuring 12 latent variables, several statistics such as minimum, maximum, mean, standard deviation, Skewness, and Kurtosis for all indicators are computed, and their frequency tables can be found in **Appendix D**. Cronbach's Alpha, as the index of internal consistency between indicators, in addition to the above-mentioned statistics, is reported for 12 measured variables. A correlation matrix regarding all 12 main factors is presented and explained concisely, and then outcomes and explanations regarding the Exploratory Factor Analysis (EFA) are stated.

1-7-6. SEM Data Analysis and Hypothesis Testing

Approaches to designing SEM models, results of measurement model-building, outcomes of structural model-building and testing of hypotheses form the four major

sections of Chapter Seven. The first section briefly explains three ways of building an SEM model, namely one-step, two-step, or four-step modelling. The other section reports the results of Confirmatory Factor Analysis (CFA) and several specifications and re-specifications to construct 12 measurement models as the prerequisite of structural models according to the approach of two-step modelling. In section three of that chapter, indices of fit and estimations regarding the two main SEM models (Accounting System Model and Performance Management Model) as well as sub-models of different types of Departments are presented. The final section reports on the testing of the 15 proposed hypotheses of this study and summarises the results of those tests in three tables.

1-7-7. Discussion and Conclusion

The final chapter of this thesis provides a brief summary of the whole study, following by discussions around the findings of the research. As some of the results are not consistent with the propositions of contingency theory, there is an attempt to explain and justify the contradictions and inconsistencies. Then, key contributions and implications of this research including methodological, theoretical and practical contributions are mentioned. Finally, several limitations of this study that might have affected the results are highlighted and some new avenues for future studies in this subject are addressed.

1-8. Summary and Conclusion

This, in fact, is a brief introduction to all the material in this thesis and it gives a short overview of the different steps of this study. Motivations for undertaking this research, research objectives, and main research questions shape the first three parts of this chapter. A concise introduction to the research methodology and hypothesis development can be found in the next section. It is followed by an outline of the perceived contributions which this study may have made to the existing body of knowledge and, to some extent, the gaps in related areas that may be filled by the results of this study. The final section of this chapter summarizes the organization and structure of this thesis to give a taster of what is reported and discussed herein.

Iranian governmental universities have been confronting new situations for seven years since the initiation of reform in Iran's Higher Education system, imposing a

kind of competition to increase quality and capacity in research and education, as well as a certain amount of budget constraints. On the other hand, new concepts of performance management such as Balanced Scorecards (BSC) and New Public Management (NPM) have been widely considered to have improved the management and accounting practices of public organizations in Western countries. This study was undertaken to investigate the interaction of those new situations in Iran's universities with the aforementioned new concepts by employing the guidelines and propositions of Contingency Theory in Accounting.

In summary, the results of this study confirm the main propositions of Contingency Theory and generally support the importance of the core idea of BSC to be applied in public organizations of developing countries. However, it seems that there are still some gaps and lags in the implementation of NPM in developing countries; for example, the use of new techniques of management accounting and accrual accounting basis are not prevalent in those organizations. Besides, natural differences between public and private sectors cannot be ignored, especially in those public organizations where professionals are the predominant role players, such as Higher Education. Therefore, this study shows that the role of the accounting system in creating competitive advantages is not very important, and budgeting practices, especially participative budgeting, are perceived as more beneficial for these kinds of organizations.

Chapter Two
Context and Background of the Study

2-1. Introduction

It seems vital for any study that its context be specified and introduced to the readers. As the context of this research is the set of governmental universities in Iran, this chapter attempts to describe the location and different aspects of situations and conditions of that environment. Every component and point of a study's background might be considered important in the different stages of the study, from research design to data collection and even findings and results. Therefore, this chapter provides a comprehensive, clear and concise description of the Islamic Republic of Iran to provide a general perspective of the research, followed by further explanation regarding higher education and universities in Iran as a particular research context for the purpose of this study.

2-2. General Characteristics

In this section, brief information is given regarding the geographic, political, historical, economic, cultural and religious traits of the research context, Iran.

2-2-1. Geography and Climate

Iran is a relatively large country, the eighteenth largest country in the world, covering about 1,648,000 sq. km., approximately 636,300 sq. miles (Haftlang et al., 2003). Iran, geographically, is a very diverse country which consists of forests and deserts in the central and southern territories, and plains on the Caspian Sea coasts to the north and Persian Gulf coasts to the south. Iran's weather also varies from area to area in terms of temperature in summer and winter on the one hand and precipitation rate and snowfall on the other. The forest and mountain areas' annual rainfall is more than 1700 mm whilst, in some arid districts, it is less than 150 mm per year. The temperature fluctuates between less than - 20 °C during winter nights in some regions to more than + 50 °C on summer days in other territories (Haftlang et al., 2003). Iran is divided into 30 provinces and has more than 1000 cities. Some of the major cities in

Iran are Tehran, Mashhad, Isfahan, Tabriz, Shiraz, Ahvaz, Qom, Kermanshah, Yazd, Kerman, Karaj, Hamadan, Ardebil, and Rasht. Iran's total population is about 70 million.

2-2-2. History

The presence of human life on the Iranian plateau goes back to 3200 BC. Cyrus the Great founded the first and biggest Persian Empire, namely the Achaemenid Empire in 559 BC; they held power for about two and a half centuries, until 330 BC. The Achaemenid rulers, who followed the Zoroastrian religion, based their government and policies on human rights, equality and freedom. They also banned slavery (Daniel, 2001). The Achaemenid Empire was defeated and dissolved by Alexander the Great, the ruler of the Greek Empire, in 330 BC and Iran was dominated by Greeks for just under a century. The Arsacid Dynasty, who defeated and expelled the Greeks in 238 BC, founded the second united Iranian Empire, called the Parthian Empire, which lasted for about five centuries.

The Sassanid Empire was the last Persian Empire before Islam and ruled in Iran for more than four centuries. Their manner and policies were similar to those of the Achaemenids and, during their reign, the official religion of Iran was Zoroastrianism (Fisher et al., 1968). Science and the arts developed rapidly in the Sassanid era, and teaching organizations such as the Nisibis School and the Academy of Jondi Shabour were very popular as academic and science centers in ancient Iran. In 644 AD Iran was once again totally occupied by a foreign enemy, the Arab Muslims. Gradually Islam became the dominant religion in Iran and the influence of Islam on Iranians caused profound changes to their lifestyle, culture and behavior.

In 1218 AD, the country was for the third time invaded by a cruel foreign enemy, Genghis Khan. This invasion resulted in murder, famine and extermination, as the population of Iran fell to less than half of what it had been in the days before the war. After about 3 centuries, in 1501, the Safavid Dynasty was founded by Shah Ismail and soon managed to impose its power on all the cities of Iran, bringing together all the local governments. Modernizing the military, developing science, especially architecture, improving relationships with European countries such as Britain, and introducing and supporting Shi'a Islam as the official religion of Iran were the most

important changes made by that dynasty. The Afsharid, Zand, Qajar and Pahlavi were the other four dynasties that ruled Iran from 1722 to 1979 (Daniel, 2001).

In 1979, the Pahlavi Dynasty, which was the last dynasty of kings who had ruled Iran for about 2500 years, was overthrown by the masses in a national and religious revolution led by Imam Khomeini. From that year onwards, Iran has had an Islamic republic system which is briefly explained in the next section.

2-2-3. Government and Politics

The political system of the Islamic Republic of Iran is based on the Constitution. The figure 2-1 shows the important parts of this system and the procedure for elections and selections.

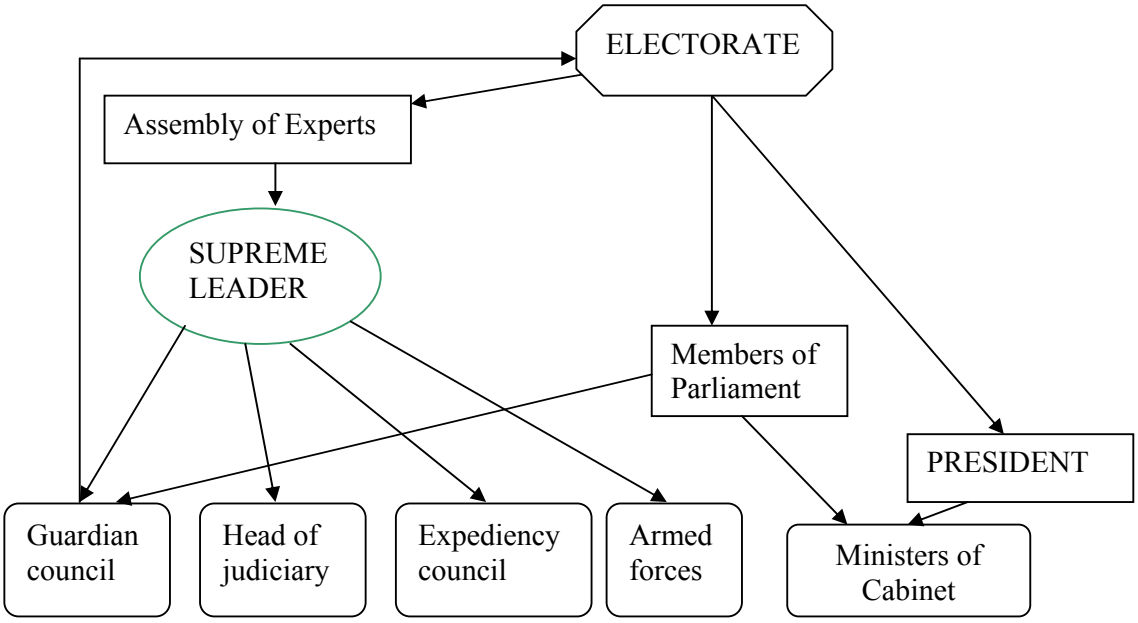


Figure 2-1) Iran's political system

The Assembly of Experts, Members of Parliament and President are elected by the people in general elections. The regulations legislated by the parliament are only valid when they are confirmed by the Guardian Council. This Council has twelve members who are appointed by the Supreme Leader (six religious experts) and Parliament (six lawyers). The Expediency Council, whose members are appointed by the Supreme Leader, judges between Parliament and Guardian Council when they have different

opinions about a newly proposed piece of legislation. Its verdict on any disagreements between Parliament and Guardian Council will be the final judgement. Perhaps the most important point to be mentioned here is governed politically quite centralized.

2-2-4. Religion and Culture

About 90 per cent of Iranians follow the Twelver Shia branch of Islam, while about 8 per cent are Sunni Muslims. The remaining 2 per cent belong to other non-Islamic religions such as Zoroastrianism, Christianity, Judaism, and Hinduism. Iran's culture is a combination of Persian and Islamic norms, customs, beliefs and traditions. Nowruz, or the first day of the New Year in the Persian calendar which is coincident with 21st March, has been celebrated for at least 2500 years. Commemoration of the martyrdom of Imam Hussein, the third Shia Imam, is the other national and religious ritual which takes place from 1st to 10th of Moharram, the first month in the Arabic calendar, each year.

The main and official language in Iran is Persian or Farsi, but there are many local languages and dialects around the country. In addition to Farsi, Azari or Turkish, Kurdish, Lori, Baloochi, and Gilaki are some of the widely used languages and dialects in Iran. Literature and poetry have long been considered an important area of Iranian culture. There have been many famous poets in Iran such as Hafez, Sadie and Firdausi, some of whose poems have been translated into other languages. The poem below by Sadie has been inscribed over the main entrance to the United Nations building:

Of one essence is the human race Thus has the creation put the base
One limb impacted is sufficient For the others to feel the mace

2-2-5. Economy

Based on Iran's constitution, the economy of Iran consists of three sectors, namely governmental (public), private and cooperative sectors; however, the public or governmental sector of Iran's economy is the largest and most dominant (Worldbank, 2009). Despite many efforts to reduce the reliance on oil, Iran's economy is still one of the most oil-dependent economies in the world. From 2000 onwards the rate of annual economic growth in Iran has been 6.4 per cent on average, while the average

rates of inflation and unemployment have been in double digits, about 17 and 13 per cent respectively (CentralBankofIran, 2009).

Since the Islamic Revolution in 1979 there have been various kinds of sanctions applied to Iran's economy; however, in recent years there has been a rise in tension associated with the development of the nuclear industry, and the intensity of economic sanctions against Iran has been multiplied. Declines in the amount of foreign investment, difficulties and obstacles in developing oil and gas industries, more expensive imports, high inflation rates, and problems in gaining trade finance are among the consequences of sanctions against Iran's economy.

As a concluding remark, it should be mentioned that this brief introduction to Iran's general characteristics might be able to show the conditions in which Iranian governmental universities are operating in terms of geography, history, political power, cultural issues and economic problems.

2-3. Higher Education and Universities

Perhaps the main motivation for conducting this research is the current position of Iran's governmental universities which have been established after new reforms and changes in the law gave more autonomy to the universities (Mehralizadeh, 2005). Before describing this situation, it seems useful to take a brief look at the history of higher education in Iran and the taxonomy of Iran's higher education institutions.

2-3-1. History of Higher Education

The history of higher education in Iran can be divided into two distinct periods: ancient era and modern era.

2-3-1-1. Ancient Higher Education

Higher education has deep roots in terms of time in Iran, but the most renowned higher education institutions included the Schools of Nisibis, Sarouyeh, Reishar and The Academy of Jondi Shabour in the cities of Riv Ardeshir and Jondi Shabour from 241 AD onwards (Mehralizadeh, 2005). Medicine, Mathematics, Astronomy, Philosophy and Architecture were the most popular branches of knowledge and

science in those years. After the emergence of Islam in Iran the speed of the growth in science increased and a new system of schools called Nezamiye were founded in many of the big cities. Farabi, Abou Ali Sina, Khayyam, Kharazmi, Razi and Beeroni were some of the most famous scholars in ancient Iran.

2-3-1-2. Modern Higher Education

A new system of Western-style higher education in Iran mainly started in the mid-19th century with the establishment of Daarolfonoon (The House of Techniques) by Amir Kabir, who was the prime minister of Naseredin Shah, one of the Qajar dynasty kings (Mehralizadeh, 2005). This institution would teach the new techniques and sciences which were admired in Western countries. The first Ministry of Science was founded in 1855 after the establishment of Daarolfonoon. After that many other schools and institutions were established in Tehran and other big cities such as Tabriz and Urmieh. Finally, in 1934 the first university, the University of Tehran, which is now the biggest university in Iran, was officially opened; this was followed by the opening of universities in Mashhad, Shiraz, Isfahan and Tabriz (Mehralizadeh, 2005). In 1967 the Ministry of Higher Education was established to supervise, coordinate and make policy for all universities and higher education institutions.

Following the Islamic Revolution in 1979, in order to adopt new policies and adapt universities to the needs of the Revolution, which was called the Cultural Revolution, the Cultural Revolution Headquarter was formed and universities were closed for three years. The Cultural Revolution Headquarters then changed into the Supreme Council of the Cultural Revolution; this became a permanent council for policy-making in Higher Education. The Ministry of Higher Education was also reconstituted as the Ministry of Culture and Higher Education (Mehralizadeh, 2005).

In 1986, in order to optimise the use of resources and facilities, mostly hospitals, the supervision of medical universities was delegated to the Ministry of Health and Medical Education. In 2004, the name and of course the mission of the Ministry of Culture and Higher Education was once again slightly changed. The new name is the Ministry of Science, Research, and Technology (MSRT) and its new mission is to highlight, coordinate and support research and knowledge generation in the country in general and in universities in particular (Tarokh and Kaldi, 2007). This change was

actually the underlying impetus for reform in the universities and an increase in their autonomy.

2-3-2. Classification of Universities

Higher Education Institutions in Iran have experienced a large increase in number and diversity during the last thirty years (Bikmoradi et al., 2009). Iran has two large general categories of Higher Education Institutions: governmental and private universities.

2-3-2-1. Governmental Universities

The basic and main part of Higher Education in Iran, in fact, comprises governmental universities (Mehralizadeh, 2005). Governmental universities can themselves be separated into two clusters. The first group receives fees from students besides public funds. The second group obtains its total budget from government. The main part of the first category is Payam-e-Nour University (Distance Education) which has branches in virtually all cities. The minority section of this group is Shabane (Night-time) Universities. Their students are at work on weekdays and have to attend the universities during late afternoons or at weekends, relying on their own funding. The difference between Payam-e-Nour and Shabane Universities concerns the amount of their tuition fees: tuition fees in Payam-e-Nour University are much lower than for Shabane University because the former receives part of its budget from the government.

The second group, governmental universities without student fees, includes three subdivisions: universities affiliated to the Ministry of Science, Research, and Technology (MSRT), Universities of Medical Sciences which are supervised by the Ministry of Health and Medical Education (MHME), and universities associated with other Ministries and Governmental Organizations. These are all supposed to educate specialist students to fulfil the needs of their own ministries or organizations. The highlighted examples are universities which are affiliated to the Ministry of Education, Army, National Iranian Oil Company (NIOC), and Ministry of Foreign Affairs. The vast majority of these universities' budgets are provided by government via public funds.

2-3-2-2. Non-Governmental Universities

The largest part of non-governmental universities in Iran is called Islamic Azad University (IAU) which has branches in almost all cities in Iran. In fact, it is one university with 357 branches throughout the country. This university is totally dependent on students' fees and does not receive any funds from the government although, in some cases, it may receive some local donations such as land or legal fees exemption.

In terms of educational regulations, the IAU follows the requirements of the Ministry of Science, Research and Technology (MSRT), but in other aspects it does not have to obey the rules and regulations set down for governmental organizations. Economically and financially it is governed by the Commerce Act, which is obeyed by all companies and organizations in the private sector. Therefore, from this point of view, it could be categorized as a private sector organization, although in its Establishment Statute it has been called a non-profit organization which means that no-one can receive any income dividend from its profits, and its income has to be spent only on the expansion and improvement of the university and its branches. The IAU is only 29 years old, having been founded in 1982, but its student numbers are now about equal to those of governmental universities. Besides the IAU, there are a number of other private universities called Not-for-profit Universities. These universities are very similar to the IAU, but on a very small scale with no branches in other cities and very few students.

2-3-3. Entrance to the Universities

For entrance to both groups of universities, applicants must sit a general entrance exam called Conquer. Annually, two Conquer exams take place in Iran, one for governmental universities and the other for IAU. Applicants are more interested in attending the governmental universities due to the superior qualifications, educational and research facilities, prestige and reputation they offer compared to the IAU (Mehralizadeh, 2005); furthermore they do not have to pay any tuition fees.

2-4. New Situations in Governmental Universities

After the Iranian presidential election in June 1997 and Khatami's arrival in office, a kind of soft political reform started in almost all aspects and affairs in Iran. One of these aspects was the field of Higher Education which attracted much more attention and consideration. The main players in higher education, who are faculty members and academic staff rather than ordinary people, were in touch with the rest of the world, particularly Western countries, and saw how universities in other countries were changing and progressing (Sepehri et al., 2004, Mehralizadeh, 2005). They were dissatisfied with the current position of Iran's universities: none of them was of world-class quality and none were categorized among the 500 top universities in the world. They believed that this was not a result of any weaknesses in Iranian students or academic and faculty members, but possibly the consequences of structural and managerial problems.

Many more discussions took place internally and through newspapers and the media; the plea was for the reform of Higher Education Institutions' structure and management (Sepehri et al., 2004). These activities and arguments put the MSRT under pressure to make a decision and prepare some suggestions for reform in the Higher Education structure. There was no clear and straightforward path and many disagreements, resistance, and even hostilities ensued, resulting in the resignation of the Minister of Science, Research and Technology at that time.

Finally, within the Fourth Five-year Development Plan Act which was approved by Parliament in 2004, some basic reforms were introduced regarding governmental universities. This Act provided for the following:

- Universities are exempted from many laws and regulations such as Governmental Financial Regulations, General Evaluation Law, and Governmental Recruitment Law.
- Universities can have their own rules and regulations regarding structure, financial transactions, recruitment, and administrative affairs if approved by their Board of Trustees.
- Their budgets will be allocated and paid from public funds based on the total number of their students, and it should be increased each year.

Partly as a consequence of this Act and partly not, some new realities have emerged for Iran's universities in recent years, mainly since 2005. These changes are discussed below.

2-4-1. Decentralization and more Autonomy

Following the above-mentioned Act, MSRT delegated much of the decision-making process to the universities themselves. Previously, most issues were centralized and dealt with by the MSRT. Staff recruitment (even for temporary instructors), faculty members' sabbaticals, curriculum planning, legislating any less important bylaws and target-setting in universities had been centralized in the MSRT, and it was too lengthy and cumbersome (Sepehri et al., 2004). Nowadays, these matters are largely decided upon and administered directly by the universities. The apparent new function for MSRT regarding universities is simply long-term policy-making and quality control.

Although one of the most important aspects of autonomy and decentralization to be retained by the government is the process of appointing chancellors for the universities, it seems that universities now feel more decentralized and autonomous compared to previous years (Sepehri et al., 2004).

2-4-2. Changes in Accounting Rules

The other changes resulting from that Act are the abolition of Zihesab and a change in accounting basis from adjusted-cash basis to an accrual basis. Zihesab was the government's agent directly responsible for checking adherence to financial regulations and adapting all transactions to Governmental Financial Regulations before approving any transaction and disbursement. These agents, Zihesab, are present in all ministries and governmental organizations that receive their budgets from public funds. It is important to state that Zihesab did not have to and mostly did not accept the instructions and commands issued by the university chancellor; this frequently created a very complicated situation for chancellors in terms of decision-making.

For many years, and similar to other governmental and public organizations, accounting systems were on an adjusted-cash basis and were conducted through fund accounting theory. On that basis, all expenses except prepayments were recorded as

expenses just after payment, and all revenues were recorded after cash collection and receipt. Now universities are allowed to change their accounting basis from adjusted-cash to accrual and many of them seem to have changed it or are trying to do so[1]. They can then use many novel techniques and instruments in management accounting and financial management which need many data as input that can be provided by a better and improved accounting system.

2-4-3. Competitive Positions

For many years higher education in Iran was confined to governmental universities, and they acted as a monopoly in this area. This monopoly has been weakened by a number of rivalries in recent years, so governmental universities are not in quite such a dominant position as before, although they are still benefiting from positive discrimination in terms of funds, facilities and political support. One of the governmental universities' oldest competitors is IAU. This university, which has received a relative increase in investment (Mehralizadeh, 2005) and has upgraded its qualifications besides offering simplicity and convenience of accessibility for local students, is gradually influencing the potential input market for governmental universities.

Moreover, several branches of some famous foreign universities have been emerging in Iran in recent years, especially in the Free Economic Zones[2] and Tehran, the capital city. Many families prefer to send their children to these universities not only to obtain a world-class certificate, but also to learn and become fluent in a foreign language, usually English. Although the Government has recently tried to prevent the activities of these universities using various excuses, they still represent a kind of challenge to governmental universities. In addition, going abroad to study has been a fashion and ambition for many Iranian students and even their families for many years. This trend has dramatically increased in recent years due to many factors such as unemployment, economic conditions, and the deteriorating social and political situation (Bikmoradi et al., 2009). Many students even prefer to go to Asian countries

[1] It is according to the Clause 49 of Fourth Five-year Development Plan Act which was approved in 2004 by Iran's Parliament.

[2] Free Economic Zones refer to some ports and islands (such as Chahbahar, Kish, and Gheshm) in Iran with less strict regulations regarding the import and export.

such as India, Malaysia, Armenia and Azerbaijan because they are not so expensive then affordable for many families and are still a valid option for studying overseas.

Another aspect of competitive situation for the universities is down to competition for better quality in research and education (Farid and Nejati, 2008). There have been strong expectations of universities in terms of enhancing their quality in recent years (Mehralizadeh, 2005), especially in research areas. For many years Iranian universities' contribution to knowledge generation and research publications has been negligible so, in recent years, a new policy and inspiration called the "Movement of Knowledge Generating" has been introduced by the Supreme Leader of the Islamic Republic of Iran. So universities are trying to outperform one another in this direction as well.

2-4-4. Financial Pressure

The other environmental or, more to the point, political and social challenge that governmental universities are facing is the demand for increased capacity and admission of many more entrants. In recent years most universities have faced government pressure to expand their capacity because the government wants to combat the situations mentioned in the previous section (for example encouraging students not going abroad for study) on the one hand and obtain great public approval by abolishing the Conquer[3] on the other hand. This capacity expansion has mostly been demanded by and conceded to postgraduates including masters and PhD students. In spite of efforts devoted to boosting capacity and quality of governmental universities, their budgets do not seem to have been increased commensurately (Mehralizadeh, 2005). Mehralizadeh (2005) believes that continuous cuts in university budgets in recent years have created a problematic position for their managers who do not know how to cope with limited budgets, environmental changes, inflation and high expectations.

Besides that, in 2006 universities were required to raise their faculty members' salaries by more than sixty per cent. Although this was very welcome and edifying for academic staff, including managers who are mostly faculty members, it imposed a

[3] The general university entrance exam in Iran.

new and heavy burden on universities' budgets. Universities have been trying to alleviate these kinds of financial pressures by taking more control over other expenses and seeking new areas from which to earn new funds as private revenue, which is now easier to achieve following recent reforms and autonomy. It seems that traditional accounting systems are not appropriate for handling these new functions and some changes to them might be inevitable.

2-5. Summary and Conclusion

This chapter has endeavoured to give a wide and general overview of the background and context of the study, ranging from a brief description of the traits of the country as a whole to Higher Education and Universities, narrowing down to the particular situations which Iranian governmental universities are facing at the present time. For the general aspects of the country some facts and figures were provided regarding the geography and climate, history, structure of government and politics, religion and culture, and the economy. The history and classification of Higher Education and universities in Iran, Higher Education in the ancient era and the modern period up to the present day, governmental and non-governmental universities, and the mechanism of students' entrance to the universities were all explained. Finally, the factors and variables that have been affecting the governmental universities over the last five years were explored.

These factors could mostly be categorized as "reform for decentralization and giving more autonomy to the universities' management", "some changes in accounting rules and practices", "demand for boosting capacity and quality", and "competitive positions" as well as "financial pressures and budget constraints". As the main aim of this study is to discover the effect of the aforementioned factors on accounting systems and performance management of the governmental universities in Iran, it seems essential to review the literature and determine what kind of suggestions and procedures might be extracted and employed in understanding the situation, measuring the factors and relationships, and explaining them. So the next chapter will be concerned with the related literature on this subject.

Chapter Three
Literature review

3-1. Introduction

For more than fifty years the academic and research dimensions of accounting have been growing and a large amount of research and studies have been conducted in this field of knowledge creating many different insights and understandings by using extant notions and theories. This chapter will attempt to review and analyse existing literature related to the topic of this study and discover the gap in knowledge of this area, which has motivated the researcher to undertake this study.

The structure of this chapter is built on the various aspects of the topic to cover the whole area of its related literature, both theoretically and empirically. Therefore, this chapter is divided into two main parts: Contingency-Based Studies in Accounting, and Performance Management studies including a brief review of related studies regarding Iran's Higher Education system.

3-2. Part one: Contingency-Based Accounting Studies

3-2-1. Origin, Definition, and Covering Area

Contingency studies originated in organizational issues and is primarily recognized as an organizational and managerial theory. *Management of Innovations* by Burns and Stalker (1961), *Industrial Organization: Theory and Practice* by Woodward (1965), and *Organization and Environment* by Lawrence and Lorsch (1967) can be mentioned as examples of these kinds of studies (Chapman, 1997).

The Contingency Theory in accounting has been built on the notion that there is no single, proper accounting system which can be employed by all organizations in all conditions (Otley, 1980). For many years organizations were seeking to find the best accounting methods and techniques to provide financial information to improve the decision-making process; however, they had mostly overlooked the importance and influence of contingent variables including environmental, organizational, and

decision-making styles (Gordon and Miller, 1976). Therefore, organizations have tried to design new systems or change their existing management control systems, management accounting systems and accounting information systems as appropriately as possible to enable them to achieve their desired and planned objectives and goals. To design these kinds of systems they have to consider all the environmental and contextual variables that may influence such structures (Chenhall, 2003).

Much progress has been made and many modifications have emerged in understanding and exploring the contingent nature of accounting as the results of the basic and continuous calls by the commentators of Contingency Theory (Chapman, 1997). From the 1970s onwards, plenty of research has been conducted in the area of accounting using the contingency paradigm as an underlying theory either implicitly or explicitly. Since that time, several aspects of management accounting systems and more than forty contingent variables have been investigated in this field, and various different methods and instruments have been employed to improve insights and knowledge of this particular sphere of accounting studies and, more specifically, management accounting research (Chenhall, 2003).

Reliance on Accounting Performance Measures (RAPM), Participative Budgeting (PB), Centralization of Control and Accounting, and Strategy and Accounting might be the most important aspects of the contingency framework in accounting research (Chapman, 1997). Contingent variables are broadly divided into two groups: external and contextual variables. In a more specific categorization, the main branches of variables are factors related to environment, structure, culture, size, technology and strategy, each of which has been subdivided into many detailed variables in turn (Chenhall, 2003). Decentralization, agreement on evaluation criteria, interactive or diagnostic, managerial level, managerial role, standard tightness, and leadership style are the main sub-variables of structure. For the technology area different researchers have investigated advanced manufacturing technologies (AMT) [4], advanced manufacturing practices, manufacturing flexibility, manufacturing practices, and manufacturing process automation. Attitude, individualism, masculinity, uncertainty

[4]AMT is regarded as comprising management philosophies embodied in practices and programs used to enhance the manufacturing process with respect to customer-focus which includes initiatives such as just in time and total quality management (Perera et al., 1997).

avoidance, power distance, locus of control, motivation, organizational commitment, authoritarianism, goal congruence and trust are variables that might be included in the cultural and personality branch. Perhaps the broadest area of variables belongs to environment which includes environmental uncertainty, simple or complex environment, static or dynamic environment, environmental volatility, functional environment, market competition, interdependence, market factors, project uncertainty, task difficulty, task uncertainty, customer power and job-relevant information. Product standardization and product lifestyle are also dimensions of product as a contingent variable that has been surveyed by many researchers (Chenhall, 2003).

Before going any further it seems necessary to explore, in the next section, different approaches adopted by various contingency-based studies in terms of fit. Those approaches that might have been undertaken either implicitly or explicitly by researchers have usually affected the area, aspects and complexity of their studies.

3-2-2. Fit Approaches in Contingency Studies

Three papers have proposed three different typologies of fit in contingency-based studies and have classified the statistical techniques employed for each kind of fit approach. The first one is by Van de Ven and Drazin (1985) and Drazin and Van de Ven (1985), who suggested three forms of fit, namely selection, interaction and system. In the selection approach, congruency between two or more variables in organisational structure and context is examined, so, organizational performance is excluded from the model. It is assumed that those organizations that can match their structural design with their contextual conditions are performing well and consequently will survive. In the interaction approach the effect of interaction of couples of organisational factors, including structural and contextual ones, on performance are assessed. This approach generally adopts just one aspect in each area (context and structure) and the result of their match on organizational performance is assessed. The third approach, system approach, attempts to define and encompass all contingency variables which could affect the organizational performance, and proposes the best design and configuration of these factors to optimize the performance.

The second paper is that of Chenhall (2003) who proposed linear additive models, interaction models, intervening models and system approach models. This taxonomy seems quite similar to Van de Ven and Drazin's classification, except for the interaction form which has been divided into two groups, namely interaction (for moderation models[5]) and intervening (for mediation models[6]). The system model is also defined by Chenhall as follows:

> systems approaches which also describe fit but do so by testing multiple fits simultaneously, involving a wider variety of dimensions of context and MCS. Variation in performance stems from variations in overall systemic fit, with multiple, equally effective alternatives being possible (Chenhall, 2003, p 156).

Studies such as those by Bruns & Waterhouse (1975), Hayes (1977), Merchant (1981), Merchant (1984), Anderson & Young (1999) and Guilding (1999) are classified in the first group, which has used correlation[7] or simple regression analysis. In some instances, Brownell (1982, 1983 and 1985) and Davila (2000) have used Moderated Regression Analysis or Analysis of Variance (ANOVA) to test the interaction models. Shields *et al*. (2000), Van der Stede (2000), Chenhall & Brownell (1988), Shields & Young (1993), Anderson & Young (1999), Shields *et al*. (2000) and Scott & Tiessen (1999) are examples of intervening models. Regression analysis for mediation, Path analysis, Partial Least Squares (PLS), and Structural Equation Modelling (SEM) are the main techniques to have been employed to test these kinds of models. To test system models, Selto *et al.* (1995) employed Euclidian Distance technique and Chenhall & Langfield-Smith (1998b) used Cluster Analysis (Chenhall, 2003).

The final taxonomy in this regard, as far as this researcher could find, has been suggested by Gerdin and Greve (2004). They have proposed two general and conflicting paradigms of fit, namely Cartesian and Configuration[8]. For each paradigm two optional approaches of modelling - either Congruence or Contingency[9] - are

[5] A model is called moderation where it is assumed that the relationship between independent and dependent variables could vary depending on a third variable (Gerdin and Greve, 2004).
[6] In a mediation model there are also at least three variables; the third variable is dependent on the independent variable and the independent on the dependent variable (Gerdin and Greve, 2004).
[7] All related statistical techniques are explained in chapter 5.
[8] In the Cartesian paradigm some limited variables are included in the model while in the Configuration paradigm it is attempted to insert all related variables in the model (Gerdin and Greve, 2004).
[9] In the Congruence approach performance is excluded from the model, but in the Contingency approach performance as the main variable is included (Gerdin and Greve, 2004).

assumed. The Configuration paradigm which might be adaptable to the system approach of Drazin and Van de Ven (1985) and Chenhall (2003) stops at this stage with no further classification, but each of the branches in the Cartesian paradigm (Congruence and Contingency) is divided into two kinds of interaction models, namely moderation and mediation. They also distinguished between studies that have looked at either strength or form of moderation in moderated models. Table 3-1 shows the summary of the above-mentioned classification including exemplar studies and the statistical techniques employed.

Table 3-1) Different paradigms, approaches and statistical techniques of contingency-based studies (adapted from Gerdin and Greve (2004)).

Paradigm	Modelling approach	Type of models	Dimension of models	Statistical techniques	Example of studies
Cartesian	Congruence	Moderation	Strength	Correlation analysis of sub-groups	Khandwalla, 1972
			Form	Moderated Regression analysis	Perera *at al.*, 1997
		Mediation		Path analysis	Ambernethy & lilies 1995
	Contingency	Moderation	Strength	Correlation analysis of sub-groups	Simons, 1987
			Form	Moderated Regression analysis	Govindarajan, 1988
		Mediation		Path analysis	Chong & Chong, 1997
Configuration	Congruence			Cluster analysis	Simons, 1987
	Contingency			Profile Deviation analysis	Chenhall & Langfield-Smith, 1998

Gerdin and Greve (2004) explain that the Cartesian paradigm is based on reductionism whereas the Configuration paradigm attempts to look at the issues in a holistic way. To distinguish between Congruence and Contingency modelling approaches, they state that the Congruence option for constructing models assumes

that, when contextual variables are matched with environmental variables, according to the natural selection notion, the organization survives without the necessity of looking at its performance; in this approach organizational performance is then deleted from the model. However, in the Contingency modelling approach organizational survival is not considered a sufficient surrogate for organizational performance, so the latter should be entered into the model of studies. To clarify the discrepancy between moderation and mediation models, they state that, in moderation models, the relationship between independent and dependent variables could vary depending on a third variable as moderator while, in mediation models, a mediator variable plays a dependent role for the independent variable and an independent role for the dependent variable. Finally, the difference between Strength and Form in moderation models has been explained in terms of the extent of predictability and type of impact (respectively) of independent variables on dependent variables in different subgroups.

Although all of the above-mentioned commentators recommend that contingency-based researchers adopt a system approach (Drazin and Van de Ven, 1985, Chenhall, 2003) or Configuration paradigm for their studies, Donaldson (1996) argues that the Cartesian paradigm is more valid in these kinds of studies. He explains that proponents of the Configuration paradigm assume that there is just a limited form of match or fit between contextual and structural variables in any organization that could lead it to the highest level of performance, and that organizational changes are like a "quantum jump". Donaldson rigorously rejects this assumption and supports the idea that there are many ranges of fit and match between environmental factors and structural and control systems in any organization, and that organizational performance can be optimized in any of those fit conditions; likewise, organizational change should be viewed as continuous and incremental. In any case, a review of empirical studies shows that, although the effect and interaction of many contingent variables on control and accounting systems have been investigated so far, no single study in this field can be found that takes up all related variables in an attempt to build a configuration-based model. In the next section some of the most popular papers to have theoretically and critically considered the contingency-based studies are reviewed.

3-2-3. Theoretical Review and Criticism of Contingency- based Studies

Gordon and Miller (1976) criticised other efforts to design an accounting information system before that date because those attempts had a rather constricted and rigid view of accounting information. They proposed the contingency framework as a "broader and more adaptive" approach that takes into account many variables to design an appropriate accounting information system.

Nevertheless, Otley (1980) criticised contingency-based studies for their failure to propose a clear relationship between contingent variables and a suitable accounting system design. He asserted:

> "The idea that "it all depends" tends to be used as a means of avoiding rather than addressing design implications. The contingency approach, thus, has the appearance of being an influential but ephemeral fashion and it is particularly insidious because it occurs in a relatively immature field" (Otley, 1980, p 414).

Otley believed that researchers have only utilized a small number of works on Organization Theory and subsequently the shortcomings of that theory have been transferred into the Contingency Theory. Criticising other previous contingency accounting studies for their problems in terms of a theoretical framework, he proposed a new model with a number of specific characteristics:

1- Considering an accounting information system (AIS) as a component, besides other components of a control system,
2- Taking into account as contingent variables just those variables that are not controllable by the organizations (except organizational objectives),
3- Measuring the effect of AIS and control system on organization performance and organizational effectiveness,
4- Bearing in mind that there are other factors, besides control strategy, which play a role in organizational performance

Perhaps it should be mentioned that Otley's work (1980) was a turning point in the theoretical literature of contingency-based studies in accounting because he proposed a comprehensive look at control systems and called upon researchers to link the contingent variables and control system to the organizational performance in subsequent studies.

Another significant paper in this kind is Chapman's work (1997) which briefly raised several criticisms of contingency studies and proposed the need for communication between different disciplines of research into the contingent essence of accounting. He says that, in most of the contingency research, accounting has been assumed to be an entirely recognized and absolute technology: use of it means reliability and ignorance of it means instability; however, this assumption does not seem to be completely valid. This could be one of the roots of the differences between research expectations and findings.

To review contingency-based research in accounting, Chapman has divided the literature into "Reliance on Accounting Performance Measures (RAPM)", "Centralization of control and accounting", "Strategy and accounting", and "Early contingency studies". The core concept of RAPM studies revolves around the different situations of either appropriateness or inappropriateness of accounting information to be used as performance measures and an instrument for organizational control. In the "Centralization of control and accounting" section, Chapman has discussed those works which have attempted to find and define the necessary conditions for centralized and decentralized control systems and, subsequently, a suitable accounting system for each situation. By reviewing studies on strategy and accounting, Chapman implicitly concludes that, under any strategy, an accounting system has its own power and importance in organizations but, as Simon (1990) indicated in a more in-depth study, there could be some alternatives for the use of accounting information.

In the last part of his paper, using the roles of accounting model proposed by Hopwood (1980), Chapman emphasises two possible roles of accounting, namely "answer machine" and "learning machine". He believes that, in most of the contingency studies, especially in the RAPM cluster, accounting is assumed to be an answer machine, but in uncertain situations the role of accounting is that of a learning machine. It is thus necessary to investigate in more depth and discover broader aspects of the contingent nature of accounting systems through the use of a different school of research, namely a qualitative approach. He thinks that, by employing both of these approaches, it may not only be possible to find better answers to the questions

raised in this field, but could also be possible to "crystallize notions of complex integrative roles for accounting in future qualitative research".

The other reviewing paper published in 1997 was that of Langfield-Smith (1997), which concentrated on contingency studies regarding management control system and strategy. He briefly proposed a definition and different methods of control such as formal, informal, clan and strategic control. Next, he quoted Mintzberg's definition of strategy (1978) as "a pattern of decisions about the organization's future" and explained different aspects of strategy, namely corporate strategy, business strategy and operational strategy, and continued by discussing strategy formulation and implementation and various paradigms in strategy studies such as positive approach and normative approach[10]. After that, four diverse views on defining strategy variables are reviewed: Miles and Snow's strategic typologies (1978) including defenders, prospectors, analysers and reactors; Porter's positioning strategies (1980) encompassing lower cost, differentiation, and focus; Miller and Friesen's (1982) product strategies, namely conservative and entrepreneurial; and Gupta and Govindarajan's (1984) mission strategies categorized into build, hold, harvest and divest.

In the other sections of his paper, Langfield-Smith reviewed nine published survey-based contingency studies and some previous case-studies and discussed their findings and contradictions. He, very much like Chapman (1997), concluded that a case-study could produce better knowledge about suitable forms of management control system for each type of strategy. He pointed out:

> "…there is clearly a place for both case and survey research, and both forms of research should continue to play a role in the future…. However, in studying MCS (Management Control System) and strategy the interactions are complex and perhaps only in-depth research can help us understand the complex nature of these relationships" (Langfield-Smith, 1997, p 228).

Finally, he criticised previous research for their many weaknesses that can be summarised as below:

[10] In positive approach it is assumed that strategy can be adopted in a rational way, but normative approach sees existing strategy as ritual then ideal strategy is just in the mind of key managers (Langfield-Smith, 1997).

1- Large diversification in control measurement has caused problems for generating a coherent body of knowledge in this field.
2- In many of the studies it has not been made clear whether the control system is really being used or is simply there as a set of rules and procedures.

Most of the studies have only concentrated on formal control and ignored other means of control such as clan control[11] (Ouchi, 1979) and informal control.

3- There are many different measurements of effectiveness amongst this kind of research and some of them seem inappropriate.
4- Just a small number of studies have stated that strategy has a multi-aspect nature.
5- It is more likely that some of the respondents are voicing their desired strategies rather than describing the implemented strategies or vice versa.
6- Hence, strategy can be a developing process; failure to grasp this reality may cause errors in evaluating the right type of strategy in some organizations.

One of the valuable review papers of contingency studies and perhaps the best one in relation to the design of management control systems by employing the contingency-based findings is the work of Chenhall (2003). In this paper a definition of management control system (MCS) and its outcomes has been given and each section has been critically evaluated. In the main section of the paper, namely "Contextual variables and MCS", he reviews the studies on the most important contingent factors affecting design of a suitable MCS separately, summarises the most common findings about those variables, then criticizes individual studies or groups of them. The variables which have been reviewed are external environment (in two dimensions of uncertainty and hostility), technology (generic concepts and contemporary ones), organizational structure, size, strategy and culture. In the other section, all contingency-based studies are classified into selection, interaction and system in terms of their approach to the interaction between variables and the scope and extent of research including contingent variables, MCS and organizational performance. In selection studies, researchers have simply examined the effects of contextual and environmental factors on MCS, but interaction studies are looking at the relationship

[11] Clan control has been proposed by Ouchi (1979) as a mechanism of control besides other mechanisms such as market control and bureaucratic control. Clan has been defined as something like cultural and moral commitment, but on a smaller scale such as in an organization or between certain professions and individuals who have shared values and beliefs, or it could be based on a social agreement.

between contingent variables, MCS and performance, while system models have concentrated on ways in which the different aspects of MCS and contextual factors can be combined in various approaches to improve the performance of organizations.

Finally, Chenhall proposes seeking help from other theories to enlighten the problematic features of contingency-based findings in MCS and to gain much more than what has been obtained thus far. He believes that the use of other organizational theories, economic theories such as Agency Theory [12], Institutional Theory [13], psychological theories[14], and even Darwinian natural selection can be helpful for explaining and predicting the situations under which a particular type of MCS could increase organizational performance. In addition, similarly to Chapman and Langfield-Smith, he recommends that the new researchers combine case studies with surveys in contingency-based research to gain deeper and broader insights in their studies.

By reviewing the above-mentioned papers it is revealed that Contingency Theory has been engaged with a number of problems and shortcomings from the beginning, although many researchers in this area have tried to overcome those problems in subsequent studies. For example, after Otley's (1980) point regarding the fact that organizational performance had been ignored, most of the later contingency studies added this part to their models (section 3-2-3-2). As another example, following Chenhall's (2003) suggestion that help be enlisted from other theories, several studies moved in that direction trying to improve the quality of their Contingency-based studies (see for example: Widener, 2004, Soobaroyen, 2007). It is argued that the problems with contingency-based studies are not related to the essence of Contingency Theory but hinge on particular postulates within this area (Hopwood, 1989). Regardless of certain criticisms as mentioned above, several strengths still make this theory useful as a guideline for investigating certain research cases and

[12] Agency Theory tries to define and explain the issues arising between two co-operating parties where one of the parties has a kind of ownership and supervisory role (principal) whereas the other one has a functioning and working (agent) role (Eisenhardt,1989).

[13] The main assumption of Institutional Theory is that organizations' behaviour, structure and systems are shaped by external and internal stimuli and pressures, so organizations try to adapt their behaviour and systems to those pressures and expectations for gaining legitimacy and the required resources to be able to survive (Brignall and Modell, 2000).

[14] Psychological Theory looks at individuals as incomplete information processors who may exhibit dysfunctional behaviours because of misinterpreting messages (Hopper and Powell, 1985).

answering some research questions. The existence of a consistent and complete theoretical framework in some parts of this field could be employed in improving the expectations of the impact of several variables in a particular context (Chapman, 1997). An extensive amount of literature has virtually created a kind of pool of propositions between components of management control/accounting systems and context, and this framework, which is potentially strong, can be employed continuously to explore some generalizable findings that may enhance organizational effectiveness (Chenhall, 2003).

3-2-4. Review of Empirical Contingency-based Studies

The general purpose of contingency-based accounting research in private firms can be summarised based on three whole objectives as below:

1- Designing the best accounting system or management control system for a company based on its identical situations or attributes.
2- Evaluating the effects of more appropriate management accounting system on organizations' performance.
3- Discovering any dysfunctional behaviour resulting from using a particular management accounting or management control system.

So to review empirical research in this field studies are categorized into three groups based on above-mentioned taxonomy.

3-2-4-1.Contingent Variables and Accounting Systems

From the mid-1970s onwards, the number of contingency-based studies in accounting increased rapidly (Collins, 1978, Ansari, 1977, for example Burns and Waterhouse, 1975, Gordon and Miller, 1976, Daft and Macintosh, 1978, Waterhouse and Tiessen, 1978, Piper, 1980, Hayes, 1977, Otley, 1978). Perhaps one of the earliest studies that can be classified in this part is the work of Khandwalla (1972). In that research, the relationship between "intensity of competition" and "management control system" has been investigated. He found that competition encourages management to employ a strict and quite sophisticated control system.

Rockness and Shields (1984) investigated the association between organizational tasks and organizational control, using a wider means of control. They proposed four features of task, namely the level of knowledge of the transformation process,

measurability of output, task complexity and task dependency on the one hand, and three kinds of control, which they called input control, output control, and behaviour control on the other hand. Chenhall and Morris (1986) tried to discover the impact of three contextual variables - structure, environmental uncertainty and organisational interdependence[15] - on preference dimensions of management accounting systems. They defined scope, timeliness, aggregation and integration[16] as four main aspects of information produced by management accounting systems. Their collected and analysed data showed that decentralised organisations need more aggregated and more integrated information while companies that are facing environmental uncertainty are mostly interested in having broader scope and more timely reports. According to their findings, organisations with interdependent subunits prefer broader scope and more aggregated and integrated information.

Many other vigorous empirical works investigated the relationship between contingent variables and design of accounting systems or management control systems in the 1990s including the following: influence of environmental uncertainty, managerial autonomy and size on different types of budgetary system (Ezzamel, 1990), effect of decentralization on budgetary system (Gul et al., 1995a), impact of manufacturing flexibility on design of management control system (Abernethy and Lillis, 1995), organizational culture and budget behaviour (Goddard, 1997), reasons for participative budgeting (Shields and Shields, 1998), and uncertainty, accounting, and budgeting (Hartmann, 1999).

In another empirical study, (Reid and Smith, 2000) tried to find the association between three contingent events in small firms, namely cash flow crisis, financial budgetary pressure and innovation, after commencing to use new techniques of management accounting and computer systems for information storing. Their collected data supported the above-mentioned expected relationship. In the second part of that research, using the classification suggested by Gordon and Miller (1976),

[15] Organizational interdependence refers to the exchange of output that takes place between segments within a sub-unit (Chenhall and Morris, 1986).
[16] Scope of information encompasses time horizon, quantification, and the areas of focus. Timeliness is about speed and frequency of preparing accounting reports. Aggregation refers to combination of data for different periods and functional units as well as use of analytical models. Integration relates to the information that is generated to summarize activities in different units of organizations to be comparable to the targets (Chenhall and Morris, 1986).

they grouped firms into stagnant, running blind, and adaptive[17]. Then, in the light of cluster analysis[18] of their collected data, they concluded that stagnant and adaptive firms, although in totally opposite positions in terms of performance, use more developed management accounting systems compared to 'running blind' firms.

From a slightly different point of view, Haldma and Lääts (2002) tried to explain the need for accounting changes in Estonia's companies after her independence from the Union of Soviet Socialist Republics (USSR). By conducting a survey of manufacturing companies, they wanted to confirm the previous findings of contingency-based studies regarding the effects of external factors on accounting systems, although they proposed two new variables, namely the legal accounting environment and shortage of qualified accountants. In spite of their valuable efforts to test postulates of contingency theory in one of the countries of the former USSR, their failure to use a rigorous method of hypothesis definition and data analysis converted their study into a kind of descriptive observation; nevertheless, their boldness in casting two new contingent variables (possibly) could be appreciated.

Seaman and Williams (2006), conducting a survey of more than 110 Singaporean manufacturing firms, investigated and confirmed the moderating role of environmental uncertainties on changes in components of management accounting systems and performance. They found that, in different levels of environmental uncertainty, different changes can emerge in management accounting system components. In a low level of uncertainty, a defensive kind of change could be seen in that planning system changes are mostly emphasised, but the costing system is not considered so important. Conversely, in a high level of uncertainty an aggressive form of change emerges and more emphasis is put on decision-making rather than reward system changes. Looking at the relationship between organizational culture and two traits of performance measurement systems (variety of measurements and essence of their use), Henri (2006) found that firms with more flexibility use more performance measures and concentrate much more on attention-focusing and strategic decision-

[17] Stagnant companies work in a stable environment; their decision-making style is conservative and their structure is centralized. Running blind describes the companies that function in a dynamic environment with an entrepreneurial decision-making style and centralized structure. Adaptive companies also operate in a dynamic environment with an active decision-making style and decentralized structure (Reid and Smith, 2000).

[18] Cluster analysis is explained in the chapter 5, section 5-2-6.

making. On the other hand, firms with control of cultural value mostly use performance measurement systems for monitoring and legitimization.

Finally, Abdel-Kader and Luther (2008), by conducting a survey across the UK's largest industrial sector, have shown how sophistication in management accounting systems is related to variables such as company size, customer power, environmental uncertainty, new technology and company structure. They proposed "product perishability" and "customer power" as two new contingent factors for contingency studies. Unlike previous contingency studies which investigated the association between a few contingent factors and some aspects of management accounting systems, this research has tried to discover a relationship between ten contingent variables and a comprehensive concept of system sophistication according to the level of importance of 38 techniques in management accounting used by sample companies. Their collected data, which was based on 245 completed questionnaires, only supported the relationship between environmental uncertainty, customer power, decentralization, size, advanced manufacturing technology [19], total quality management (TQM)[20], and just in time (JIT)[21] with the level of sophistication in the management accounting system. Surprisingly, they could not find any significant association amongst strategy, processing system complexity, product perishability and the extent of sophistication in the management accounting system.

As a concluding remark, it can be said that, in this kind of contingency-based research, just some contingent variables amongst all possible ones have been adopted and their effects on or associations with control system or management accounting system have been investigated and matched between control or accounting systems; contingent variables have been assessed. Even the latter paper (Abdel-Kader and Luther, 2008), notwithstanding its intention, could not take into account all related variables. Chapman (1997) implied that contingency-based accounting studies "examine the interaction of a limited number of variables", so it is admitted that there is no accepted

[19] See footnote number 4, page 25.
[20] "TQM is an organization-wide philosophy and problem-solving methodology that focuses on systematically and continuously improving the quality of products, processes, and services"(Ittner, and Larcker 1995, p 3) .
[21] JIT refers to the ability of organizations to link between different expectations of customers and elements of production processes (Chenhall, 2003).

combination of variables that can be considered important in this field (Mauldin and Ruchala, 1999).

3-2-4-2. Contingent Variables, Accounting System, and Performance

Otley (1980) criticised contingency-based accounting studies for a lack of attention to the effect of accounting system on organizational effectiveness and performance improvement. It seems the final aim of contingency theory is to help organizations achieve their objectives by performing more effectively; therefore, effectiveness and better performance should be the key purpose or goal of management control system design (Chenhall, 2003).

Perhaps coincidentally, after Otley's (1980) call, Brownell (1981) published the results of his laboratory experimental study which showed that budgetary participation could have different and quite opposite effects on managerial performance and organizational effectiveness, depending on the individual's locus of control. For those who have an internal locus of control and believe that their destiny is - to a large degree - under their control, a participative budgetary system has a positive association with their performance; however, for managers with an external locus of control - those who believe that their future is planned by luck or chance - it has a negative effect. In another study, Brownell (1982a) concluded that the effectiveness of a budget-focused leadership style depends on the level of participation in the budgetary system. Brownell and McInnes (1986 a) undertook an empirical study to assess the mediating role of motivation in the relationship between budgetary participation and performance. Their evidence supported a significantly positive association between participation and performance, but the mediating effect of motivation was found not to be as significant as expected. Another study (Chenhall and Brownell, 1988b) nominated "role ambiguity" as an intervening variable in participation, job satisfaction and performance correlation. They found that participative budgeting influences managerial performance and job satisfaction in some way through the role vagueness.

Many other researchers have studied different aspects of management accounting systems and their effect on performance, such as product standardization and manufacturing process automation (Brownell and Merchant, 1990), strategy and

control system (Govindarajan and Fisher, 1990), job-relevant information (Kren, 1992), job-related tension (Dunk, 1993b), environmental uncertainty and decentralization (Gul and Chia, 1994), the joint effect of participative budgeting and managerial interest in innovation (Dunk, 1995), and task uncertainty (Chong, 1996).

Chenhall and Langfield-Smith (1998b) undertook an empirical study to discover how the combination of management techniques and management accounting procedures in the context of a specific strategy could improve organizational performance. They tried to measure four groups of variables in each company, namely chosen strategy, management techniques, management accounting practices and performance, to assess the probable links between them. The result of their study showed that the companies which have undertaken differentiation strategy and whose performances are at a relatively high level are mostly using quality systems, integrating systems, team-based structure, human resource management, improving existing process and manufacturing systems innovations as management techniques, while the use of the two last techniques contradicted their hypothesis. This strategy was also associated with the use of benchmarking, employee-based measures and strategic planning but, unexpectedly, data did not support the use of balanced scorecard techniques under this strategy, while activity-based costing and conventional accounting practices have been considered important although this was not hypothesised. On the other hand, they found supportive evidence regarding the use of existing processes and manufacturing systems innovations as well as integrating systems by the high performance organizations which were adopting a lower price strategy. Those kinds of companies had chosen traditional accounting practices and activity-based techniques as well as benchmarking and strategic planning as the important tools in management accounting.

Another study investigated the relationship between market competition, management accounting system (MAS), and business unit performance (Mia and Clarke, 1999). The researchers defined three hypotheses as below:

1- There is no association between intensity of market competition and business unit performance.
2- When market competition becomes more intense, use of MAS information by managers increases.

3- The extent of use of MAS information by managers is positively associated with the level of business unit performance.

By collecting data through personal interview with 61 business unit managers, they were able to support all three proposed hypotheses and concluded that intensity in market competition indirectly through more use of MAS information is positively related to business unit performance.

Many other researchers have considered organizational culture as a contingent factor that can affect both management accounting system and organizational performance (Hofstede, 1984, Harrison, 1993, O'Connor, 1995, Goddard, 1997, Subramaniam and Ashkanasy, 2001). Subramaniam and Ashkanasy (2001), however, could not find a moderating or mediating effect of managers' culture perceptions on a positive relationship between participative budgeting and managerial performance. Tsui (2001) investigated the probable different effects of management accounting system (MAS) and budgetary participation on the performance of managers when the managers have dissimilar cultural settings. By collecting data via questionnaire from Chinese managers in China and expatriate Western managers in Hong Kong, she found that, in a high-level participative budgetary situation, the relationship between MAS and managers' performance was negative for Chinese managers, while this relationship for their Western counterparts was positive. Those findings imply that Chinese mangers in opposite of their western counterparts do not prefer to be involved and participate in budgetary practices.

Perhaps Widener (2004) was subconsciously following the above-mentioned advice of Chenhall (2003) regarding a combination of theories to gain better insights into MCS when she endeavoured to mix contingency theory with Transaction Cost Economic Theory (TCE)[22] to discover how different uses of strategic human capital are related to the proposed use of management control systems in organisations. She chose the importance of human capital as a contingent variable in the contingency framework and behavioural uncertainty, firm-specificity and spread of resources from

[22] Based on TCE Theory for each economic transaction there will be a cost, so as organizations are involving in many economic transactions, they will incur costs for those. Therefore, organizations try to design their governance structure to minimise the transaction costs (Williamson, 1998). This theory relates to Contingency Theory in two ways: first, some of the variables influencing transaction costs are in fact the contingent variables in Contingency Theory; Second, management control system and accounting system are parts of governance structure (Widener, 2004).

TCE as three attributes which could affect the kind of control system that is adopted by companies. Gerdin (2005) investigated the mixed effect of departmental interdependencies and organizational structure on management accounting system (MAS) design, using a multiple contingency model. The findings of this research could provide confirmatory evidence, to some extent, that companies design their MAS based on their need for a suitable pattern of control in different situations.

It may be worth mentioning the results of a case-study-based piece of research on this issue undertaken by Peljhan and Tekavcic (2008). They investigated the dealings of management control systems (MCS) and strategy and their final consequences for boosting organizational performance. Unlike most of its counterpart studies which have used survey-based research, this one tried to find the relationship between MCS, strategy and performance in more depth by looking at just one specific company. They concluded that MCS could facilitate the implementation and screening of strategies and supply day-to-day information and understanding to managers sufficiently well to be employed to promote strategy formulation. The study explained how configuration of some performance-focused policies alongside common use of MCS information could result in enhanced performance in an organization. By using the case-study method, they were able to look at the MCS in terms of broader concepts, including formal, informal and clan control abilities and techniques, and discovered that not only the formal control methods but also other forms of control, such as organisational culture and leadership style, should be considered important in this kind of study.

Reviewing the above-mentioned papers as some examples of contingency studies that tied up the interaction and match between the contingent nature of context and environment of organizations and their accounting and control systems with their effectiveness and performance, one can see a serious shift in the stream of contingency-based studies in accounting. This shift was mainly followed by some criticisms of contingency-based studies regarding the ignorance of organizational performance (Otley, 1980, Schoonhoven, 1981). However, the continuing lack of a consistent approach in these kinds of studies is quite understandable and is mostly linked to the nature and definition of Contingency Theory (Chenhall, 2003).

3-2-4-3. Negative Effects of Accounting Systems

Another area to have been investigated by these kinds of studies is the unwanted consequences of accounting and other control systems on different aspects of organizations. Job-related tension, budgetary slack[23] and data manipulation[24] have been addressed as three main negative consequences of accounting and management control systems in the contingency literature.

Job related tensions

Hopwood (1972) used a contingency framework to try to discover whether dysfunctional behaviours are the inevitable results of applying accounting information for performance measurement or whether it depends on how those data are used. He hypothesised that, if a head of a cost centre is evaluated based on budget constraint style rather than profit conscious style or non-accounting style, he/she is more likely to:

- feel more job related tensions

-report having poor relations with his/her superior and colleagues

-engage in manipulation of the accounting data and dysfunctional decision-making.

The collected data confirmed all parts of the hypothesis, and Hopwood then concluded that the profit conscious style was more likely to result in greater efficiency than the budget constraint style. Otley (1978) replicated and extended Hopwood's study in another industry with different characteristics in subunits interdependency; surprisingly enough, however, his findings contradicted those of Hopwood (1972). Otley himself tried to explain the contradictory results, tentatively, by proposing another influencing variable as "the state of economic environment". He suggested that a tough or liberal operating environment, type of organization, and internal and external norms and values surrounding organizations might better explain the relationship between budgetary style and dysfunctional behaviours and performance (Otley, 1978).

[23] Budgetary slack can be defined as the amount by which a subordinate overstates the needs or understates the existing capabilities when given a chance to participate in the budgetary process (Young, 1985).

[24] Data manipulation includes any deliberate change in a set of data to affect the decision that might be taken based on it (Merchant, 1990).

Hirst (1981) tried to link the dysfunctional behaviour following use of and reliance on accounting information and performance measures to the task uncertainty. By analysing Hopwood's and Otley's work he asserted that, in a situation with a high level of subordinates' task uncertainty, if supervisors rely heavily on accounting performance measures to evaluate their performances the rate of dysfunctional behaviour will increase, but with a low level of task uncertainty it will minimise the dysfunctional activities. As he had no empirical evidence of his own, Hirst (1983) undertook a survey-based study to confirm those postulates more vigorously with his own data. The findings of this study showed that, when task uncertainty is high, more reliance on accounting performance measures causes more job-related tension for subordinates; however, for a low level of uncertainty, less emphasis on accounting performance measures will lead to more job-related tension. This latter conclusion was a little surprising. Several other researchers considered job-related tension a side effect of accounting systems, particularly as subsequent results placed a strong emphasis on accounting measures for performance evaluation (for example see: Dunk, 1993b, Ross, 1995, Lau et al., 1995, Shields et al., 2000).

Ross (1995) tried to somehow reconcile the inconsistent findings of three previous studies in this field, namely Hopwood (1972), Otley (1978) and Hirst (1983). Since Hirst did not use the methodology used by Hopwood and Otley, Ross wanted to replicate Hirst's work using Hopwood and Otley's methodology to remove the possible methodological bias. His findings contradicted all three of the above-mentioned researchers, because he not only failed to discover any meaningful relationship between uncertainty, performance evaluation style and job-related tension as Hirst had claimed, but also found that use of non-accounting style of performance evaluation under a high level of uncertainty would increase the job-related tension. He also claimed that, in a high uncertainty environment, job-related tension would occur regardless of style of evaluation.

Budgetary slack

Budgetary slack is known as another unfavourable consequence of some types of management accounting systems by many researchers, although others have viewed it as a positive tool in the hands of managers (Davila and Wouters, 2005). Many reasons, such as risk-aversion, knowledge asymmetry, lack of social pressure and participative

decision-making, have been proposed as likely to lead to budgetary slack (Young, 1985). Young (1985), undertaking a study with an experimental method, discovered that budgetary participation is significantly associated with budgetary slack. Also, Merchant (1985a) published the results of a field study on budgeting systems and technical framework as antecedents of budgetary slack in that year. Unlike Young's findings, Merchant's data showed that, in participative situations, managers are mostly reluctant to create slack in budgets but would be more likely to do so if it were technically possible to forecast the outcomes of activities. Conversely, if tight budget targets are being regularly monitored, the managers' willingness to creating budgetary slack would increase.

Many other researchers have continued to study budgetary slack to resolve contradictory findings of previous research and enhance understanding in this area (Awasthi, 1988, Dunk, 1993a, Dunk and Perera, 1997, Davila and Wouters, 2005). Unlike most of the previous studies, Dunk (1993a) found that, in a participative situation, more emphasis on budgets and a high level of information asymmetry are negatively related to high budget slack. He claimed that, if there were sufficient emphasis on budgets, even in a participative budgetary system, budgetary slack could be reduced. As he himself mentioned, the contradictory findings in that study might be due to certain limitations such as measurement and validation of variables, method of data collection, and sample selection.

Gradually, two different opinions were formed regarding the relationship between budgeting participation and budgetary slack. On one side it is argued that, through participative budgeting, middle managers deliberately try to obtain slacker budgets; on the other side it is deemed that budget participation leads managers to decrease budgetary slack (Dunk and Perera, 1997). To eliminate some of the limitations in Dunk's previous research (1993a), it seems, Dunk and Perera (1997) undertook a field study to discover the mediating effect of performance evaluation procedure and information asymmetry on the relationship between participative budgeting and budgetary slack. They were able to determine that the association among participation and slack in budget is due not to just one variable but to a set of factors including contextual and personal factors. It could be seen that, although managers in participative positions could build slack budgets, this does not mean that they would

use or misuse this opportunity for moral, ethical or professional reasons and possible future progression.

As was mentioned earlier, some studies have looked at the positive side of budgetary slack as an instrument for helping managers to achieve the organization's goals rather than just meeting the budget figures. Davila and Wouters (2005), conducting an empirical enquiry, attempted to investigate this aspect of budgetary slack. Collecting data by interview and questionnaire from different logistic sites of a manufacturing company, they discovered that budgetary slack is allowed when it is necessary to achieve other defined goals such as service quality. Headquarters had asked the local managers not to sacrifice service quality just to meet budget targets. They realized that budgetary slack was being built intentionally in both the budgeting process and cost accounting analysis to assist managers to achieve the company's objectives.

Data manipulation

The third adverse outcome of certain kinds of management control system to be investigated by contingency-based studies is data manipulation. The interesting instances of manipulative actions and biased decision-making found in Hopwood's study (1972) are:

-charge items of cost to other cost centres

-change the volume and type of production

-postpone the occurrence of certain overhaul and maintenance expenditures to a later date when the budget is available in order to avoid unfavourable variances.

By embarking on a field and survey study, Merchant (1990) attempted to investigate the occurrence and roots of two other derivative consequences of accounting systems, namely "manipulation of short-term performance measures" and "encouragement of myopic orientation". The information gathered via interviews and questionnaires illustrated that the key reason for these two problems is the solid emphasis on meeting the financial targets under any circumstances. Environmental uncertainty, superiors' concerns and organizational strategy were known as moderating effects on the relationship between solid stress on fulfilling financial targets and the two above-mentioned dysfunctional behaviours. Otley (2003) presented several anecdotal examples of data manipulation in response to the management control system and performance management systems' standards and guidelines.

A review of the above-mentioned empirical papers in this section reveals that Contingency Theory has also been employed to shed light on the dysfunctional behaviours resulting from the use of different types of control systems and accounting controls and practices. Although this aspect of contingency-based studies is not directly related to the subject of the current study, some of the concepts and findings such as budgetary slack will be used in hypothesis development in this study. As explained earlier (section 3-2-2), several different statistical techniques have been employed to analyse the data in contingency-based studies. However, since this study will utilize Structural Equation Modelling (SEM) as the primary statistical technique, in the next section the use of SEM in these kinds of studies is briefly reviewed.

3-2-5. Use of SEM in Contingency-Based Studies

The use of SEM in management accounting research has increased over the last decade but SEM is still used less frequently than other statistical techniques (Williams et al., 2009). Several commentators have encouraged the utilization of SEM in management accounting research (Shook et al., 2004, Smith and Langfield-Smith, 2004, Williams et al., 2009), particularly in contingency-based studies (Shields and Shields, 1998, Smith and Langfield-Smith, 2004). Several additional capabilities of SEM have been mentioned by the aforementioned researchers compared to other statistical techniques. Principles and practices of SEM including its exclusive abilities are explored in chapter 5, section 5-3, but two studies (as examples) which have employed SEM are reviewed here.

Shields et al. (2000) adopted SEM to analyse and compare two competing models regarding the relationships between participative standard-setting and job performance. In the first model they proposed a direct positive association between "participative standard-setting" and "job performance" and the mediating effect of "standard-based incentives" (positively) and "standard tightness" (negatively) on that relationship. In the second model, they added another mediating variable (job-related stress) as a second stage of mediating, suggesting that "participative standard-setting" is associated with both "standard-based incentives" (positively) and "standard tightness" (negatively); then all three of these variables were associated with "job performance" indirectly through "job-related stress". The results of analyses

confirmed both proposed models although the latter model was found to fit better with the data.

Widener (2004), whose work was mentioned earlier in section 3-2-4-2, used SEM to investigate associations between 9 variables (4 attributes of strategic human capital[25] and 5 approaches of control) in a complex model to examine how different uses of strategic human capital are associated with the different approaches of control in organisations. Although many of the proposed relationships in that model were statistically significant, she decided to reject the initial model, as the indices of fit for the model did not support the fitness with the data. Finally, she deleted two (use of financial measures and budgeting control) of the nine variables from the model and proposed an alternative model to achieve an acceptable fit model. She justified her decision through the literature on both Contingency Theory and SEM. The conclusion was that "the use of strategic human capital significantly explains the design of the MCS, only as it applies to the use of personnel and non-traditional controls" (Widener, 2004, P 394).

Characteristic capabilities of SEM (see sections 5-4-8 and 5-4-10 in chapter 5) allow researchers to test complex theoretical structures in just one run and simultaneously (Echambadi et al., 2006). So the use of composite hypotheses in contingency-based papers using SEM seems to be quite commonplace (Widener, 2004, Widener, 2006, Xanthopoulou et al., 2007, Cadez and Guilding, 2008). The hypothesis below might be considered a good example in this regard.

H3:

a. For non-manufacturing firms the strongest indirect effect on performance is managers' assessment of the use of human capital, as mediated by managers' assessment of the importance of using non-traditional measures.

b. For manufacturing firms, the strongest indirect effect on performance is managers' assessment of the use of structural and human capital, as mediated by managers' assessment of the importance of using non-traditional measures (Widener, 2006 ,p 441).

[25] Strategic human capital is about the use of knowledgeable and trained employees to provide a competitive advantage for organizations (Widener, 2004).

This brief review shows that the use of SEM in management accounting studies and contingency-based studies in particular is recommended and the aforementioned examples highlight three abilities of SEM including test of competing models, constructing alternative models when original models do not fit with the data, and assessing multiple relationships simultaneously. These abilities are in addition to SEM's other capabilities such as dealing with complex models that have several variables and different kinds of relationships as well as assessing the subject of the study taking a holistic view and a broader perspective. Although most of the contingency-based studies in accounting have been conducted in the context of private-sector organizations (Chenhall, 2003), several important studies in this field can be found in the public-sector realm. Therefore, the next section looks at some of the limited number of this kind of studies in public sector.

3-2-6. Contingency Studies in the Public Sector

Most of the studies that have used a contingency framework have been concerned with business organizations (Chapman, 1997, Miah and Mia, 1996). Perhaps this is due to the non-use of management accounting techniques in the public sector on one hand and the discrepancy in objectives and environment of business organizations compared to non-profit institutions on the other hand. However, with the emergence of New Public Management (NPM) which prescribes and recommends the application of management and management accounting instruments in public-sector and governmental organizations (Hood, 1995), many such organizations have adopted the use of those kinds of techniques. On the other hand, it seems unreasonable to generalize the results of accounting research in for-profit organisations to governmental and public organisations. Mia and Goyal (1991) proposed three reasons for this view:

- Unlike the private companies, public organisations' objective is not to maximize profits but to maximize benefits for the people, and this leads them to minimize their costs. Then, the utility of accounting information may vary in these two categories.
- Governmental organizations have to perform under more regulated conditions and this could affect the importance of accounting information for them.
- The operational environment of public organisations is mostly far from competitive situations and this may change the extent of their need for the accounting information.

Contingency-based accounting studies in the public sector could be divided into two different clusters. The first are studies that have been employing contingency propositions and results of private companies to be tested and applied in public-sector organizations. The second one is a specific model that has been suggested for governmental organizations to explain the governmental accounting innovations in that context.

3-2-6-1. Common Contingency Accounting Studies

Although the amount of contingency-based accounting studies in the public sector is not considerable compared to the private sector, there are still some valuable works to be found in this regard. The earliest contingency-based study in the public sector found by the researcher is the work of Williams *et al.* (1990) who tried to test the relationship between managers' budgetary behaviour and divisional performance in two different types of task interdependency, namely pooled and reciprocal. Their collected data from 201 departments in 22 public organizations showed that departmental performance is related to the managers' budgeting actions and it could vary from department to department according to their positions in terms of task interdependency. Interestingly enough, they concluded that the budgetary behaviour of managers in public organizations is largely similar to that in private companies.

Abernethy and Stoelwinder (1991) extended some other hypotheses developed by contingency literature in four large not-for-profit hospitals in Australia. They also confirmed the postulates that claim that if organizational structure and management control system are designed with consideration of contingent variables, the performance will be higher and the organization more efficient in public institutions. Combining institutional theory with contingency theory created a framework for Geiger and Ittner (1996) to look at the drivers of cost accounting systems in governmental organizations from a new point of view. Investigating the role of "force in self-funding"[26] and "compulsory application of cost accounting methods", they noticed that external commands to use cost accounting practices leads institutions to the formal use of those methods in a superficial way, but not for real decision-making. Conversely, when the organizations have to rely solely on their revenue rather than

[26] In such a situation governmental organizations are legally required to fully recover their costs from revenues or fees for providing service or goods (Geiger and Ittner, 1996).

predetermined budgets from public funds, use of cost accounting practices would be considered very important in nearly all aspects of planning and decision-making.

Miah and Mia (1996) investigated the effect of decentralization of decision-making on the extent of use of accounting control systems (ACS) and their performances in local governmental offices of New Zealand. They found supportive data for the claim that more decentralized decision-making in regional government offices is positively related to the greater application of ACS and consequently their performances will show a higher improvement. However, the collected data did not confirm a direct association between decentralization and improved performance after eliminating ACS as a mediating variable. They tried to explain these results by proposing that, for decentralization to be effective and improve an organization's performance, it needs to be supported by an appropriate accounting control system that can provide sufficient information for lower-level managers.

One year later Jacobs (1997) published a paper and criticised most of the bases and results of the above-mentioned study (Miah and Mia, 1996). He claimed that Miah and Mia's work has serious problems in understanding and defining decentralization, essence of accounting control system, and definition and measurement of district governmental offices' performance. Regarding the decentralization, the first point is that there is no clear evidence to show that regional offices are really decentralized. Moreover, to measure decentralization, they used Gordon and Narayanan's instrument (1984) which has been used to measure the difference between mechanistic and organic companies, so it could not be an accurate measurement. In addition, the nature of decentralization in US and Australian companies which has been considered in their work is quite different from decentralization in New Zealand's public sector. For measuring the degree of use of accounting control system, there are also a number of inaccuracies (Jacobs, 1997). First, no clear definition of accounting control system has been provided. Second, following legislation in 1989, governmental organizations in New Zealand have had to prepare annual accounting reports based on Generally Accepted Accounting Principles and this could be the reason for the increase in the use of accounting practices in the public sector. Finally, they employed Khandwalla's (1972) instrument for measuring use of accounting control system, and this instrument had been used to measure use of control system (not the accounting system) in US

private companies (not public-sector ones). To gauge the local offices' performance, they looked at just one dimension of their performance, but performance (especially in public organizations) is a complex phenomenon to measure and is multidimensional.

In another attempt, postulates regarding the relationship between strategy and management control system (MCS) in the private sector were examined and confirmed in the public sector (Kober et al., 2003). Kober *et al.* (2007), also collecting data from a public-sector institution with change in its strategy, discovered that not only can a change in strategy cause some modifications in MCS, but interactive use of MCS can also help the new strategy to be implemented. By undertaking a qualitative-based study of Dutch municipalities, Budding (2004) tried to assess the effects of environmental uncertainties on the relationship between management accountability and organizational performance. His data showed that, in those organizations, throughput criteria rather than output indicators are used to lead managers towards accountability. He found that environmental uncertainty is not considered important by the managers as a hindrance to accountability.

In another study which formed the thesis for his PhD programme, Budding (2008) looked at the relationship between decentralization, performance evaluation approaches and level of performance in Dutch municipalities. He discovered that decentralisation is highly related to the design and use of more sophisticated cost accounting systems in public organizations and this finding is compatible with contingency literature and even with Miah and Mia (1996) to some extent. His data did not confirm any association between decentralization and performance evaluation measures and, interestingly enough, he found that the performances of middle managers with more authority in decision-making were not evaluated according to the accounting measures. Conversely, the performances of the managers were being evaluated mostly by non-financial measures and this could have a positive effect on managers' behaviour and performance and consequently on organizational performance.

Three contingent variables, namely governmental policy, information technology and organization size, are said to be influential on the effectiveness and appropriateness of the type of control system in governmental organizations (Woods, 2009). Another

contingency-based study in the public sector, and the only study on universities' accounting systems - as far as the researcher could find – is the PhD thesis by Broad (2001). He found that Contingency Theory plays an explanatory role regarding the advancement of universities' accounting systems, but just for one section of UK universities - the former polytechnics. The collected data showed that, in that kind of university, financial pressures during the 1990s encouraged and facilitated the changes in their accounting systems as they used to over-rely on governmental funds. Before proceeding to the area of performance management it seems necessary for the sake of completeness to look briefly at a subsidiary branch of contingency studies in governmental organizations in the next subsection.

3-2-6-2. Specific Contingency Model of Accounting

In another branch of accounting studies, Governmental Accounting, Lüder (1992) tried to elaborate a contingency model for governmental accounting innovations. Based on extant literature at that time and his personal observations, rather than any vigorous empirical research, he proposed a four-part model including initial motivations, structural variables regarding users of information, structural variables influencing producers of information, and obstacles for innovations to be implemented.

Luder proposed capital market, external standard setting, financial pressures, financial scandal and professional interest as important drivers for change in accounting systems in the public sector. Administrative culture, political competition, and employee hiring and training in the area of information producers and political culture, as well as socioeconomic position in the area of information users can play a role as contingent constructs in governmental accounting systems. Of course, in implementing new procedures and practices, a public organization might face one or more barriers such as existing legal system and regulations, extent of government authority, organizational traits and accountants' qualifications. Following Luder, some other researchers tried to develop, purify and enrich the governmental accounting contingency model (for example see: Monsen and Nasi, 1998, Chan et al., 1996), but few significant empirical studies seem to have tested the whole model or parts of it.

A review of previous contingency-based studies in the public sector revealed four points to benefit the present research. First, it implied that extending the contingency postulates of private companies to public organizations is not unprecedented or invalid and it creates a kind of legitimacy for this study to adopt some of the other contingency propositions that have been tested in the private sector, giving the researcher hope of finding some compatible results. Second, the results of these kinds of studies show that the main part of the findings in the private sector is compatible with the context of public organizations; in some parts, however, there is a clear discrepancy between the nature and behaviour of private and public organizations, so those kinds of postulates may not be adaptable completely for the public sector. Third, relating to parts of the present study, for example the effect of financial pressure and reward system, no work has been undertaken in this area. The final point is that Higher Education, as an important part of the public sector, has not received sufficient attention in these kinds of studies. Therefore, the researcher will attempt to consider these points in this study as some of the contributions of the present research may lie in this area. As this study will extend the contingency framework to the area of performance management, it seems useful, and even necessary, to review some related concepts and studies in performance management, so the next part of this chapter is devoted to that.

3-3. Part two: Related Studies in Performance Management

Although it seems difficult to give a precise definition of performance management[27], it could generally be defined as a combination of steps and techniques to provide a reasonable system for an organization to be sure that its objectives will be fulfilled at a rational level (Otley, 1999). Every company or institution is interested in knowing what its past situation has been, where it is at present (level of performance), and what it could and should be in the future (objective setting). They also want to know how they can reach the desired situation in the future (strategy) and find some criteria to reassure them about the right or wrong direction (feedback) that lies ahead (Lebas, 1995).

[27] Performance management is a broader approach compared to performance measurement as performance measurement is perceived as just one step of performance management (Otley, 1999).

Perhaps the first picture of performance that comes to mind is the role of individuals; some may think that this can be improved simply by the employees' performance development, but the role of organizational variables on quantity and quality of performance should not be ignored *(Den Hartog et al., 2004)*. Therefore, performance management can in fact be analysed on at least two different levels: individual and organizational levels. The individual level of performance management is mainly concerned with the area of human resource management, while the management accounting studies are much more related to the organizational level (Otley, 1999). Performance management has also been tied to performance measurement and, in some situations; one of them may be used mistakenly instead of the other one. Although there may seem to be little difference between performance measurement and management, moving from the former to the latter could be considered a big step since there are many measures and performance measurements in some companies, but they do not or cannot use them to manage their performances (Otley, 2001).

Anyway, performance measurement is just one part or phase of performance management and it would be better to have a performance management before any performance measurement (Lebas, 1995) to be able to use the measures effectively and in a predefined and systematic direction. Two main tasks of performance management are the proper use of performance measurement for managing organizations and the prediction of necessary changes in strategies to be able to adapt the organizations to new situations (Amaratunga and Baldry, 2002). During the last three decades, performance management has attracted a large volume of researchers' efforts in all aspects and levels, as the following three subsections will verify: more relevant performance management studies in the private sector, public sector and Higher Education.

3-3-1. Performance Management Studies in the Private Sector

For many years and without any explicit agreement, in most private-sector companies and organizations performance has ultimately meant the simple maximization of profits and this may still be true although the word 'performance' can have many different meanings varying from efficiency to robustness and resistance (Lebas, 1995).

3-3-1-1. Traditional Performance Management

For many years performance management systems have been mainly financially oriented and a budgeting system has been considered a common performance management system in private organizations, although nowadays it might be called a traditional performance management system (Otley, 1999). In one view performance management has three different stages, namely objective-setting, managing performance towards objectives, and measuring performances and comparing with targets (Winstanley and Stuart-Smith, 1996). In another opinion a good performance management system is one that covers all the five-phase functions including objective-setting, strategy-defining and implementing, performance measurement, rewarding system, and feedback-providing (Otley, 1999). For many years, a budgeting system has been considered the best performance management system in private companies. Economic Value Added[28] could also be called a financial-based performance management system. Otley (1999) has reviewed the compatibility of these systems with the above-mentioned steps as a proper performance management system.

Researchers have investigated different aspects of performance management systems such as their effectiveness and influence on organizational performance, implementation process and problems, subjective criteria and lack of objectivity in performance indicators, and essence of performance management; they have widened their perspective to look at different aspects, not just financial issues and employees' performances.

3-3-1-2. New Forms of Performance Management

Undertaking a stakeholder approach in one case-study, Winstanley and Stuart-Smith (1996) tried to look at the ethical aspect of a performance management system. They found that a holistic view of designing and implementing a performance management system which covers organizational, individual, customers' and other stakeholders' interest can maximise the effectiveness of such a system. They proposed that, with respect for individuals, mutual respect, use of reasonable criteria, and clarity in

[28] "Economic Value Added has been developed by the Stern Stewart Corporation as an overall measure of financial performance that is intended to focus managers' minds on the delivery of shareholder value" (Otley, 1999, p 371).

decision-making, a performance management system could be guided towards a more ethical approach. For some years, many researchers in accounting, management accounting and management had been claiming that reliance only on financial measures and information could not convey a clear and comprehensive picture of an organization's performance, and that other criteria and information should be considered in decision-making, planning and control in institutions.

In 1991 Fitzgerald *et al.* proposed a normative model for performance management (PM) in service organizations; it had three components including a control system surrounding PM, a reasonable level of organization of PM analysis, and some different dimensions for PM. This new model was called Results and Determinants Framework (Fitzgerald et al., 1991). To manage their performance firms were recommended to consider six features of performance. On the one hand, these features gauge the results of a firm's strategy, namely competitiveness factors such as market position or customer loyalty and financial parameters such as rate of return, liquidity, and profit. On the other hand they measure the determinants of that strategy's success in terms of quality, flexibility, innovation, and resource utilization (Ballantine et al., 1998). Performance Pyramids and Hierarchies, Intangible Asset Scorecards, and Balanced Scorecards are the results of other efforts to integrate financial measures with non-financial ones (Chenhall, 2005). This kind of initiatives in performance management finally resulted in a more general view of performance management that is called Balanced Scorecards.

3-3-1-3. BSC, a Holistic Form of Performance Management

It seems that the most explicit and systematic work in this area is Kaplan and Norton's proposal, the Balanced Scorecard (1993). With the development of the Balanced Scorecard (BSC) (Kaplan and Norton, 1996c) a turning point was reached in performance management because this system tries to link the use of non-financial measures as well as financial measures with organizational strategy; this could be called a strategic performance management system (Chenhall, 2005). They proposed four categories of measures to gauge an organization's performance; each group looks at performance from a different perspective including shareholders (financial measures), customers, internal process, and learning and growth. In their opinion, building a balanced emphasis on all of these groups leads organizations to better

performances and there are positive interrelationships among all the measures. These measures should be rooted in a company's strategy to assure the achievement of its objectives.

They claimed some exclusive benefits from implementing BSC including the possibility that companies could focus on their strategic vision, thereby sharply increasing the likelihood of achieving it. Moreover, BSC not only looked at past information but also at present and, mostly, future-oriented information. In addition, a balanced stress on all important aspects of operations including internal and external measures helps managers to control all dimensions of the company without sacrificing one aspect to support others. More importantly, BSC gives managers a holistic view of performance measurement and an integrated set of information. However, it seems that the most important feature of these kinds of performance measurement systems is their capacity for information integration (Chenhall, 2005).

Many studies have been conducted to determine whether this new instrument is effective and can improve organizations' performance. Most of these studies involved private and for-profit organizations. Hoque and James (2000) found that, whenever companies use BSC more comprehensively, their performance continuously improves. Conducting a survey of 66 Australian manufacturing companies, they also discovered that larger companies with shorter product life cycles are more interested in using BSC, but there is no relationship between market position and use of BSC. Furthermore, no moderating effect could be found regarding the size, product life cycle and market position on the relationship between use of BSC and better performance in those companies. Other researchers also found supportive evidence for a positive relationship between BSC and enhanced performance in organisations (for example see Davis and Albright, 2004).

On the other hand, some researchers could not discover a reliable association between use of BSC and improved performance in organizations. Ittner *et al.* (2003) undertook an empirical study to assess the effect of strategic performance management including BSC on the performance of firms providing financial services in the USA. Although they hypothesized a positive relationship between the use of BSC, economic value measures, and causal business models and performance improvement, collected data

showed only an insignificantly positive association between extensive use of BSC and sales growth and other stock market measures, but a negative relationship with return on assets (ROA). BSC has also been criticised as a performance management technique which does not cover all the steps of a performance management system, especially in rewarding incentives (Otley, 1999).

In the review of performance management in private sector, besides exploring basic concepts and direction of performance management the concentration was on just two points that are more related to this study. Firstly, a shift from relying just on financial or quantitative measures to a multi-dimensional and comprehensive set of measures to evaluate organizational performance is the core idea of BSC and other similar concepts. Secondly, absolute advantages of this shift have not been accepted by everyone as different research has reached different conclusions, so more investigation in this regard could be helpful. In the next section, recent studies on performance management in the public sector are briefly examined.

3-3-2. Performance Management Studies in the Public Sector

Management in governmental organizations has traditionally been hierarchical and based on extensive and intensive forms of bureaucracy (Ezzamel and Willmott, 1993). Over the last two decades several theories have been suggested to improve management in public sectors (Strehl et al., 2006). The most important theories in this regard could be mentioned as follows: New Public Management (NPM) (Hood, 1995); New Institutional Economics (Williamson, 2000, Daniel, 2001); and Good Governance (Turner, 2005).

According to the NPM literature, the management approaches and techniques used in private-sector and for-profit companies could and should be used by public-sector and not-for-profit organizations. Examples include decentralization of decision-making, giving more autonomy on global budgets, encouraging competition between institutions, distinction of goals and objectives through performance agreements, emphasis on outcomes rather than process and compliance with rules, and prescribing use of private-sector management instruments such as managerial accounting, production management, resource management, strategic management and marketing; these are the core and hub of NPM Theory (Hood, 1991).

The other notion which has emerged during recent years is Governance or, more to the point, Good Governance (Strehl et al., 2006). The main aspects of Good Governance are certain management concepts, for example transparency, responsibility, accountability, participation and responsiveness (Turner, 2005). Good Governance is a new approach for managing governmental and public organizations in a more efficient and effective way in this changing and modern world. The other consequences of Governance are fewer regulations, differentiation between leadership and management functions in the public sector, decentralization, privatization, outsourcing of tasks, contractual relations between central government and decentralised institutions according to the principal-agent and performance management and, finally, adoption of new management, financing and budgeting principles.

Moreover, the New Institutional Economics[29] model (Williamson, 2000) has had its own effects on defining a new contractual framework between government as a centre and its affiliated organizations. The New Institutional Economics, which was invented by Oliver Williamson in 1975, concentrates mainly on markets and hierarchies examination by emphasising the concept of Transaction Cost Economics[30] (Ahmed and Scapens, 2000). Following the aforementioned theoretical insights that influenced management as well as performance management in the public sector, this area of knowledge has been examined from many angles by researchers. It seems that use of Balanced Scorecard technique, different approaches to performance measurement, intended and unintended consequences of performance management systems, and relationship between accounting and performance management are the most relevant aspects of performance management in the public-sector context to the present study, so these topics are explored here.

3-3-2-1. BSC in the Public Sector

Many researchers have studied the possibility and usefulness of BSC implementation in public organizations. The examples set out below briefly show these kinds of

[29] The aim of New Institutional Economics Theory "is to explain what institutions are, how they arise, what purposes they serve, how they change and how - if at all – they should be reformed" (Klein,2000, p. 456) .
[30] See footnote number 18.

attempts. For BSC to become more useful in any given circumstances it could be adjusted in terms of its perspectives (Kaplan and Norton, 2001b); for example, some perspectives can be added to it or the situation of one perspective could be changed. Kaplan himself (2001) tried to justify the usefulness of BSC implementation in not-for-profit organizations by reporting the results of several case-studies and observations in organizations which had been using this technique as their performance management system. He claimed that BSC helped the not-for-profit organizations to a position where they can be evaluated on meeting society's needs rather than on the amount of money they have raised or expenses, they have cut. BSC has also assisted them to narrow their strategy as far as it is achievable and translate that strategy into clear and measurable actions to be accomplished each day. He concluded:

> It has enabled them to align initiatives, departments, and individuals to work in ways that reinforce each other so that dramatic performance improvements can be achieved. Used in this way, all organizational resources—the senior leadership team, technology resources, initiatives, change programs, financial resources, and human resources—become aligned to accomplishing organizational objectives (Kaplan, 2001, P 369).

More interestingly, he found that in two of the cases that have been studied, after senior managers' change, Performance Management Systems could not survive due to the lack of full commitment of new managers to the BSC. This was reasonably similar to the situations that had been observed in private-sector companies.

The usefulness of BSC was investigated in healthcare organizations in Sweden and was found suitable for such a professional environment, leading management from a "top-down" style towards a sort of "clan control" approach (Aidemark, 2001). It could reduce goal uncertainty, increase facilitated communications between doctors, managers and even politicians and initiate a review of objectives and strategies. Another set of studies' findings showed that adopting BSC as a performance management system can help with the implementation of Best Value[31] strategy in UK local governments (McAdam and Walker, 2003). However, Broad *et al.* (2007) could not find strong evidence to support the idea that the use

[31] The main aim of Best Value is to improve local governments' performance continuously and enable them achieving the NPM goals (McAdam and Walker, 2003).

of performance measures can facilitate strategic decision-making and resource allocation in the public-sector context. They also failed to discover a strong interrelationship between financial perspective and other perspectives in terms of BSC in such organizations.

Kasperskaya (2008), undertaking two case-studies in two Spanish city councils and in the light of two concepts of Institutional Theory, namely Old Institutional Economics[32] and New Institutional Sociology[33], tried to evaluate the outcomes of BSC implementation. The researcher found that, in both cases, all aspects of institutional isomorphism have played their role in BSC implementation; legal mandate forced them to adopt it (coercive isomorphism). She looked at other city councils that had successfully implemented BSC (mimetic isomorphism) and tried to use her knowledge gained from attending courses on the essence and implementation of BSC (normative isomorphism). However, in one case the use of BSC was considered very artificial and ceremonial, unlike the other case which used it more practically and profoundly. Moreover, in the first case, a new complex strategy had been defined just to complete the implementation of BSC; it then caused divergence between the existing strategy and the new one, making the new one merely an emblematic plan and practice. Conversely, in the latter case the extant strategy and BSC measures had been tied to each other; therefore, each one could support the other, thus enhancing the chance of achieving the objectives. Therefore, it seems that the usefulness of BSC practice in public organizations mostly depends on the extent of the efficiency and legitimacy of implementation.

3-3-2-2. Other Bases for Performance Measurement

Many researchers in this field of study advocate measuring performance of public organizations according to their outputs and outcomes. In many countries, Governments have been trying to make a kind of link between allocating budgets

[32] Old Institutional Economics tries to explain the role of institutions in forming economic behaviour in evolutionary conditions. Burns and Scapens (2000) employed and developed this theory for studying managerial accounting changes, arguing that organizations will better accept the new techniques and rules of management accounting that are more compatible with their existing methods.

[33] The core concept of this notion (coined by Meyer and Rowan, 1977) is that institutions build their appearance based on societies' dominant rules and expectations (Kasperskaya, 2008). These two concepts were employed to explain some stimuli for the adoption of Balanced Scorecards.

to governmental organizations and their performance results (Carlin, 2004). Outcome-based performance measurement in governmental organizations is somehow the opposite of the traditional approach to performance measurement which is mostly based on several factors including input, processing and output constructs (Buckmaster, 1999).

The clear distinction between output and outcome is important in this issue; whereas one may be applied, the intention of the other has no vivid definition. Outcome in this context is more comprehensive than output and should be measured with an overall view to gauging the effect of a performed programme on attitude, behaviour, position, skill or welfare of targeted people and community, and it is mostly subjective; meanwhile, outputs could be referred to as direct objective products of that programme in terms of service unities (Buckmaster, 1999).

Heinrich (2002) undertook an experimental study to assess the accuracy of administrative data for estimating the control of public management and system-design factors on outcomes of federal job-training programmes. The collected data showed that it is unlikely that administrative data are able to fully convey the impacts and outcomes of such a programme, although they could still provide helpful information for mangers to correct the directions and boost the organizational outcomes. Although, theoretically, outcome-based performance management is preferable to the output-based type (de Bruijn, 2002), it is not such a simple matter to design a reliable performance management system based on outcomes, and it could always be questionable (Heinrich, 2002), complicated and time-consuming (Boland and Fowler, 2000); therefore, the trend is mostly towards the use of some clear and accepted performance indicators for budget allocation and accountability in governmental organizations (Boland and Fowler, 2000).

3-3-2-3. Results of Performance Management

Performance management could have many positive consequences as well as several unintended outcomes in governmental organizations. More transparency, increased accountability, rationalized and improved process and enhanced outputs are the common positive outcomes of performance management systems (de Bruijn,

2002). Nevertheless, Goddard (2005) asserted that the influence of budgeting practices on accountability in UK local governments is greater than certain new techniques proposed by New Public Management, such as performance indicators or Value for Money (VFM)[34].

By taking "efficiency" and "the amount of service provided" as quantitative performance and "accuracy", "quality", "innovation" and "employee morale" as qualitative performance, Verbeeten (2008) attempted to assess the effect of a performance management system on organizational performance in both aspects of quality and quantity. The data were collected via questionnaire within 93 organizations in the public sector of the Netherlands. Based on the definition of performance management as the process of objective-setting, strategy-choosing, correct decision-making, and performance measuring and rewarding, he tried to assess the relationship between each part of the definition and organizational performance. The collected data supported the positive association between clear objectives and quality and quantity of performance, but the reward system was simply related to the amount of work produced rather than the quality of that work.

However, too much emphasis on performance indicators for performance evaluation in the public sector could cause many dysfunctional results (Smith, 1993). De Bruijn (2002) has mentioned game-playing, more internal bureaucracy, hindrance of innovations and ambitions, conflict with professionals, and weakening organizational responsibility as some of the unwanted effects of performance measurement in the public sector. Reviewing the literature, Van Thiel and Leeuw (2002) have also summarised the side effects of performance management in the public sector including more regulations, increased audit expenses, obstacles to innovation, ignorance of quality, sub-optimization, tunnel vision, inflexibility, measure pressure and tension, and converting to routine and symbolic actions. They then proposed the performance paradox which is the difference between real performance and what has been measured and reported. The performance paradox mainly occurs when performance indicators lose their sensitivity and accuracy over time due to changes in situation and people's behaviour. Positive learning, negative learning, selection and

[34] VFM tries to maximize outputs from a particular amount of resources by assessing three criteria - economy, efficiency, and effectiveness - in using those resources (Butt, 1987).

manipulation can result in weakened performance measures and, consequently, a performance paradox which could present the performance level as greater or even less than its real level.

They gave several reasons for unintended performance paradox such as the limited number of performance indicators, one-dimensional and simple ones, ambiguousness in objectives, non-measurability of certain goals in the public sector, and excessive stress on performance measures as exclusive criteria for evaluation. It seems that commercialization and anti-professional actions are the most common outcomes of New Public Management and performance management in public organizations. Therefore, this kind of management in governmental organizations is probably not a perfect approach for achieving their objectives, so many adjustments and improvements should be made in present performance management systems (Adcroft and Willis, 2005).

3-3-2-4. Accounting and Performance Management

It appears that most companies in the private and public sectors are still keen on using quantitative performance indicators which are mostly based on accounting information rather than other criteria (Modell, 2004). It seems that the most significant application of accounting systems in governmental organizations is the budgetary control aspect (Ramadhan, 2009). The budgeting system, which is now called a traditional form of control and performance management system, has more influence on accountability in public organizations compared to the new practices proposed by New Public Management (Goddard, 2005). The use of financial and accounting information for performance management and even pricing process in governmental organizations has been increased due to the new forms of competition and advanced management practices (Ballantine et al., 1998).

Martí and Vía (2007) conducted a study to investigate the association between accrual basis of accounting system, fiscal decentralization (delegation of decision-making in revenue, expenditure and control to the lower level of government) and Governance indicators in 26 member countries of the Organization of Economic Co-operation and Development (OECD). The focused secondary data supported a significant positive relationship between using the accrual principle in accounting system and having

decentralized financial management and improvement in Governance measures; however, the correlation between financial decentralization and accrual accounting was not found to be significant. Based on this, they concluded that, for increasing accountability, transparency and openness as proposed by Governance, it is essential to change the basis of accounting systems from other bases such as cash basis to the accrual basis.

Broad *et al.* (2007) conducted an empirical study using Grounded Theory to discover the relationship between organizational strategy, accounting and performance measurement system in universities and City Councils at an organizational level. They found that the managerial approach is highly centralized, structured and formalized in the City Councils; conversely, in the Higher Education Institutions this approach is mostly decentralized, informal, and open. The perception regarding performance management and performance indicators in the Local Government Institutions was also bureaucratic and firm, both in design and in practice, while in Higher Education Institutions it was much more flexible and unstructured. In other words, performance management was not being perceived as important and valuable by all levels of the universities' members and by the lower levels of the Local Government members in contrast to how it was being judged in the minds of the City Councils' managers. The connection between accounting and performance management and strategy occurred primarily through the budgeting system, ranging from a one-year planning tool to a long-term strategy in different studied cases, although there was a separate reporting system for each of them and no sufficient closeness could be found amongst them.

Based on this brief review of performance management in public sectors, some clues for this study can be explored. The implicit influence of new theories and concepts such as NPM and Good Governance on initiating new reforms in Iran's Higher Education cannot be ignored (Mehralizadeh, 2005). Consequently, expectations of private companies' management and accounting practices being used in public organizations including Iran's governmental universities may not be far from reality. Reviewing different approaches to evaluating performance in public organizations as well as their outcomes would be helpful to link those approaches to performance measurement in the context of this study. Finally, it may provide some understanding and anticipation regarding the relationship between accounting and performance

management in the universities. More related and exclusive points about performance management in Higher Education can be found in the next section.

3-3-3. Performance Management Studies in Higher Education

The Higher Education sub-sector as a part of the public sector has also been studied from different angles in terms of performance management due to its importance, magnitude and various exclusive characteristics in this field. Staats (1976) mentioned several difficulties which universities were facing, such as financial crisis, weakness of public confidence in the value of higher education, change in educational demand from the arts to the vocational subjects, and rapid expansion and large diversification in knowledge and majors. Some of these problems, for instance fiscal pressure and expansion and diversification, are still present while a number of new problems have been added to the previous ones, such as more demand for better accountability, quality, efficiency and market orientation in management and financing (Maassen, 2000).

What has been mentioned in the previous section concerning change and evolution in the management of public organizations could evidently be true in Higher Education Institutions. Therefore, many studies have also been undertaken in this field to investigate the different features of performance management in universities. To comply with the aim of this study, these features could be categorized as follows: external stakeholders, decentralization and autonomy, performance indicators, and use of total quality management (TQM) and balanced scorecard (BSC) in higher education.

3-3-3-1. External Stakeholders and Performance

Universities have been confronting many challenges in recent years. Financial problems, market orientation, demand for more accountability, greater quality and efficiency, rapid expansion and more diversity are the main fields of universities' concern (Johnstone et al., 1998). Government, as the main stakeholder of universities, has tried to improve their efficiency using various instruments. One of the most available and influential tools for them is the budget and funding approach. Maassen (2000) studied the funding structure of universities in several European countries and analysed its effects on their staff, students and qualities. Another study has shown the

role of fiscal resources as an internal incentive to implementing a strategy in colleges or universities (Powers, 2000). According to Liefner (2003), different forms of funding systems and resources allocation affect the level and type of performance in universities, but these effects usually last for just a short time.

Broadbent and Laughlin (2006) argue that the regulatory mechanism could be one of the most important influential factors in the design and development of performance management systems in Higher Education Institutions. More interestingly, they assert that, amongst the many regulations enacted by different bodies concerning universities in England, those originating in local funding councils, particularly the Higher Education Funding Council of England (HEFCE), have a stronger effect on the performance management system in the universities. So, since governmental universities in many countries (Maassen, 2000) including Iran (Malekzadeh et al., 2001) are still funded by governments, they can influence performance management and performances in those universities. However, different approaches to budget allocation could also create some financial problems for the universities.

3-3-3-2. Autonomy and Decentralization

Academic freedom and a tendency to autonomy have been considered important characteristics in the higher education environment, although this does not mean that universities are interested in or entitled to exemption from performance evaluation and accountability. Governments, then, should try to avoid any clash between the legitimate requirement for more accountability in Higher Education and the pivotal need for autonomy in universities (Berdahl, 1990), although this may seem inaccessible in some cases. It might seem an exaggeration, but many believe that one of the key reasons for the significant success and excellence of US universities could be autonomy and independence in decision-making (Leveille, 2005). Leveille (2005) argues that, for any system design to increase accountability in Higher Education Institutions, it is important to maintain and protect the institutional independence and autonomy as well as coordination and collaboration for students and transparency to the public to show that the main objectives are being achieved and the money is being spent wisely.

Aghion *et al.* (2007) found that budget autonomy could almost double the universities' research performance. They concluded that more autonomy in the use of budget, hiring, rewarding, and course designing and student admission could improve the performance of universities. Schools with autonomy in hiring, salary, budget and course content are performing better and their students' achievement is higher (WoBmann, 2007). In an empirical study, Kempkes and Pohl (2008) hypothesised that German universities located in the states which give them more autonomy are more efficient in terms of cost and money than those in the states with restrictive regulations and which offer less autonomy to universities. Collected data from 67 governmental universities confirmed the proposed hypothesis. Therefore, it seems that the necessity of autonomy and delegation of authority is considered important for the universities to improve their efficiency and performance in all areas of activities.

3-3-3-3. Performance Indicators

In most of the studies related to the performance of Higher Education Institutions, research area and teaching area are considered separately and several performance indicators have been proposed for each. They also looked at one other section under different names such as financial position, service section, administrative section, or support division. Comparing departmental performance in a Higher Education Institution, Clement and Stevens (1989) investigated several activities in teaching, research and service. The significance of published papers, other publications and other research projects were assessed to evaluate the research performance. To assess education performance, they examined the importance of student entrants, peer evaluation, and course contents.

It is claimed that prestige could be considered one of the main objectives of universities and is defined by other factors whereas the objectives of stakeholders may differ from those of the university itself; however, meeting one's objectives somehow means the other's goals are also achieved (Johnes, 1992). Many of the studies on performance evaluation in UK universities have used degree quality, student attrition and research productivity as the three main categories of performance indicator in universities (Johnes, 1992). Johnes argues that none of these indicators can accurately gauge the universities' performance in terms of efficiency and productivity, although the use of such yardsticks is somehow inevitable.

Sizer *et al.* (1992) undertook a comparative study to explore the definition and use of performance indicators in the higher education sectors of five European countries including the UK. They argue that the role of performance indicators in universities is strongly related to the political background, budgeting system and quality evaluation methods. Five functions have been mentioned for performance indicators, namely screening, assessment, communication, decision correction and resource allocation (Sizer et al., 1992). Therefore, based on Otley's framework for a performance management system (Otley, 1999), a performance indicator can somehow be considered as a performance management system. The federal government in Australia also imposed an institutional assessment framework on governmental universities using three categories of key performance indicators, namely financial viability, teaching and learning, and research and research training, to evaluate and report on universities' performance (Guthrie and Neumann, 2007).

Suryadi (2007) proposed a framework for gauging performance in higher education in three main areas of universities' activities including teaching, research and supporting functions. Quality of instructors, course quality and variety are some examples of criteria in the teaching area. In the research area, the number of patents and national and international publications have been suggested as instances of performance indicators while in the supporting function area operational cost, electricity use efficiency and IT down time can be considered. The other complete form of performance indicators can be found in BSC (Chen et al., 2006) which has been implemented in some universities as well as many other public organizations. To sum up, it seems that consensus on an acceptable set of key performance indicators (KPIs) for Higher Education has not been achieved; however concentrating on three different areas of activity including education, research, and supportive activities and employing some suitable KPIs are common to all studies.

3-3-3-4. Use of TQM and BSC

By imposing more financial pressures on universities and proposing the use of new management accounting techniques in the public sector, several researchers tried to test the application of BSC and TQM in universities' performance management (Lawrence and Sharma, 2002). For example, Kanji and Tambi (1999) undertook a

survey to discover the extent of TQM use in UK Higher Education Institutions. They found that many universities have begun to apply TQM and it could help them, to some extent, to improve the quality of their performance in many aspects. Willis and Taylor (1999) also tried to assess the employers' perception of the quality of the graduates universities were producing to gauge the impact of TQM in higher education. However, they could not find any significant differences between universities' graduates as employees, based on companies' viewpoint as employers. Grant *et al.* (2004), investigating different features of TQM in US universities, including quality of design, quality of conformance and quality of performance, claimed that implementation of TQM in the US universities is suffering from a lack of quality of performance.

Chen *et al.* (2006), undertaking a case-study of BSC implementation in a private university in Taiwan, found that, in terms of universities' emphases, priority should be given to the vision and mission followed by the financial perspective and then to the customer's and other perspectives. They claimed that the use of BSC with the support of senior supervisors in private universities could improve the educational quality and national competitiveness. They also found that using such a coherent performance management system and linking it to an appropriate and strong budgetary and reward system would create an excellent atmosphere for staff activities. Kettunen (2006) investigated the role of BSC in implementing a new governmental strategy for Higher Education Institutions in Finland. The paper wanted to discover how the universities could set their regional strategies to boost their external influences on the environment. It has been argued that BSC could help managers and employees in each institution to have a better understanding of strategy details and assist them to implement that plan.

A short review of the above-mentioned papers as examples of the papers looking at the use of TQM and BSC in Higher Education Institutions reveals that these techniques have been employed to boost the performance management and performance of universities. However, the application of new techniques such as TQM and BSC in universities could somehow mislead the universities into achieving their goals by producing social goods, and this causes the commercialization of

education, according to the Habermas's critical theory[35] (Lawrence and Sharma, 2002).

In this section, four particular aspects of performance management in Higher Education, in addition to the points reviewed for the whole public sector in previous section (3-3-2), were explored in four subsections. New approaches by stakeholders in allocating funds to the universities, the orientation to give more autonomy and decentralization in decision-making, different classifications regarding performance indicators in Higher Education Institutions, and use of BSC and TQM to improve performance management in these kinds of institutions were examined here. All of these points are related to the different parts of the present study including relevant contingent variables, performance management and universities' performance. In next section, the final section of this part of the study, some papers relating to Performance Management in Iranian universities are reviewed.

3-3-4. Relevant Studies about Iran's Higher Education

Despite a wide search, only nine papers could be found that were relevant to this topic, to any extent, in respect of Iranian universities. Malekzadeh *et al.* (2001), looking at just Medical Science Universities in Iran (see classifications of universities in Iran, section 2-3-2), investigated the progress in all aspects of performance including a rapid increase in the number of universities, faculty members and graduate students as well as a remarkable improvement in Public Healthcare and life expectancy, and a big reduction in infant and maternal mortality and infectious diseases. However, they argued that, in spite of the aforementioned progress and growth in national medical publications, the output of Medical Science Universities in terms of international publications and scientific contributions at a global level is not satisfactory; therefore, to achieve a better performance level, enhancement of quality in research studies and programmes is unavoidable. The result of this study implies that those kinds of universities are evaluated as successful based on certain performance indicators such as expansion, improving public healthcare criteria, training, and national publications,

[35] This theory is based on the concept of legitimating crisis to explore the problems in capitalist societies. It argues that the instrumental reasoning associated with capitalism has stretched in daily activities; and power and money as steering media influence and control all aspects of human life (Lawrence and Sharma, 2002).

but have not performed well in another important performance indicator which is "the amount of international publications".

Sepehri *et al.* (2004) have reported some parts of their project on a pre-study of reform in the mission, objectives and organizational structure of the Ministry of Science, Research, and Technology (MSRT) in Iran. They applied the Business Process Re-engineering (BPR) [36] technique to diagnose the cumbersome and superfluous processes and procedures which have been used in supervising universities. They proposed several new and short procedures to manage universities, mostly in terms of administrative issues, and tried to implement them in one university as a pilot case. They suggested less direct intervention in universities' management by MSRT and shifting the policy-making from the centralized administration, so more delegation of authority to the universities was recommended.

Another paper has been published showing the results of an investigation of recent reform to give more autonomy in terms of decision-making to the universities (Mehralizadeh, 2005). Using a mixed model of planned, dialectical-political and socio-cultural change, he attempted to analyse the reform in three key areas of universities' management, namely financing, performance quality and organizational systems. The researcher claimed that, in this reform, internal and external customers to some extent have been forgotten.

Tarokh and Kaldi (2007) looked at the internal and external customers of Iranian universities from the human resource angle. Using the Supply Chain Management model as an underlying framework they argue that there is no adequate coordination between graduates' skills and quality performance and industry's needs and desires. In other words, graduates are not sufficiently qualified to be considered part of an internationally competitive workforce. Moreover, it is necessary for the universities to have a shorter human resource life cycle in order to provide qualified personnel in an acceptable timescale for industry, which is facing rapid changes in production technologies.

[36] BPR is an approach in strategic management introduced by Hammer and Champy in early 1990s. Based on this approach, existing cycle of activities in an institution is analysed and problematic parts are redesigned (Sepehri et al, 2004).

Ahmady *et al.* (2007), undertaking a survey in three different Medical Science universities, attempted implicitly to investigate the effect of new reforms in universities on faculty members by gauging the extent of role stress and aspects of job conflicts amongst faculty members in that type of Iranian university. Their collected data showed that, in all three universities with a different rank of performance and position, the amount of role stress was the same and at a high level. They concluded that faculty members' job stress and conflict are a result of many drivers including contrary and contradictory expectations from colleagues and managers, insufficient resources for proper performance, limited competency for fulfilling some demands, and an unsatisfactory level of academic autonomy and freedom.

From a slightly different viewpoint, Bikmoradi *et al.* (2009) tried to discover the faculty members' opinion of the governmental management and academic leadership in Iranian Medical Science universities. They also conducted a cross-sectional survey in six universities and found that frail organizational culture and norms on the one hand, and habitual behaviours on the other hand resulted in a low level of satisfaction with the academic leadership. According to their evidence, bureaucratic process, politicization, centralization and traditionalism are the main areas of tension between the academic leadership and the universities' appointed management.

As was mentioned in the previous chapter (section 2-4), one of the aspects of reform in Iran's universities concerns their funding process. According to the 49th clause of the Fourth Five-year Development Plan Act which was approved by parliament in 2004, universities' budgets should be computed based on cost per student from public funds. Gharun (2007) attempted to propose a rational approach to computing the amount of budget per student for different universities and different majors with the aid of an Activity-based Costing technique. Educational, environmental, and capacity and number of students have been suggested as three main categories of drivers for universities' costs which should be considered for estimating universities' budgets based on a per student formula. She argues that use of a modern method of costing in budget allocation to the different universities could enable them to feel more fairly treated and would improve their performances.

Farid and Nejati (2008) argue that universities are currently facing a challenge of quality competition. Therefore, those universities which are able to produce more qualified graduates could be considered successful, thereby attracting and retaining more students; failure to do so would cause lower student enrolment and consequently less funds, less job security and more risk to continuity and stability of the university. Then they proposed a BSC technique as a fruitful tool to assist universities' managers to improve quality and excellence in their own institutions. They used BSC to discover which key performance indicators currently used in Iran's universities are considered more important than others (Farid et al., 2008). They found that "students' satisfaction", "faculty members' satisfaction", "ratio of students to academic staff in master and PhD programmes", "increase in students' tendency to enter school" and "level of performance-based culture availability" are considered the most important performance indicators of an educational balanced scorecard.

Each of the reviewed papers in this section addresses some performance management issues of Iran's governmental universities during the past decade. Unbalanced achievements in terms of key performance indicators (Malekzadeh et al., 2001, Tarokh and Kaldi, 2007), situations of universities before the reform and their need of such a reform and decentralization (Sepehri et al., 2004), and instant consequences of that reform for the universities' financing, management and quality of performance (Mehralizadeh, 2005) were assessed by the first four papers. The other five papers reviewed other issues, such as job stress among faculty members as a result of insufficient resources and contradictory expectations of them as well as a lack of academic leadership (Ahmady et al., 2007, Bikmoradi et al., 2009), the need to adopt a more efficient approach to funding allocation (Gharun, 2007), and accepting the assistance of BSC to manage them as they are entering a competitive phase (Farid and Nejati, 2008, Farid et al., 2008). All of the above-mentioned points are dealt with in this study either directly or indirectly.

3-4. Research Gaps and Concluding Remarks

This chapter tried to review the literature related to this study from a broader perspective, so a more concentrated use of the literature will be made in the Hypothesis Development section (4-5) of the next chapter. Reviewing the literature

relevant to the topic of this research project has uncovered some important points and revealed some gaps related to the context of this study. First, it was clear that there are many contradictory findings in contingency-based accounting research that still need much more work to reach a consensus and compromise on basic points. It is claimed by many commentators that there is still a long way ahead to finalize a generally accepted and comprehensive contingency theory of accounting (Chapman, 1997). Therefore, it seems that any new studies that might be conducted to test contingency postulates regardless of their context and statistical techniques could help to create more opportunity for understanding this controversial, but essentially genuine, theory. In addition, most contingency-based studies in accounting have been conducted in private-sector organizations (Miah and Mia, 1996). There are just a few significant papers regarding application of these theory assumptions in public-sector institutions, so the perception of Contingency Theory in this context is quite narrow. The situation for Higher Education in this sense is even worse, as just one noteworthy contingency-based study could be found in the area of accounting activity (Broad, 2001). Moreover, the number of studies that have used a contingency framework to look at accounting problems is quite limited in the developing countries' context, not only in public-sector institutions, particularly higher education, but also in private-sector organizations both in manufacturing and business sectors. The situation of Iran as a developing country in this case is even worse, despite the promising positions in other disciplines such as medical sciences, chemistry, and space science.

In terms of performance management, although lots of research has been conducted so far in the private sector, in the public sector there are still many equivocal cases to be discovered and examined. In particular, empirical studies with large-scale data to gauge the consequences of different performance management systems on performances of governmental organizations are scarce (Verbeeten, 2008). Besides that, in many developing countries including Iran, the context of this research, performance management in terms of an integrated and pre-designed system using new techniques such as BSC, Results and Determinant Framework and benchmarking, seems new and fashionable; but it is not widely applied either in not-for-profit organizations or in business companies and entities. Furthermore, after the recent reform in Iranian universities' regulations and funding process towards more decentralization from the central government and more autonomy and authority in

decision-making to improve Higher Education's performance, just a handful of studies have been conducted to investigate the impact of this reform on universities' performance. None of these studies has even tried to collect data from the entire population of universities to gain a comprehensive understanding of Iran's Higher Education, at least in the governmental sector, which is the main part of Iran's Higher Education.

From another point of view, an insufficient number of papers could be found which have looked at the relationship between accounting system and performance management system. It cannot be denied that many companies and organizations in both private and public sectors still rely on accounting-based reports and information as a tool of organizational control and management (Modell, 2004). Goddard (2005) found that, in spite of many new performance measurement practices such as performance indicators and best Values For Money, the budgeting system, which is part of the accounting system, can still play a more useful role in organizational accountability. Therefore, it seems valuable to look at the interactions between accounting system and performance management in a large and important part of the public sector, Higher Education Institutions, in a developing country such as Iran. This nationwide research project may somehow be able to fill the gaps in contingency-based accounting studies in the public sector and Higher Education, contingency-based studies in developing countries, performance management studies in the public sector and Higher Education, performance management studies in developing countries, and the performance management-accounting system relationship.

Having reviewed the literature and identified the gaps, it now seems sensible and reasonable to discover the existence and reality of external factors which are currently enveloping Iranian universities and use them as contingent variables to investigate their effects on the universities' accounting system. In addition, since the literature review shows that many studies have been conducted to assess the effects of changes in accounting system on organizational performance in the private sector (mostly) and the public sector (somewhat), it would be interesting to investigate the position of universities in this matter, especially in a developing country such as Iran. Finally, according to the above-mentioned literature in the areas of contingency-based

research and performance management studies, the scarcity of projects which have looked at the interaction between accounting system and performance management with the aid of propositions of Contingency Theory seems evident. It might therefore be considered useful to discover the level of relations between accounting and performance management through the postulates of Contingency Theory in the context of Governmental Higher Education Institutions.

The next chapter, the Methodology Chapter, will present the detailed philosophy, paradigm, strategy, approach and procedures for conducting this study to answer the aforementioned questions. The theoretical models, research hypotheses development, instrument and bases of variables measurement, and a brief introduction to data-analysing techniques will also be explained in that chapter.

Chapter Four
Methodology and Hypotheses

4-1. Introduction

It seems evident that one of the key elements in the success of any research work is the adoption of a proper and appropriate research methodology. If a research project could be assumed metaphorically as a journey, the road and vehicle for this travel could be considered the methodology of the research. What is meant by research methodology here is a comprehensive concept including research philosophy and paradigm, underlying theory, research approach, research strategy, data collection methods, time horizon and data analysing techniques. Therefore, it is very important for every researcher to choose a methodology suitable for the research topic in order to conduct a reasonable and reliable study (Ardalan, 2003).

To perform this research the author has attempted to employ as suitable a methodology as possible subject to certain limitations in terms of time and money, as this is a PhD student research project. Had there been no constraints in terms of time and cost, it might have been possible to conduct a longitudinal survey rather than just a cross-sectional survey[37], collect some complementary data through interview, and analyse them in a qualitative approach as triangulation[38] to enrich the results of the research. However, that approach can be undertaken later in the researcher's career.

This chapter consists of research philosophy, underlying theory, research approach and strategy of the research, theoretical model and hypothesis development, and questionnaire design and variable measurement, as well as a brief introduction to data-analysing technique.

[37] A longitudinal survey produces data regarding a sample at different points in time whereas cross-sectional survey collects data jus at a specific point in time (Gill, 2002).

[38] Triangulation is defined as different method of data collection or data analysis (Gill, 2002)

4-2. Research Philosophy

Depending on different ontology (nature of reality), epistemology (different beliefs about knowledge), and axiology (value-free or value-laden) a research project can be conducted in the light of different philosophies, namely positivism and phenomenology. Based on ontological assumption the reality could vary from certain beliefs in individuals' minds (phenomenology) to an observable and external object (positivism) (Hussey and Hussey, 1997). Epistemology also embraces three aspects of knowledge as a phenomenon including the essence of thoughts and notions, the basis of them and the ways to justify them. Knowledge can be briefly defined as that part of beliefs which is true. Two main approaches are proposed as bases of knowledge, namely observation or perception at the one end of a continuum and interpretation or rationalization at the other end. According to positivist philosophy, the nature of reality is objective and independent of the researcher's mind whilst, in phenomenology, the reality is assumed to be subjective and could be seen differently by different researchers (Rayn et al., 2006). There is no priority among different philosophies per se; however depending on the subject of study and the target of the researcher, one philosophy may be more useful than another (Ardalan, 2003). For example in phenomenology, the outcome of the study could be richer with higher validity, but in positivism it might be more specific and precise with higher reliability (Hussey and Hussey, 1997).

The other dimension that has been added to the aforementioned aspects is the nature of society (Burrell and Morgan, 1979), which ranges from radical changes to complete regulations. Based on that view, four different paradigms for social research were proposed: Interpretivism, Functionalism, Radical humanism, and Radical structuralism (Ardalan, 2003). In the fourth quadrant (Figure 4-1) which is surrounded by objectivism in one dimension (as the representative of ontology and epistemology) and regulation (as a proxy of nature of society) in another dimension, the functionalism paradigm of research takes place. The basic assumptions of the functionalist paradigm are as follows (Burrell and Morgan, 1979):

- **Ontology:** the nature of reality is assumed as solid and external to individuals.

- **Epistemology:** knowledge is obtained through solid facts in the social world, so the researcher is independent of the subject of research and simply collects and analyses such objective facts.
- **Human nature: the** nature and behaviour of humans is determined and controlled by their external environment.
- **Nature of society:** societies are assumed to be regulated with no radical changes.
- **Methodology:** quantitative data can be generated or collected regarding the phenomenon and those data can be analysed statistically.

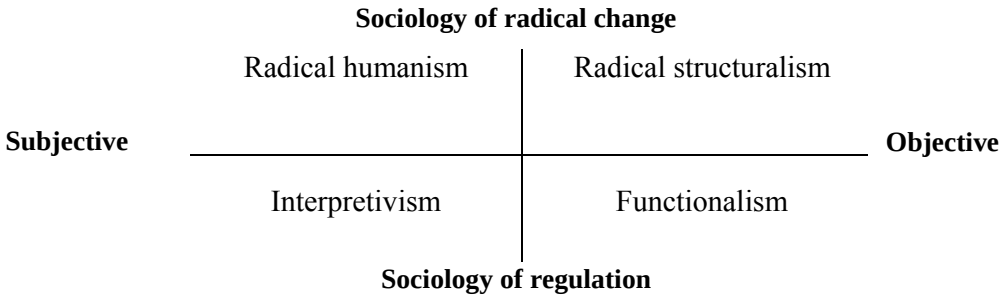


Figure 4-1) The model of Burrell and Morgan (1979) Social Theory**.**

However, the above-mentioned assumptions should not be considered as an exact and clear classification since, based on Figure 4-1, a continuum could be seen for each assumption rather than a dichotomy. Based on this view, Gioia and Pitre (1990) argue that borders between each paradigm are not quite clear, so transition regions may better define borders.

It is argued that societies, institutions, and management and control systems can be assumed to have an observed and realistic presence which can be investigated independently of the researchers' perception and interpretation (Hopper and Powell, 1985). In this research, as in other studies on accounting (Ardalan, 2003, Rayn et al., 2006), it is assumed that the relationship between external variables and contingent factors on the one hand and accounting systems and performance management on the other is an objective reality that would be discovered and confirmed at the end of the study. Particularly in accordance with the assumptions of the functionalist paradigm, the following assumptions are made in this study:

Ontology: the reality of adopted external factors, accounting systems, performance management, and performance of the universities is viewed as material and external to the researcher. Understanding and thoughts of the researcher are excluded.

Epistemology: independent facts and data regarding all the variables of the study will be collected from Iran's governmental universities and those data and facts will be analysed in a systematic way.

Human nature: it is assumed in this study that related human beings, including the researcher and respondents, are determined by external conditions although the element of human free will cannot be totally ignored.

Nature of societies: the nature of contextual society (in terms of the whole country and universities) is assumed to be regulated and not subject to radical changes.

Methodology: to understand the phenomenon, expected relationships between the related variables will be hypothesised based on the findings of previous studies. The hypotheses will be tested through statistical techniques using quantitative collected data.

According to this assumption, there is no need for the researcher to interpret subjective insights and findings; rather, the insights and realities of the relationships could be observed not just by this researcher, but also by any other who adopts the same way of approaching that reality. This relationship is also value-free; it means that no one can say this relationship that might be discovered and confirmed by the researcher is good or bad because the researcher will have had no effect on creating that relationship. To sum up, for this research project a positivist philosophy and functionalist paradigm have been adopted. In the next section, the adopted underlying theory for this study is explained.

4-3. Underlying Theory

This study attempts to investigate the impacts of some perceived relevant factors (decentralization, financial pressure and competitive position) on Accounting and Performance Management Systems of Iran's Governmental Universities. In other words, the main aim of this research is to discover the reactions of Accounting and Performance Management Systems in Iranian Governmental Universities after recent reforms in Higher Education and in the face of other above-mentioned variables.

4-3-1. Alternative Theories

Several relevant Theories seemed to be useful in helping the researcher explore the subject and understand the associations between those emerging variables and probable changes in accounting systems and performance management as well as performance of Iran's governmental universities. As far as the researcher could determine, at least three theories including Agency Theory, Institutional Theory[39] and Contingency Theory seemed capable of shedding some light on the topic of this study. However, neither Agency Theory nor Institutional Theory seemed as useful as Contingency Theory in addressing the questions of this research project. Agency Theory might be able to deal with just one of the issues perceived to affect Iran's governmental universities, the decentralization, which is the delegation of authority from the central government (principal) to the universities (agents). Therefore, two other assumed variables, competitive positions and financial pressure, might not be well addressed by this theory. Moreover, this theory has been employed primarily in the financial reporting and auditing branches of accounting rather than management accounting (Simm, 2010). On the other hand, although all given variables might be dealt with by Institutional Theory, this theory implies that organizations are not keen on changes, so they may accept those changes reluctantly (Robey and Boudreau, 1999). However, it seems that this was not the case for Iran's governmental universities which had been seeking decentralization for many years. In addition, Institutional Theory has not been adopted frequently under the functionalist paradigm. Therefore, it appears that Contingency Theory, notwithstanding many criticisms, (explained in the previous chapter, section 3-2-2) is a more appropriate underlying theory for this study.

4-3-2. Evaluation of Contingency Approach

Contingency Theory in the accounting area, which is classified under the subsection of social science in the functionalist paradigm (Hopper and Powell, 1985), argues that there is no single, proper accounting system for every organization in all situations and environments (Otley, 1980, Fisher, 1995). Core concepts and several criticisms of Contingency Theory were reviewed in the previous chapter (sections 3-2-1 and 3-2-2).

[39] See footnotes numbers 12 and 13, page 34.

Failure to suggest a clear relationship between contingent variables and an appropriate accounting system, not including organizational performance in the models, concentrating only on management accounting systems, and ignoring other components of control system are the main problems proposed by Otley (1980). Assuming that accounting is an absolute and solid technology (Chapman, 1997), the lack of communication between different schools of thought, reliance solely on quantitative data (Chapman, 1997, Chenhall, 2003), and use of different (and in some cases inappropriate) measures to gauge organizational effectiveness (Langfield-Smith, 1997) are other criticisms of this theory. Finally, failing to take a holistic view of interdependencies in organizations and looking at just some aspects of them (Drazin and Van de Ven, 1985, Chenhall, 2003, Gerdin and Greve, 2004) is a common problem of contingency-based studies.

On the other hand, Contingency Theory has been extensively employed by many researchers, as reviewed in the previous chapter, possibly implying that it has some strong points. This approach highlights the structural and behavioural differences in organizations operating in different circumstances while these may be ignored by many other universalistic theories (Miles et al., 1978). This theory is considered as one of those under the functionalist paradigm (Hopper and Powell, 1985) and it could help researchers in formulating and operationalizing their studies including defining models, developing hypotheses, measuring variables and testing hypotheses (Chapman, 1997, Chenhall, 2003).

Therefore, this theory is deemed more appropriate for adoption in the present study and it will be endeavoured, as much as possible, to prevent the above-mentioned problems regarding the theory from affecting the process and outcomes of this research. It is hoped that, in the light of this theory, the present situation of Iran's governmental universities in terms of match between some newly emerged external variables, control systems (accounting and performance management), and performance can be assessed. Based on this assumption, most of the hypotheses in this study will be developed by relying on the premises and postulates proposed by contingency-based studies in accounting. The next section attempts to clarify the strategy and research approach of this study.

4-4. Research Approach and Strategy

Depending on which philosophy is employed to undertake a study, the approach and strategy of the study might be different; otherwise, it could cause confusion or be misleading. It is argued that, when there is a well-developed theory regarding the topic of a research project, adopting a deductive approach could help the researcher in their task, whereas an inductive approach is more suitable in situations where no reliable or generally accepted theory can be found (Gill, 2002). With a deductive approach one or several hypotheses are developed relating to the research problem, based on the framework and postulates of the underlying theory; they are then tested for the collected or accessed data. However, an inductive approach leads the researcher to study, investigate and collect data pertaining to the research problem without any initial hypothesis, and then try to develop a theory to explain the research findings (Smith, 2005). As explained in sections 4-2 and 4-3, a positivistic philosophy and functionalist paradigm have been chosen and contingency theory is perceived as more suitable as the underlying theory for this study. This study will not generate any new theory or notion regarding the accounting system and performance management of Iran's governmental universities; however, it will try to test some relevant propositions of contingency theory in that context. Thus, a deductive approach might be more compatible with this research and is therefore adopted.

Having determined the research approach it is now necessary to choose the strategy of the research. Experiment, survey, case-study, action research, ethnographical, archival research and Grounded Theory could be mentioned as different strategies for carrying out research (Saunders et al., 2007). The research strategy to be adopted should be based on other research bases such as philosophy, paradigm, theory and approach, as well as the possibility and feasibility of that (Saunders et al., 2007). Most of the contingency-based studies have used cross-sectional survey as their research strategies (Chapman, 1997) so, it appears that the most compatible and feasible strategy for conducting this study would be based on a cross-sectional survey, and the adoption of a quantitative research method would seem to be more helpful. In the next section, the hypotheses of this study are developed by providing some supporting evidence from the literature.

4-5. Hypotheses Development

In this section, research hypotheses have been categorized according to the main theme of each group of variables including independent, dependent, and mediating[40] variables. The hypotheses have been developed in three subsections: Accounting System and External Factors; Performance Management and External Factors; and Probable Dissimilarity in Different Departments in response to changes in accounting and performance management system. Although SEM is able to test composite hypotheses due to its ability to deal with multiple relationships at the same time (see sections 3-2-5, 5-4-8, and 5-4-10) these kinds of hypotheses could cause some problems in the result reporting phases. Thus, in this study although the relevant hypotheses are combined under one number, they are at the same time divided into individual hypotheses by attributing different letters such as a, b, and c; therefore each part of the hypotheses can be considered and treated as an individual hypothesis.

4-5-1. Accounting System and External Factors

Although many external factors can affect the accounting systems in organisations and the effects of many of them have been investigated in contingency-based studies, in this particular context just three variables including decentralization, competitive positions and financial pressures have been chosen. The criteria for this selection are clarified as the new emergence of these variables; hence, one of the main objectives of this study is to gain some insights into the consequences of recent reforms in Iran's Higher Education. It is assumed that the existing variables have already had an effect on universities' systems and performances; however, it is not denied that, in a new situation and under emerging new conditions, existing factors may behave differently. Therefore, it would have been better to take into account all possibly related variables in this study, but at least two big obstacles prevented the researcher from doing so. The first problem is related to the limitations of Contingency Theory, some of which are explained in section 4-3-2. All contingency-based studies have undertaken a limited number of variables (Chapman, 1997), so several variables have still not been

[40] An independent variable is a "phenomenon whose variation notionally explains or causes changes" in other variables. A dependent variable is a "phenomenon whose variation" is attempted to be understood or explained. A mediating variable is treated as dependent for independent variable and independent for dependent variable (Gill, 2002).

operationalized and investigated in contingency-oriented studies. For example, although "national culture" as a contingent variable has attracted a certain amount of attention in these kinds of studies, "institutional culture" has not been investigated in this field (Chenhall, 2003). Therefore, in this area of research almost all of the studies have undertaken the Cartesian[41] approach which is based on reductionism, although a handful of studies have attempted to take a Configuration approach and include all relevant variables (Gerdin and Greve, 2004). The second problem concerns the practical limitations (Langfield-Smith, 1997) of including all variables as this might enlarge and complicate the study, placing it beyond the capability of a PhD project in terms of time and costs.

Thus, the expected consequences of just these three factors for the Iranian universities' accounting system and performance management are assessed in this research. As the role of selected external factors in all of the hypotheses will be highlighted, it seems useful to initially clarify the situation of Iranian universities in terms of facing these factors.

4-5-1-1. Decentralization

Decentralization may suggest different meanings ranging from geographical decentralization to delegation of authority for decision-making to middle or lower managers, or from change in organizational structure to more autonomy in gaining revenue and using budgets. Chenhall (2003) recommends that, in research regarding structure, the researcher should be very careful and precise as different senses of the term have been used before, such as decentralization of authority (Bruns & Waterhouse, 1975; Chia, 1995; Chenhall & Morris, 1986; Gul *et al.*, 1994; Libby & Waterhouse, 1996; Merchant, 1981), structuring of activities (Bruns & Waterhouse, 1975) and interdependence (Chenhall & Morris, 1986; Macintosh & Daft, 1987) as well as organic-mechanistic orientations (Gordon & Narayanan, 1984). What is meant by decentralization in this study is the delegation of authority by central government or particularly from the Ministry of Science, Research, and Technology (MSRT) and the Ministry of Health and Medical Education (MHME) in Iran to the Board of Trustees and chancellors of universities.

[41] See explanations regarding the different approaches of fit in section 3-2-2.

For many years there have been debates and discussions on the weakness of universities' performance, and many reasons for it have been advanced, with centralized decision-making being considered among the most important. Although there was an Act[42] dealing with the management of universities by Boards of Trustees for many years after the reopening of the universities following the Islamic Revolution in 1979, the requirements of this Act were not fully met, partly because of the country's circumstances (for example, eight years of war with Iraq) and partly because of imperfections in that law. Hence, most of the universities' managerial affairs, including staff recruitment (even of temporary instructors), faculty members' sabbaticals, curriculum-planning, minor bylaw legislating and target-setting, were decided through a centralized approach by MSRT. In most cases the process was too lengthy, bureaucratic, complicated and cumbersome (Sepehri et al., 2004).

Eventually, after the Fourth Five-year Development Plan Act had been approved by the Parliament in 2004, some basic reforms were introduced to the governmental universities. According to this Act universities are exempt from many laws and regulations such as Governmental Financial Regulations, General Evaluation Law and Governmental Recruitment Law. Besides that, universities can have their own rules and regulations regarding organizational structure, financial transactions, recruitment and administrative affairs, if approved by their Board of Trustees. Thus, it seems that the conditions for decentralization have been prepared for the universities, although the chancellors of universities are still appointed by the government, which could be considered contrary to academic freedom, autonomy and decentralization.

4-5-1-2. Competitive Position

One of the emergent situations for Iran's governmental universities, despite many years of monopoly in all aspects, is their competitive position (Farid and Nejati, 2008). In recent years, students' propensity to use the Islamic Azad University (the biggest non-governmental university in the country) has increased. This propensity is more applicable to female students because, for cultural and religious reasons in Iranian

[42] Universities' Board of Trustees Act legislated in 1988.

society, families prefer to send their daughters to schools in their own cities. Islamic Azad University has branches not only in almost all cities and towns but also in some large villages. Furthermore, this university has attempted to improve its quality after many years of enhancing its capacity (Mehralizadeh, 2005). In addition, many other private universities have been founded in recent years and they have been trying to attract a share of high school graduates each year. Moreover, the increasing possibility of going to other countries in the region for higher education has created another fascinating opportunity for students. The cost of study including living expenses in some of these countries is not much more than in Iran; however, they can also learn a foreign language, which in most cases is English. Besides, universities are being encouraged[43] to fund some of their budgets through research projects and contracts with industry and other governmental and private organizations. The process of this contract acquisition is mostly competitive and via tender. Finally, universities have recently been competing more strongly to achieve a higher ranking in quality and performance, internally and internationally. The Ministry of Health and Medical Education (MHME) has started to rank its affiliated universities and put them in three different categories (first, second, and third class) at the end of each academic year. Besides prestige, some elements of the treatment of this group of universities are based on these ranking results. The Ministry of Science, Research, and Technology (MSRT) is also planning to perform such an assessment in near future. Therefore, it seems that the situation among governmental universities could be considered more competitive than ever before in the history of Iran's Higher Education System.

4-5-1-3. Financial Pressure

In recent years governmental universities in Iran have been under great pressure to increase their capacity and quality in all aspects of their activities; however, not only have their budgets not been increased proportionately, they have even been cut to some extent. Universities' managers during this period have always attempted to find ways of coping with this problem alongside the other difficulties such as environmental changes, high rate of inflation and high expectations (Mehralizadeh, 2005). In addition, in 2006 governmental universities were mandated by the

[43] Clause 49 of Fourth Five-year Development Plan Act was approved by Iran's Parliament in 2004.

Government to increase their faculty members' salaries by more than 60 per cent. This was a very welcome decision from the faculty members' point of view, but it created much more pressure on universities' budgets because they had to pay for this salary rise by cutting other sections of their budgets. Moreover, universities have been asked to enhance their capacity and accept more new entrants each year due to the large number of young people among Iran's population and the increasing number of high school graduates in recent years. However, the universities' funding has not been raised commensurately and this has been another cause of financial pressure on universities. Therefore, they have been attempting to overcome this problem by exercising stricter control over their expenses in other areas and discovering new resources to earn extra money, such as research contracts, vocational education contracts, and even renting out their superfluous buildings and facilities.

4-5-1-4. External Factors and Improved Accounting System

The literature review revealed that the type of organizational structure impacts many features of organizations including their working efficiency, encouragement of staff, and control system (Chenhall, 2003). Burns and Stalker (1994) divide structure into two general categories, namely mechanistic and organic. In a mechanistic approach more emphasis is placed on the rules, regulations and procedures, whereas more interaction, sophisticated liaison and meetings with employees are considered important in the organic approach. It has been argued that an organic approach is more compatible with uncertain environments. Based on organizational theory, an organic structure would be more compatible with a management control system which provides more flexible and open information instead of restricting emphasis on budget figures (Chenhall, 2003). Broad scope and comprehensive information with predictive characteristics could better serve organizations with this type of structure (Gordon and Narayanan, 1984). Abdel-Kader and Luther (2008) also found an association between decentralization and level of sophistication in management accounting systems. They defined sophistication as the system's capability to prepare a wider variety of information which is necessary for managers to carry out their duties. Budding (2008) conducted research in Dutch municipalities and found that decentralization is related to design and use of more sophisticated management accounting systems.

Several studies have used a contingency framework to gauge the effect of competitive positions on organizations' accounting and control systems. Khandwalla (1972) found that, in competitive circumstances, demand for control in organizations will increase and organizations are likely to spend more money on their control systems. He also discovered that greater competition leads companies to change their accounting systems to more sophisticated ones and make much more use of accounting information. Organizations which face more intense competition might try to change their management control system and adopt some new techniques to help them survive under the pressure of competition (Cooper, 1995).

Whenever the competitive situation is intensified, the importance and scope of required information from the accounting system will increase (Bromwich, 1990). Of course, to gain a competitive advantage from formal information of a management control system, it should be used interactively (Simons, 1990). Managers' greater use of accounting information could be considered an important indicator of information enabling managers to perform their jobs accurately when there is intensified market competition, and it could mediate between market competition and organizational performance (Mia and Clarke, 1999). An accounting system should be able to provide a broad scope and integrated, aggregated and timely information for firms; otherwise, it cannot be viewed as an appropriate accounting system by managers (Chia, 1995). Undertaking an empirical study, Hill (2000) confirmed that competition in US hospitals positively influenced them to change and improve their costing systems. Recently, Ax *et al.* (2008) also found that intensity of competition positively correlates with the adoption of target costing as a new management accounting technique. Cavalluzzo *et al.*'s findings (1998) highlighted the importance of external competition to governmental efficiency and accounting system design and use. Another study confirmed that, in competitive positions, those companies that adopt a differentiation strategy are more likely to use a greater amount of advanced management accounting techniques (Baines and Langfield-Smith, 2003).

Financial pressure has been considered one of the reasons for the development of cost accounting systems in hospitals (Orloff et al., 1992). Reid and Smith (2000) found that most of the companies in their research sample had started to develop their management accounting systems during periods of cash flow crisis, deficit of finance,

or innovation. These developments mostly involved the use of Just-in-Time technique, Activity-Based Costing and Value Analysis and had taken place at times when firms were facing financial budgetary pressures. When organizations face situations that impose restrictions on their revenues, they try to apply new methods of management accounting such as allocation of overhead costs (Cavalluzzo et al., 1998). The association between financial pressures and evolution in one section of UK universities' accounting systems – the former Polytechnics – was confirmed (Broad, 2001). In spite of the recognition of financial pressure as one of the problems that Iranian universities are currently facing, there is a very limited amount of relevant literature on this subject to suggest that a more efficient accounting system could help them. Hopwood (2001) argues that there is great pressure on public organizations to make their accounting more efficient as well as more influential in a broader area of activities. Nevertheless, Mail *et al.* (2007), undertaking a qualitative case-study in the public sector of Malaysia, found that financial pressure was unable to change the management accounting practices in that case, either technically or conceptually. Therefore, the first hypothesis of this study could be proposed as below:

H1. Iranian universities which are (a) more "decentralized", (b) facing more intense "competition" and (c) facing higher "financial pressure" have more "improved accounting systems".

4-5-1-5. External Factors and Budget Emphasis

Decentralized companies are mostly willing to employ formal management control systems (Burns and Waterhouse, 1975). In regard to public organizations, Miah and Mia (1996) found that, following decentralization, the need to use accounting control systems will increase. Their data collected from governmental organizations in New Zealand showed that, in cases where more responsibility and authority was delegated by top managers to the lower managers, more control and financial activities evaluation is needed. Kempkes and Pohl (2008) argue that, according to the research, universities' autonomy is not only interrelated with better research performance but is also associated with an increase in efficiency of budget consumption in these kinds of institutions.

Other studies confirm that, when governmental organizations are required to earn part of their budgets, they attempt to implement a more elaborate accounting system and use more efficient financial information compared to institutions whose budgets are

fully provided and whose expenditures are completely compensated from public funds. In that kind of organization, emphasis on budget figures, use of a more detailed costing system, and more extensive application of accounting and budgeting information in a broad range of decision-making processes seems inevitable (Geiger and Ittner, 1996). In more hostile environments resulting from resource limitations and intense competition, there will be much more reliance on formal control (Imoisili, 1989). Environmental hostility has a significant relationship with increased stress on performing within the boundaries of budgets (Otley, 1978). According to the aforementioned literature, the second hypothesis is suggested as below:

H2. Iranian Universities which are (a) more "decentralized" and (b) facing "higher financial pressure" put more "emphasis on budget control".

4-5-1-6. External Factors and Participative Budgeting

Traditionally, decentralization, in terms of autonomy in decision-making, has been considered one of the antecedents of participative budgeting (Modell et al., 2000). Shields and Shields (1998) proposed information asymmetry as one of the main antecedents of participative budgeting; therefore it is not unreasonable to expect a positive association between participative budgeting and decentralization, which increases information asymmetry (Modell et al., 2000). However, Zainuddin *et al.* (2008) could not find a significant association between information asymmetry and participative budgeting in the context of manufacturing firms. Nevertheless, Merchant (1981) found that, for large, diverse and decentralized organizations, stress on sophisticated and participative budgets is of high importance. This was partly consistent with Khandwalla's findings (1972, 1977) confirming that large decentralized companies use more sophisticated procedures for organizational control and a high degree of participation and interactions between managers and employees in control activities compared to centralized firms. Gul *et al.* (1995b) found confirmatory evidence on the association between decentralization and participative budgeting in Hong Kong companies. The results of a study on the public sector in Uganda show that decentralization has great potential for boosting budgeting practices such as participative budgeting in developing countries, but it should not be expected to perform miracles (Awio and Northcott, 2001).

Literature on contingency studies regarding financial and budget pressures is very limited and it seems that this is due to the relevance of this issue mainly for

governmental organizations. Research findings in governmental organizations have shown that financial difficulties forced organizations to adopt much more sophisticated accounting systems and sometimes caused reforms in public-sector accounting systems. In many developed countries, such as Canada, Sweden, Denmark, United States of America and United Kingdom, several principal changes were made during the1980s. Most of these reforms have been initiated by budget deficit and fiscal pressures in public institutions; at the very least, a limited budget has been one of the impetuses for those changes (Lüder, 1992). Lüder (1992) has suggested financial situations as one of the stimuli for changes in accounting systems in his model proposed as a contingency framework of governmental accounting innovations in the political-administrative environment.

Shields and Shields (1998) argue that antecedents of participative budgeting are environmental uncertainty, task uncertainty, task interdependence and superior-subordinate information asymmetry. They also call for more empirical research to discover the reasons for the existence of participative budgeting. As far as this researcher could determine, financial pressure has not been considered a contingent variable in contingency-based studies explicitly. Therefore, no evidence could be found that directly confirms the negative association between financial pressure and participative budgeting, although several papers have looked at the effects of participative budgeting and budgetary slack (Young, 1985, Awasthi, 1988, Dunk, 1993a, Van der Stede, 2000, Davila and Wouters, 2005, Kren and Maiga, 2007). On the other hand, it has been confirmed that rigid budget control could negatively affect the slack in budgets (Merchant, 1985a, Dunk, 1993a). Having assumed these relationships to be true and according to the evidence and arguments in the previous subsection regarding the positive relationship between financial pressure and more budgetary control, one might expect to find a negative association between financial pressures and participative budgeting. In other words, it is anticipated that, in budget constraint positions where universities have to put more emphasis on budget control and cannot afford any slack in budgets, Budgeting Departments would not seek the opinion of other departments and would not involve them in the budget-setting process. So, based on above literature and new reforms in Iran's higher education system it seems reasonable to propose the following hypothesis:

H3. "Participative budgeting" in Iran's universities is (a) positively associated with "decentralization", but (b) negatively associated with "financial pressure".

4-5-1-7. Participative Budgeting and Performance

Many researchers have studied the consequences of participative budgeting in management accounting and contingency frameworks. Shields and Shields (1998) have reviewed 47 published papers which had investigated the effects of participative budgeting. They summarised one or more variables such as motivation, attitude, job-related tension, budget slack, role ambiguity, budget commitment, satisfaction and performance as dependent variables in those studies. Satisfaction and performance are the most frequently occurring dependent variables in those studies. Brownell (1982b) found that those employees who think their destinies are in their own hands under a high level of budget participation are much more satisfied and their performances are much better than would be the case with a low level of participation. A significant association was confirmed between participative budgeting and both job satisfaction and satisfaction with budgets (Chenhall, 1986). Aranya (1990) also found that participative budgeting and budget-based incentives could improve the level of employee satisfaction and performance. Of course, the significance of association between job satisfaction and budgetary participation might vary among different levels of managers and ordinary employees. In other words, evidence shows that high-level managers derive more satisfaction from participative budgeting than middle managers and other staff (Dunk, 1992).

Although organisational scholars such as Argyris (1952) and Becker and Green (1962) have proposed a positive relationship between participative budgeting and performance (Kren, 1992), results from studies in management accounting in this regard are somehow equivocal (Chenhall, 1986). Therefore, many of the studies in this field have looked at a mediating variable which may affect the relationship between participation and performance. Dunk (1995) found that, in a highly innovative atmosphere, participative budgeting is highly related to organizational performance, although this relationship is not significant where there is no innovation interest amongst subordinates. Motivation is another mediating variable to have been investigated in many studies (Kren and Liao, 1988; Murray, 1990; Merchant, 1981; Brownell and McInnes, 1986). As the results were not consistent, Brownell and McInnes (1986 a) suggested that more investigation is necessary to discover the

positive effects of participation on performance without any mediation from motivation. Others looked to cognitive factors to explain the relationship between participation and performance. For example, Chenhall and Brownell (1988a) discovered that participative budgeting could improve job satisfaction and performance if it were able to reduce the role of ambiguity in the organization. Job difficulty was also found to be an important moderating factor in the participation-performance relationship (Mia, 1989). Kren's findings (1992) could also confirm the positive association between participation and performance but indirectly and through job-related tension; however, Shields *et al.* (2000) confirmed the relationship between participative standard setting and job performance both directly and indirectly via job-related stress.

Although many studies have confirmed the positive relationship between participative budgeting and performance, other researchers found that budgetary participation might be negatively associated with performance due to budgetary slack (Young, 1985, Dunk and Perera, 1997). While the definition of budgets proposed by King *et al.* (2010) can also be employed for public organizations, participative budgeting in a public organization is not quite the same as in a private organization, so it is expected that mediating variables will also vary. In public-sector organizations, at least in the context of Iranian universities, the budgeting system is mainly about distribution of funds between different departments and activities. Thus it seems that, if participative budgeting could improve the Departments' satisfaction with budgets which may result from fairness, completeness, and flexibility of budgets, it might improve their performance; otherwise, it may not have any positive consequence for performance or could even be negative, as it might create extra duties for each department and employee. Nevertheless, according to the above-mentioned literature it seems that the following hypothesis could be suggested.

H4. Iranian "universities' departmental performance" is (a) positively related to "participative budgeting", and (b) mediated by "satisfaction with budgets".

4-5-1-8. Improved Accounting System and Performance

Several researchers have proposed that, in an uncertain environment, information provided by a management accounting system is much more useful (for example see: Gordon and Narayanan, 1984). Competition has been identified as an element of uncertain environment (Mia and Clarke, 1999). It is almost an accepted expectation of

accounting systems as a part of a management control system to help organizations gain competitive advantages (Bromwich, 1990). Many researchers have devoted their efforts to investigating the details and extent of this interaction in different circumstances. For instance, Ismail (2007) found that sophisticated information technology can supply the necessary amount of management accounting information to boost organizational performance. One of the popular concepts of strategy, besides many others, is competitive position (Simons, 1990). As mentioned in the Literature Review chapter, Miles and Snow (1978), Porter (1980), Miller and Friesen (1984) and Govindarajan (1984) proposed four different views of strategy. One of the most important functions of any strategy is to help the managers be aware of their rivals' position to be able to maintain their competitive excellence. Strategy itself as a contingent variable in a management control system has been investigated in order to discover its reciprocal effects on control system, management accounting system and performance.

Khandwalla (1972) found that, as competition is intensified, the extent of management control use and the sophistication of the accounting system is increased. Simons (1990), conducting a two-year field study of two competing companies, tried to investigate the extent and process of formal management control systems' effects on strategy formulation to discover whether competitive advantages would be maintained. He suggested that a formal management control system can coordinate strategy which may emerge in different shapes in every corner of an organization.

The findings of Mia and Clarke (1999) confirmed the association between intensified market competition and increased use of management accounting information. They also found that the improved business unit performance is related to greater usage of information provided by the management accounting system in competitive situations. Guilding (1999) found that those companies whose strategy could be categorized as prospector, in a wide range, use competitive-focused accounting reports and perceive them as very useful.

As was mentioned earlier, Lüder (1992) has suggested that financial situations could lead public organizations to create some changes in their accounting system. Also, Miah and Mia (1996) found a positive association between greater usage of

accounting information and performance in public organizations in New Zealand. After new concepts such as New Public Management (Hood, 1995) and Good Governance (Aguilera and Cuervo-Cazurra, 2004) were proposed for the public sector, many accounting practices in private organizations were prescribed for public organizations. Accounting in public organizations can potentially reveal facts and visibility about the past performance of organizations as well as constructing their future through planning activities (Hopwood, 2001). Nevertheless, the expectation that accounting will create a competitive advantage in public organizations, at least in Iranian universities, may stem from a high degree of ambition. However, based on the above evidence, as one part of the research in this area, it seems reasonable to develop the following propositions to be tested in public-sector organizations.

H5. Iranian "universities' departmental performance" is (a) positively related with "improved accounting system" and (b) mediated by "competitive advantage".

4-5-1-9. Budget Emphasis and Performance

Hopwood (1972) proposed two different styles of performance evaluation - the so-called Profit-Conscious and Budget-Constrained versus the use of Non- accounting Measures. He concluded that the use of the profit-conscious style is more related to improved organizational performance and less job-related tension amongst employees and their supervisors; however, Otley (1978) could not confirm these results in another company and tried to justify the contradictory results by proposing the difference between the characteristics of tasks and job centres in those companies. To reconcile those contradictory conclusions, Hirst (1981) added another factor to the model: task uncertainty. Also, Lau (1998) found that, in the financial services sector which contains more accounting-oriented firms, more emphasis on budget control could improve their performance. Many other studies using a Finance Theory framework found that budget control which results from financial pressure in state-owned production enterprises could have negative effects on employment, pay rise, and sustainability in the market, but a positive effect on productivity (Bertero and Rondi, 2000, Nickell and Nicolitsas, 1999, Musso and Schiavo, 2008). Of course, they have said nothing about performance and it is clear that productivity could not be used interchangeably with performance in every situation. However, it seems the situation for service organizations in the public sector is different from production firms in this matter.

Nonetheless, it should be borne in mind that budget control in Iranian universities is mainly about cash and funding, so it is somewhat different from budget control in private organizations. Shen (2003) found that budget constraint in US hospitals is adversely related to the quality of their performance. In the higher education field, many studies have discussed the consequences of budget constraint on institutions' performance. Reform of universities' funding resulting in more budget control in Ghana's universities could reduce their efficiency and create many problems for them (Brock, 1996); this is also the case for universities in Sri Lanka (Chandrasiri, 2003). Greenaway and Haynes (2003) argue that budget constraint in UK universities resulted in poorer performance in at least four aspects of activity, namely class size, recruitment and remuneration, research, and social exclusion, although universities have endeavoured to compensate for this problem by increasing their productivity. Although the effect of greater emphasis on budget control appears to be ambiguous, it is expected that the following hypothesis will be proved correct, at least in the context of Iranian universities.

H6. Iranian "universities' departmental performance" is negatively associated with "more budget emphasis".

Figure 4-2, which has been developed based on contingency theory literature, seems to be able to summarize all of the hypotheses in this subsection. In contingency studies there are two general approaches regarding the outcome variables (Chenhall, 2003). In the first approach, Management Control System or Accounting System is adopted as a dependent variable[44], and contingent variables are assumed independent variables influencing different aspects of Accounting System. This approach is based on the Natural Selection Notion and assumes that compatibility between contingent variables and Management Control System and Accounting System will result in improved organizational performance (Gerdin and Greve, 2004).

[44] See footnote 37, page 85.

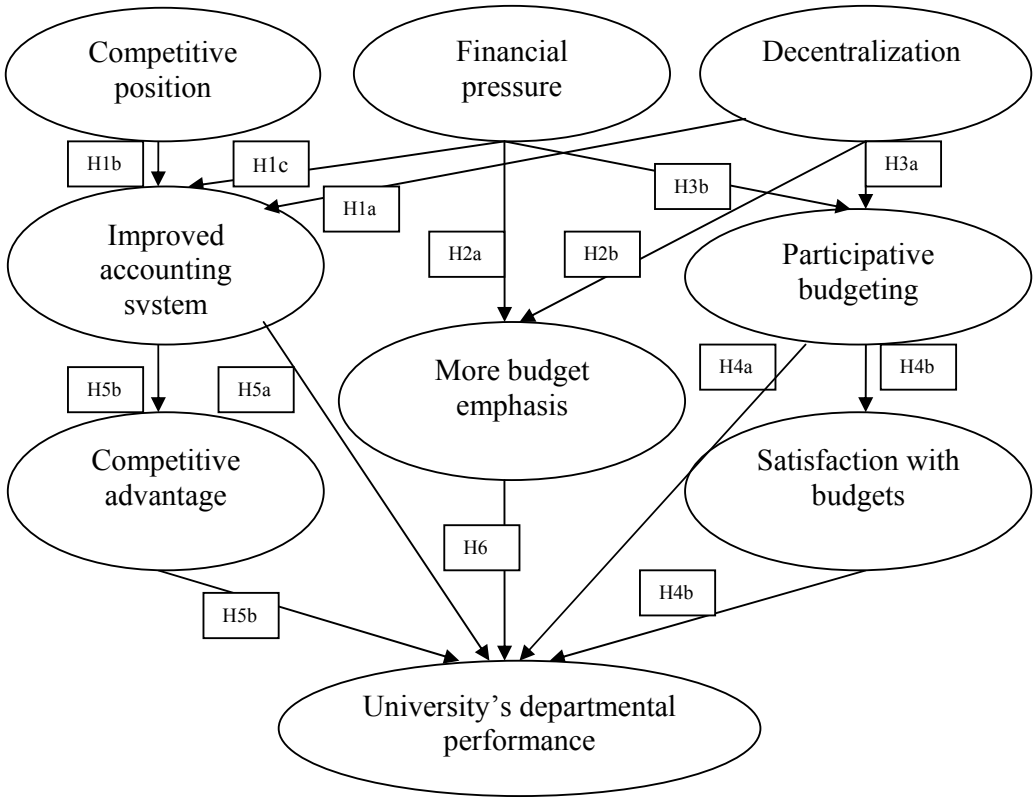


Figure 4-2) Effect of external variables on Iranian universities' accounting system and performance

In the second approach, organisational performance is considered as a dependent variable and Accounting System as a mediating variable. However, it is argued that relationships between contingent variables, Accounting System components, and organizational performance are not based on an equilibrium condition; thus it would be more reasonable for contingency studies to first investigate the interactions among contingent variables and Accounting System, and then to examine how different aspects of Accounting System could be influential in performance improvement (Chenhall, 2003). Thus, it seems that the latter approach is more suitable for this study as factors that affect performance of governmental organisations are more than for private companies. Having said that, the above model and above-mentioned hypotheses indicate that, in the first step, the effects of three proposed contingent factors on three dimensions of Accounting System (system improvement, participative budgeting, and budget emphasis) of the universities are assessed. Then, in the second step, the consequences of changes in Accounting System performance aspects via two perceived relevant mediating variables (competitive advantage and

satisfaction with budgets) for the universities' performance are investigated. This approach is also followed in the next model on Performance Management. In the next section, hypotheses about the second model of this study, which is about the effect of relevant contingent variables on Performance Management of Iranian universities, are developed.

4-5-2. Performance management and external factors

As has been discussed in the beginning of previous section, three external variables have been identified as factors currently affecting Iranian universities, namely competitive situation, financial pressure and decentralization. On the other hand, one of the Government's main purposes in delegating more authority to the universities was to prepare a situation in which they can improve their performance[45].

There are many studies and much evidence supporting the positive relationship between performance management and performance (for example: Widener, 2004, Widener, 2006, Schulz et al., 2010). Although, as far as the researcher knows, based on his experience during many years as a middle manager in one university, and based on preliminary enquiry, there is no systematic performance management in most of the Iranian universities, some components of performance management can still be found in all organisations, including Iranian universities. All kinds of performance management systems, such as budgeting, balanced scorecard, economic value added (Otley, 1999), key performance indicators, results and determinants, and benchmarking, appears to have two aspects in common, namely "performance measures" and "reward or compensation system". Therefore, these two components have been chosen as two dimensions of performance management in the context of this research. Moreover, there has been an attempt to assess the interaction between accounting system and performance management in the given situation of Iranian universities.

4-5-2-1. Comprehensive Performance Measures

According to the balanced scorecard notion (Kaplan and Norton, 1993) it seems evident that, in a new situation such as competitive position, organizations are more likely to employ new and comprehensive measures to evaluate their performances.

[45] Clause 49 of Fourth Five-year Development Plan Act was approved by Iran's Parliament in 2004.

Amir and Lev (1996) found that, in those kinds of industries that are facing growing competition, the propensity for employing non-financial measures to gauge performance has also increased. Use of qualitative measures alongside quantitative measures in competitive positions appears to be prevalent in organizations' efforts to reach a better position compared to their rivals. Perera *et al.* (1997) found that those organizations that have adopted a customer-focused strategy mostly use non-financial measures for performance management; however they could not find any association between the use of non-financial measures and organizational performance. Nevertheless, Chenhall (1997) found a positive association between use of non-financial measures and performance for those companies that have implemented a total quality management system (TQM). He argues that many companies are facing a high level of competition and try to gain competitive advantage by applying TQM, and this could be achieved by linking the implementation of TQM and performance evaluation systems which do not rely solely on financial measures. Nevertheless, it is interesting to note that a recent study of Taiwanese companies could not find a significant relationship between intensity of competition and use of integrated performance measures, but the influence of employing more developed performance measures on organizational performance, in more competitive positions, was found to be remarkable (Lee and Yang, 2010). However, another study that collected data from Taiwanese high-tech manufacturing firms confirmed that, when competition is more intensive, use of comprehensive performance measures also increases (Schulz et al., 2010). As a result of another empirical study, it is claimed that there is a positive and significant association between the magnitude of market competition and use of multiple performance measures in manufacturing organizations (Hoque et al., 2001).

Although there has been a natural difference between performance measures used in public-sector and private-sector organizations, it seems that competitive position has a unique effect on encouraging firms to apply much more comprehensive performance measures for employees' performance evaluation rather than sticking with traditional measures. It is thought that, should universities wish to absorb qualified students and achieve remarkable outcomes in teaching and research areas, they will have to adopt a wider range of performance measures and carry out evaluation processes much more extensively than before. Therefore, and based on the above discussion which is just a

minor part of the literature in this subject, it seems rational to hypothesize the following relationships:

H7. Use of "comprehensive performance measures" is more important[46] for Iranian universities which are facing more intense "competition".

4-5-2-2. Improvement in Reward System

Flamholtz (1983) argues that accounting and budgeting systems cannot be seen as a complete control system and they should be linked with other parts of a holistic management control system, including an appropriate rewarding system, to be able to meet their ultimate objectives. In TQM literature, there are many studies on the importance of linkage between reward system, management accounting system and organizational performance. For example, Ittner and Larcker (1995) tried to assess the association among TQM practices, reward system, and level of performance. They found supporting evidence for a relationship between emphasis on non-traditional information and reward system with performance only for companies that used TQM practices less broadly. It seems that the most important reason for companies to adopt TQM is to cope with intense competitive position and gain some competitive advantages (Ahire, 1997). Chong and Rundus (2004) found a positive relationship between intensity of market competition and degree of TQM design and employment. Therefore, one of the most important factors in making TQM practices successful is the improvement of reward system practices and the creation of a link between reward system and employee performance (Allen and Kilmann, 2001).

As was mentioned in the previous subsection, while Perera *et al.* (1997) could not find any association between use of non-financial measures and performance, Chenhall (1997) *did* find such a relationship. Chenhall himself refers this difference to the linkage between non-financial measures and reward system as Chenhall did make such a connection, whereas Perera *et al.*(1997) did not. This proposition was partly confirmed by another study which found that linking TQM and JIT practices with remuneration plans would be able to improve performance (Sim and Killough, 1998). Sprinkle (2000), also conducting an experimental study, illustrated that incentive-

[46] The importance here is estimated from the Department Managers' perspective as they were asked to gauge how important (varying from very low =1 to very high = 6) is for their department to employ each one of the suggested performance measures (see section 4-7-9).

based rewarding contracts are more likely to enhance performance than flat rate ones. He claimed that this kind of scheme would motivate individuals to work longer and more diligently and would increase the probability of them learning much more and being able to cope with more complicated jobs.

In the contingency-based field there have been several studies on the relationship between competitive strategies and performance evaluation and reward system. Chapman (1997) has reviewed those studies and concluded that defender-like strategies with a high level of performance mostly use objective criteria linked to the managers' and employees' rewards and remunerations, whereas organisations that adopt more proactive strategies such as prospector, differentiator, and build, which might be more compatible with competitive position, often use subjective measures for performance evaluation and bases of reward system. Also, sticking with a mechanistic performance and reward system is associated with decrease in innovation and individual performance in a competitive situation (Hartmann, 2000). Chenhall and Langfield-Smith (2003), conducting an exploratory study, discovered that, in that particular company, management tried to change their reward system as part of a strategy to deal with intensified competition. They found that the new reward system could improve the organizational trust and performance.

Before going any further, it seems necessary to explain the nature of reward system in Iranian governmental universities. The reward system in Iran's universities is different for faculty members and other members of staff. The reward system for faculty members or academic staff consists of just three main parts.

1- Main salary is different in amount and components from other staffs' salary and is paid for a fixed number of weekly hours of teaching and attendance in their offices to answer the students' questions and give them advice and guidance. The fixed number of hours varies depending on their academic position such as lecturer, assistant professor, associated professor, or full professor.
2- Other earnings mainly result from teaching in excess of the fixed number of hours, administration duties, or contribution in fulfilling research contracts.

3- Annual promotion is mainly based on performance in teaching, research and administration jobs. Annual promotion will result in a change in academic position and prestige, and a rise in their main salaries.

Components of the reward system for non-academic or other staff are as follows:

1- Main salary that is paid for 44 hours' attendance at the workplace per week and performing the defined duties.
2- Overtime, this is paid to the employees who remain at the workplace and perform their duties or unexpected works in excess of 44 hours per week.
3- Other earnings, which might be paid as a kind of remuneration, prize or incentive for doing something remarkable or contributing to projects outside of their duties. These kinds of payments are rare and mostly without any well-defined basis.
4- Annual promotion is theoretically based on employees' performance, but in most of the universities there are no transparent regulations for this; it is therefore mostly awarded subjectively by the managers. Annual promotion for non-academic staff might also result in a rise in salary and might be considered a criterion for promotion in the hierarchy and achieving a higher position which, in turn, would give them a higher salary.

One of the main challenges for Iran's universities during recent years has been the inappropriateness of the reward and remuneration system (Ahmady et al., 2007). It was/is believed by many faculty members, managers and other staffs that there is no proper link between what the staff members (including faculty members and other staff) is performing and what they are gaining. It was/is claimed that there are many inequalities and injustices in payment and promotion systems, not only in universities but also in all governmental organizations. Perhaps this is partly because in public organizations, compared to private companies, there are no transparent measures for employees' performance to be used as the basis of a reward system (Modell et al., 2000). It was/is a common saying in Iran that governmental employees receive the fixed part of their salaries regardless of whether they do as much work as they are supposed to. Many employees believe that the main criteria for payment and remuneration are not their own performances but many other undefined elements.

It has been argued and evidenced that localization in designing reward systems could better benefit organisations (Thompson and Richter, 1998). Shelley (1999) argues that each university in the UK has a high level of autonomy to specify its own appraisal system, whereas this has not been the case in Iran's universities for many years. As was mentioned earlier, following the new legal reforms the authorities were supposed to delegate more authority and autonomy to universities to change, legislate and administrate those regulations that they thought should be corrected, especially if they contained ambiguity and inequalities. Therefore, one of the main fields in which one might expect amendments could be the reward system; reform could trigger staff members' satisfaction and improve their performance which might finally improve the universities' performance. Therefore, the following proposition is hypothesized in this regard:

H8. The "improvement[47] in Iranian universities' reward system" is associated with (a) their level of "decentralization" and (b) intensity of "competition".

4-5-2-3. Use of Accounting Information in PM

For many years, accounting reports and traditional financial measures were assumed to be the main performance measures, at least in for-profit organizations. With the proposal of new techniques in management and management accounting such as TQM, JIT, BSC, and SMA it seems that the weight of accounting information and financial measures in performance measurement and performance management has decreased. However, even now, no-one can deny the importance and usefulness of accounting information in helping management perform its main tasks, especially in decision-making and control (Zimmerman, 1995). Accounting information is used by managers to measure subordinates' performance and compensate their efforts, and it could be seen as an instrument for managing and channelling employee behaviour towards achieving the organization's objectives (Abernethy and Vagnoni, 2004). There is some evidence in the literature to support the direct association between decentralization and extent of usage of accounting information (for example see: Miah and Mia, 1996, Budding, 2008) and an indirect relationship between competitive position and degree of usage of accounting systems after changing to a more efficient system (for example see: Khandwalla, 1972, Simons, 1990).

[47] Improvement here means the extent of appropriate links between different components of "reward system" and "employee's performance" (see section 4-7-10).

Although Gordon and Narayanan (1984) could not find a significant association between structure and usefulness of accounting information system, Chenhall and Morris's (1986) findings confirmed the existence of such a relationship. Based on these inconsistent results Miah and Mia (1996) endeavoured to test some propositions in this regard in New Zealand governmental organizations. They found a positive association between decentralization in terms of delegation of authority and greater usage of accounting information on the one hand and a positive relationship between greater usage of accounting information and performance on the other hand. Even though Jacobs (1997) criticized certain weaknesses in their study, he agreed with them that much more empirical research needs to be conducted in this area. Abernethy and Vagnoni (2004), performing an exploratory study in two teaching hospitals in Italy, found that decentralization in the sense of authority delegation directly affects the extent of usage of accounting systems for decision-making and control.

It has been claimed that new forms of competition and improved management in public services have resulted in some changes in their costing systems and performance measurement systems, and the degree of usage of accounting information in performance measurement has risen (Ballantine et al., 1998). Williams and Seaman (2002) argue that managers need relevant information to perform their tasks, and just that amount of information that can help managers to fulfil their responsibilities and commitments could be considered relevant information. They then conducted an empirical study and found that changes in management accounting systems are related to providing more relevant information for managers and this affects managerial performance. However some researchers believe that accounting information is the main source of relevant managerial information (Kren and Liao, 1988). Hence it seems acceptable to suggest the following:

H9. The extent of "use of accounting information in performance management" by Iranian universities is related to (a) their level of "decentralization" and (b) intensity of "competition".

4-5-2-4. Performance Management and Performance

It also seems evident, as has been claimed by many researchers, that having access to more information would assist managers in making decisions much more effectively (for example: Miah and Mia, 1996, Baines and Langfield-Smith, 2003, Chenhall and

Langfield Smith, 2003). Cadez and Guilding (2008) found a positive association between the degree of usage of strategic management accounting techniques and performance. Although most of the studies which have investigated the relationship between greater use of accounting information and improved performance have found a positive association, some of them could find no such relationship, and a few of them even discovered a negative association. Nevertheless, it seems that the predominance of findings that support such a positive relationship is widely accepted (Cadez and Guilding, 2008).

Regarding the relationship between "reward system" and "performance", there are many studies in different areas confirming a positive association between them; however, many of them have inserted some moderating or mediating variables into that relationship. Gomez Mejia (1992) found a positive association between reward system, diversification, and performance. Bonner and Sprinkle (2002) reviewed and proposed the relationship between monetary incentives, effort (direction, duration, intensity and strategy development), and task performance. In a recent study, it was also confirmed that performance-based payment would affect employees' effort, which would consequently improve organizational performance (Schulz et al., 2010). Although Ittner and Larcker (1995) could not find a positive relationship between TQM, reward system and performance, Sim and Killough (1998) evidenced that connection and compatibility between TQM and JIT and compensation system would boost company performance.

There is sufficient evidence in the literature to support the existence of a positive relationship between "comprehensive performance measures" and "organizational performance", and some of them were implied in previous sections (Kaplan and Norton, 1993, Chenhall, 1997, Lee and Yang, 2010). Besides those, the results of Widener's study (2006) could be considered as further evidence supporting the positive association between importance of performance measures and firms' performance. Schulz *et al.* (2010) also found that employing comprehensive performance measures would increase organizational performance. Comprehensive performance measures are also crucial for governmental organizations as it has been evidenced that behavioural aspects of performance management practices are no less

important than their financial aspects in public organizations (Verbeeten, 2008). Therefore, the final hypothesis that will be tested in this matter is as follows:

H10. "Universities' departmental performance" in Iran is positively related to (a) "improved reward system", (b) importance of "comprehensive performance measures" and (c) "use of accounting information in performance management".

Figure 4-3 summarises the aforementioned hypotheses. Of course, this model cannot convey a holistic approach to performance management in Iranian universities, but it can attempt to illustrate this concept in the light of contingency theory and by emphasising the association between accounting information and performance management system in the context of this research in which there is no well-defined performance management system. In the next subsection, as this study's third set of hypotheses, the different reactions which might be expected from different Departments of Iranian universities following the changes in Accounting Systems and Performance Management are examined.

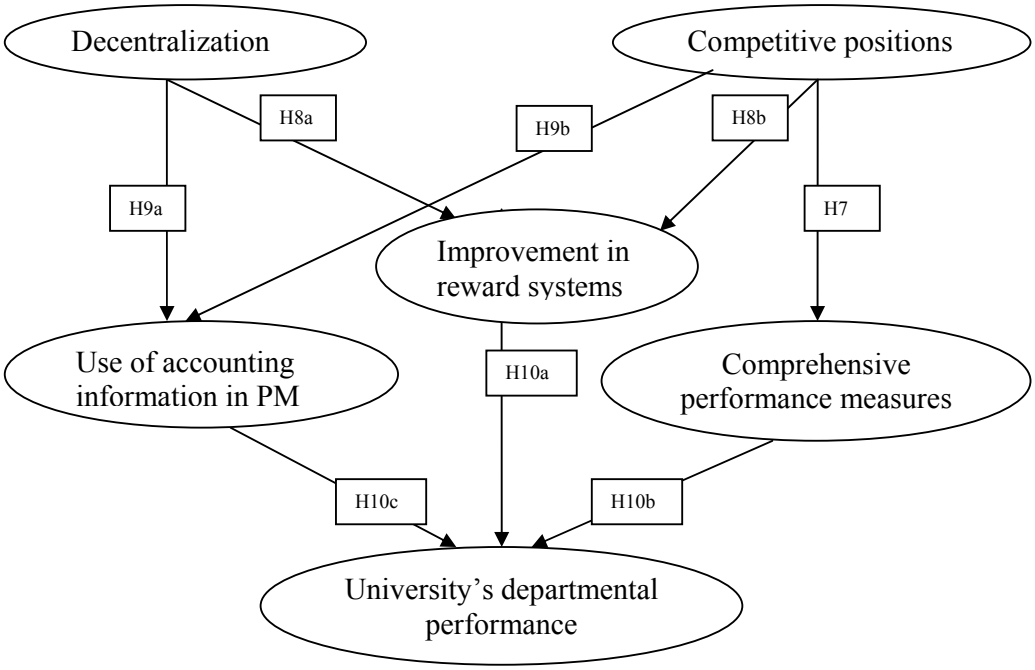


Figure 4-3) External factors, accounting information and performance management in Iran's universities

4-5-3. Differences in Departmental Level

One of the supplementary branches of contingency-based accounting studies looks at the differences amongst organizational subunits. The nature of an organization is derived from the work or job that is being accomplished by it and this creates the characteristics of the organization (Perrow, 1967). Based on this definition, as different subunits in an organization are somehow doing different jobs, different characteristics can be assumed for each of them. Hayes (1977), undertaking an empirical study, tried to discover the different variables that could affect the performance of different departments in an organization. He found that internal variables such as productivity and cost behaviour can better explain the performance of production departments compared to interdependency variables such as reliability and cooperation. However, for departments of research and development, interdependency variables were not found to have any great capacity to explain performance; this was in line with Hayes's expectations. Moreover, his collected data showed that environmental variables, for example market share, environmental diversity and dealer opinions, have greater explanatory power for the performance of marketing departments compared to interdependency variables.

Many other studies have investigated the relationship between task complexity, task variety and task uncertainty and extent of information and information processing (for example, Connolly, 1975, 1977; Glisson, 1978; Tushman, 1978; and Daft and Macintosh, 1978). Daft and Macintosh (1981), choosing work units as a unit of analysis, claimed that, according to their data, when the diversity of task is higher the amount of required information is greater, but when the job is more analysable the need for information decreases. By proposing a framework, Ouchi (1979) argued that usefulness of different kinds of organisational controls such as Input Control, Output Control and Behaviour Control depends upon task traits of the organisational department, including technological uncertainty, the measurability of outputs, task interdependency and task complexity.

In another empirical study in the context of Research and Development organizations, Rockness and Shields (1984) tried to test some parts of Ouchi's framework. They found a strong association between controls and knowledge of the transformation process. Their collected data confirmed that Input Controls such as social controls and

expenditure budgets could be most important when there is little knowledge of the transformation process, whilst Behaviour Controls, such as regulations, rules and procedures, are most important when there is a high level of knowledge of the transformation process. However, the association between importance of controls and task characteristics, measurability of the output, dependence and complexity could not be supported. Abernethy and Brownell (1997) also found that non-accounting controls, especially forms of personnel control, contribute to an organisation's effectiveness, particularly where task characteristics are not well suited to the use of accounting-based controls, which could be the case for Research and Development departments and organisations.

Govindarajan (1984) found supporting data for the proposition that managers who are facing higher environmental uncertainty will employ more subjective performance measures, whilst managers who work in an environment with less uncertainty will rely more on rules, procedures and formula-based measures. In another study, he also explored how participative budgeting for departments operating in higher environmental uncertainty will improve their performance, whereas it might hinder the performance of departments with lower environmental uncertainty (Govindarajan, 1986b). In addition, he claimed that participative budgeting does not lead managers to create budgetary slack in high uncertainty situations, but may do so in a low uncertainty environment (Govindarajan, 1986b). Finally, Seaman and Williams (2006), undertaking an empirical study, confirmed that perceived environmental uncertainty acts as a moderating variable on the relationship between "changes in components of accounting system" and "organizational performance". The influence of interest in innovation on the relationship among budget participation and departmental performance was investigated by Dunk (1995). Marketing, Production, Finance, Research and Development, and Administrative departments comprised the different departments in that study. The results of the study showed that participative budgeting in the departments with higher interest in innovation could improve their performance more than it could for the departments with lower interest in innovation. Many other studies have tried to propose a kind of unique model of management control for Research and Development departments and organizations (see for exampel: Silaen and Williams, 2009, Sutton and Brown, 2008).

Drawing on the aforementioned literature it might be concluded that Research and Education departments' nature and the characteristics of tasks in universities are somewhat different from Financial Departments. Therefore, it seems interesting and useful to discover whether or not there is any meaningful difference between consequences of changes in components of Accounting System and Performance Management for performance in different departments. It would be helpful to know which part of Accounting System or Performance Management is more important for different departments to improve their performance, and whether there is fundamentally any association between them. It seems that Education and Research Departments, compared with Financial Departments, are facing higher task and environmental uncertainty, and have more diverse jobs (Silaen and Williams, 2009), more professionals, and more innovative orientation (Sutton and Brown, 2008). Thus, in this subsection and as a subsidiary product of this study, the following propositions are suggested regarding Iranian universities:

H11. The positive relationship of "participative budgeting - satisfaction with budgets - performance" in Research and Education Departments is stronger than in Financial Departments.

H12. The negative relationship of "more budget control - performance" in Research and Education Departments is stronger than in Financial Departments.

H13. The positive relationship of "improved accounting system - competitive advantage - performance" in Research and Education Departments is weaker than in Financial Departments.

H14. The positive relationship of "usage of accounting information in PM - performance" in Research and Education Departments is weaker than in Financial Departments.

H15. The positive relationship of "comprehensive performance measures - performance" in Research and Education Departments is stronger than in Financial Departments.

It might be necessary to clarify that the "strength" and "weakness" of relationship in aforementioned hypotheses are a matter of comparison between different departments and will be measured based on "standardized amount of regression coefficients" reporting by SEM analysis (see section 7-5-11 for further explanations). To test the proposed hypotheses, data are collected from Iranian governmental universities by

questionnaire. In the next section the data collection procedure and population of the study is explained. The summary of all hypotheses can be seen in the **Appendix A**. The method of data collection as well as the population who participated in this research project is introduced in the following section.

4-6. Data Collection Method and Population

As was mentioned earlier, in common with most of the contingency-based accounting studies (Chapman, 1997), a questionnaire has been employed to collect the data. It is argued that one of the major problems in survey-based research in accounting studies is how to prevent the questionnaire from being completed by inappropriate recipients, which could cause misleading research results (Smith, 2005). Moreover, it is important to choose the right level of analysis in contingency-based studies, so consistency between the theory, unit of analysis, and source of measurement should be maintained (Chenhall, 2003). Therefore, it was decided that the main departments of each university should be considered as single units of investigation for the purposes of this study instead of regarding the whole university as a unit. Choosing departments as units of study is expected to confer a number of benefits on this project.

First, no one person in the university is supposed to know exclusively everything in detail about the university's level of performance, accounting system and performance management. By sending questionnaires to the three different managers in each university, namely Financial Manager, Education Manager, and Research Manager, a more complete insight might be obtained regarding accounting system, performance management, and level of performance in each university. By posting questionnaires just to the Financial Managers or Heads of Accounting divisions, it would not be possible to gain a reliable understanding of the level of education and research performance, the reality of external factors, the extent of use of accounting in their management, and their views regarding accounting, budgeting and reward systems as well as styles and extent of evaluation measures.

In addition, if entire universities were chosen as the unit of study, rationally the chancellors of each university should be the recipients of the questionnaire; however, they are very busy and not as well-informed as their department managers on all the

details required by this study. Moreover, by opting for university departments as the unit of investigation, it will be possible to look at the probable differences between results of studies on different departments in the main areas of activity including education, research and financial issues; otherwise, any possible differences would be overlooked. Finally, the number of governmental universities in Iran, as in many other countries, is limited and small in terms of sample size. As will be discussed in more detail, the researcher plans to use Structural Equation Modelling (SEM) technique as the main tool of data analysis in this study. One of the necessary conditions for SEM to work well and produce reliable results is a large sample size, at least more than 100 cases (Kline, 2005). By asking department managers to be participants, the sample size of this research could potentially increase from 126 to 378 (126*3).

After making a decision about the unit of analysis, the questionnaire was designed and phrased in English and finalized after many corrections on the recommendation of the supervisor. It was then translated into Farsi (Persian) by the researcher. To ensure the accuracy of the translation, one of the associate professors in accounting at Petroleum University of Technology (PUT) in Iran, who had graduated from a University in the UK several years ago, was requested to translate it again. Then, some minor differences in the two translations were reconciled and several changes of wording were made with his help. For the pilot testing, four universities were chosen based on ease of access and, similarly to a structured interview, they were asked to fill out the questionnaires and inform the researcher of any ambiguity or misunderstanding in concepts, words or expressions. Several misunderstandings, mostly similar to one another, emerged and were subsequently corrected on the advice of the aforementioned associate professor.

Upon the finalization of the Persian version of the questionnaire, a covering letter explaining the purpose of the research and its possible advantages for the universities was prepared. The option on whether to participate or not, the anonymity, and the confidentiality of the data were also emphasised in the covering letter. The postal addresses and telephone numbers of the universities were found in the official websites of the Ministry of Science, Research and Technology (MSRT) and Ministry of Health and Medical Education (MHME); their addresses were confirmed or corrected by telephone. Finally, the questionnaires were mailed to them in a package

including a questionnaire, covering letter and a prepaid envelope to be used for sending the response. In **Appendix B** a copy of three different questionnaires and covering letters can be found.

The population for this research is intended to be governmental universities in Iran, which amount to 126 universities. There are two different groups of Higher Education Institutions in Iran, namely governmental and non-governmental universities. Although the non-governmental universities have grown in terms of quantity and quality in recent years, governmental universities still comprise the main part of Higher Education. Regardless of the importance of governmental universities, the recent reform in regulation, funding and management has only been applied to the governmental universities. In other words, there has been no notable change in management, policy and legislation in non-governmental universities during the last 25 years; not even the chancellorship of the key non-governmental university - Islamic Azad University - has changed during this period. Therefore, governmental Higher Education Institutions seem to be the best context for data collection in view of the subject of this research project. Due to the population size, which is relatively small, it was decided to send questionnaires to all of them, so 378 questionnaires were sent to all three departments of the 126 Iranian governmental universities. The subsequent section explores the format of the questionnaires and describes the bases of variable measurement in this study.

4-7. Questionnaire Design and Variable Measurement

The researcher has endeavoured to use existing instruments which were used by other previous contingency-based accounting studies as far as possible. For measurement of all variables a six-point Likert-type scale was used to encourage respondents not to simply choose a middle value. In each questionnaire an open-ended question was provided to give respondents the opportunity to describe the process of divisional performance measurement in their own divisions. To discover whether there is any systematic performance management system in the universities or any intention to design and implement such a system in the near future, two yes/no questions were also included in each questionnaire.

Before explaining the indicators that have been used for measuring the variables, it seems necessary to clarify the basic assumption of variable measurement in contingency-based studies including the present study. Contingency-based studies have mostly collected their data through cross-sectional postal questionnaires (Chapman, 1997), so the level of variables rather than the process of change is measured since no time-series or longitudinal [48] data are usually collected. Organizational Contingency Theory, which is also the basis of contingency-based accounting studies (Otley, 1980), assumes that fit between the organization and its context are associated with organizational performance (Donaldson, 1996). Donaldson explains that the structure of an organization is made of several quantitative continuous variables that can vary from low to high; this is also the case for contingency factors. He asserts *"…the fits between them are also continua, there being many points of fit. This structural contingency theory view, in turn, allows frequent, small movements by organizations from one fit to an adjacent fit, producing incremental change over time"*(Donaldson, 1996, P 9). However, contingency-based studies generally assess associations (rather than causation) between contingency factors, structures and systems, and organizational effectiveness, and they capture the extent of fit amongst them at a single point of time (Chenhall, 2003, Gerdin and Greve, 2004). It is assumed that changes in some variables interact with other variables during a reasonable period of time and, finally, fit is achieved (Donaldson, 1996). For this study the elapsed time is about five years, the period between 2004 (start point of reform in Iran Higher Education) and 2009 (data collection time). However, it might also be necessary to clarify that all variables in this study are assumed to be measured in terms of extent and level rather than the process of change of those variables. For example, the variable measurement does not seek to capture how an accounting system has improved over the five years (i.e. the process of change); rather, the degree of improvement (i.e. very low, low, moderate …) is gauged.

In two developed models of this study, summarized in Figures 4-2 and 4-3, there are 12 different variables including 3 independent variables, 8 intervening or mediating variables, and one dependent variable as below.

[48] See footnote 34, page 79.

Independent [49] variables:

- Competitive Positions
- Financial Pressure
- Decentralization

Mediating[50] variables:

- Improved Accounting Systems
- More Budget Emphasis
- Participative Budgeting
- Satisfaction with Budgets
- Competitive Advantage
- Comprehensive Performance Measures
- Improvement in Reward Systems
- Use of Accounting Information in PM

Dependent[51] variable:

- Departmental Performance

As the reliability and validity of the results of a survey-based study largely depend upon the indicators or questions of the survey, in most cases relevant indicators in the literature have been chosen and adapted. In the following subsections the measures that have been employed to gauge the above-mentioned factors are explained. The intact form of the questionnaires for this study can be seen in **Appendix B**.

4-7-1. Competitive Positions

The measure of "competitive position" is taken from Khandwalla's work (1972) but, as there were two differences in the context of this study, it needs to be changed significantly. In the present study, competitive positions could be considered important besides other external factors such as financial pressure and more student entrants, for comparison purposes. In addition, the notion of profitability in Iran's governmental universities still does not make sense since the main part of their funds is provided by the Government (Malekzadeh et al., 2001). Moreover, the researcher had intended to gauge this variable to some extent in comparison with the years before the year of reform in Iranian universities. Then, two questions included in all three questionnaires asked the respondents to measure the extent of competitive position in their universities in terms of education issues and research issues. The anchors of the scale were "Nothing"=1 to "Very large"=6. In another question they

[49] An independent variable affects other variable or variables, see also foot note number 37, page 85.
[50] A mediating variable is affected by an independent variable and affects a dependent variable. Therefore, a mediating variable plays two roles at the same time, independent and dependent.
[51] A dependent variable is affected by an independent variable, see also foot note number 37, page 85.

were requested to give their opinion on the sentence "the universities' position now is more competitive than 5 years ago" by choosing an answer ranging from "Strongly disagree"=1 to "Strongly agree"=6.

4-7-2. Financial Pressure

To measure "financial pressure" no previous instrument could be found in contingency-based studies. It appears that no previous contingency-based study has taken financial pressure as a contingent variable in private-sector organizations. Therefore, the researcher has tried to gauge this construct by designing four questions for all respondents. The first question was about the amount of financial pressure on universities in the past 5 years and the answers could vary from "Nothing" = 1 to "A very large extent" = 6. The second question about financial pressure addressed the frequency of postponing or ignoring certain expenditures because of budget constraints. Participants could choose an answer from "Never"=1 to "Very frequently"=6. The third question in this regard asked them to estimate the trend of budget growth to cover inflation rate in the past 5 years. The answers could be anything from "Significant increase" = 1 to "Significant decrease" = 6. In the last question on this matter, they were requested to give their opinion on whether "financial pressure on universities has increased in the past 5 years". The anchors were "Strongly disagree" = 1 to "Strongly agree" = 6.

4-7-3. Decentralization

As decentralization can have different meanings in these kinds of studies, this research has defined it as 'autonomy in decision-making and legislation for organizations'. Inkson *et al.* (1970) proposed 23 criteria to be measured as proxies of decentralization in this sense. This instrument has been employed by several other researchers such as Chenhall and Morris (1986) and Merchant (1981) to measure decentralization. Eleven of those 23 criteria are only meaningful for private (mostly manufacturing) companies, leaving 12 criteria suitable for a governmental organisation. In order to adapt them to the case of universities in Iran, the researcher merged 4 of those criteria into indicators, so just 10 criteria were used instead of 23.

These indicators come from 2 aspects of authority, decision-making and legislation, and 5 main areas of activity in universities including education issues, research issues,

financial and accounting affaires and administrative issues, as well as recruitment affairs. Education issues were addressed to Education Managers, research issues to Research Managers and financial issues in this matter to Financial Managers, as their special areas of activity. Administrative and recruitment affairs were addressed to all managers as all of them are involved in such matters. The question asked them to assess the extent of change in managers' authority in the above-mentioned areas during the past five years, and the anchors were "No change"=1 to "Very large increase"=6. To consider the variable from another angle, as another indicator, they were asked to assess the extent of the recent delegation of authority in legislation and decision-making from the Government to the universities resulting from new legislation in the Fourth Five-year Development Plan Act. They could answer the questions by ticking one of the answers varying from "Nothing" = 1 to "Very large increase" = 6.

4-7-4. Improved Accounting Systems

To assess the improvement in accounting systems, the instruments of Khandwalla (1972), Chenhall and Morris (1986) and Martí and Vía (2007) were integrated and modified to be compatible with Iranian universities' situations. By asking one question with 11 elements all managers were requested to measure the extent of changes in these elements of their accounting systems since 2004 by choosing answers from "Nothing" = 1 to "Very large increase" = 6. The employed elements are as follows:

a. Demand for different accounting reports
b. Frequency of accounting reports
c. Speed of preparing accounting reports
d. Use of internal auditing
e. Use of independent auditing
f. Accuracy of accounting reports
g. Qualification of accounting reports
h. Use of non-financial information in accounting reports
i. Use of new techniques of management accounting
j. Computerising accounting practices
k. Automatic reporting

4-7-5. More Budget Emphasis

Although, in several previous studies such as Otley (1978) and Hopwood (1972) emphasis on budget control has been employed, there is little difference between their meaning and what is meant by budget control in this study due to the governmental context of the research. No instrument could be found that measured the extent of emphasis on budget control in governmental organizations. Therefore it was decided to measure this variable by putting three different questions to all managers.

1- To what extent has emphasis on budget figures increased at this university in the past 5 years?
2- To what extent are other managers directly allowed to transfer budget funds between different headings (in percentages)?
3- How important is the compliance between your actual performance and budget figures?

The anchors for the first question were "Nothing"=1 to "Very large extent"=6, for the second question "More than 20 per cent"=1 to "Nothing"=6, and for the third question "Very low importance"=1 to "Very high importance"=6.

4-7-6. Participative Budgeting

The instrument proposed by Milani (1975) has been employed by this study with just a few changes in wording to render it usable in the context of the present research. This instrument has also been used by almost all studies that have tried to assess the effect/association of participation on/with other variables such as performance, budgetary slack, job-related tension, motivation and staff satisfaction. For example Tsui (2001), Brownell (1982b), Brownell and McInnes (1986 a), Mia (1989), Nouri and Parker (1998) and Lau and Tan (1998) have employed Milani's (1975) instrument to measure the degree of budgetary participation. The questions and their anchors are as follows:

-What is the extent of your department's involvement in finalising its budgets?	Very Low Involvement	Very high Involvement
-To what extent is the reasoning given by the budgeting division for revising your budget convincing?	Very Low extent	Very high extent

-How often do you need to discuss with the chancellor or budgeting division about your department's budget?	Never	Very frequently
-How often does the budgeting division seek your opinion or suggestion when setting budgets?	Never	Very frequently
-How great is your influence on the final figures of your department's budget?	Very Low Influence	Very high Influence
-How important is it for you to participate in budget decisions to ensure a reasonable budget for your department?	Very Low Importance	Very high Importance

4-7-7. Satisfaction with Budgets

Many instruments have been employed to measure job satisfaction but, as Brownell (1982a) has stated, it seems the most valid and reliable one is that well-known instrument, the so-called Minnesota Satisfaction Questionnaire (MSQ). However, owing to the importance of other parts of this study it was neither possible nor even intended to gauge the employees' job satisfaction. The researcher had intended to use the contents of the instrument employed by Chenhall (1986) as a proxy of "satisfaction with budgets"; however, as they are mostly about the budgeting aspect of costing systems, they did not seem to be suitable for this study. Thus, using the format and anchors in MSQ and adapting a 6-point scale, the following four questions were put to all managers to measure their level of satisfaction with the budgeting system.

1- How satisfied are you with the completeness of budget figures for your department in the past 5 years compared to the years before that?
2- How satisfied are you with the fairness of budget figures for your department in the past 5 years compared to the years before that?
3- How satisfied are you with the flexibility of budgets for your department in the past 5 years compared to the years before that?
4- In your opinion, how satisfied are other members of staff with the budgets at this university in the past 5 years compared to the years before that?

Anchors varied from "Very dissatisfied" = 1 to "Very satisfied" = 6.

4-7-8. Competitive Advantage

To measure the competitive advantage that improved accounting systems might create for the departments, the instrument developed by Guilding (1999) was employed. Guilding (1999) claims that, according to the literature, five main accounting practices are used to provide competitive advantages for their users. Four out of these five practices were considered compatible to some extent with the conditions of departments in Iran's universities, at least in theory. Therefore the managers were asked: "to what extent do you use accounting information for the practices listed below in your own area of activity?" The practices are "competitors' cost assessment", "competitors' position monitoring", "strategic costing", and "offering competitive price in proposals". They could answer in a range from "Nothing" = 1 to "Very large extent" = 6.

4-7-9. Comprehensive Performance Measures

Fisher (1995) proposed substitution and complementary controls as two forms of improvement in management control. In complementary control, two or more methods of control are employed to help managers achieve their control objectives. The literature suggests that managers are mainly interested in adopting a complementary approach to control rather than a substitution approach (Widener, 2004). Therefore, using the concepts proposed by Hopwood (1972) and Otley (1978) as surrogates for performance measurement styles, seven meaningful and usable criteria which are used and could be used by managers in Iran's universities were included in all the questionnaires. Four of these are qualitative or non-financial and the other three are quantitative or in some way financial. These indicators are a combination of quantifiable and non-quantifiable measures of performance evaluation (Hirst, 1983, Govindarajan, 1984). Therefore, the balanced importance of using all the measures could be interpreted as employing comprehensive performance measures to measure employees' performance. The managers were requested to express the importance of each measure by using answers ranging from "Very low importance" = 1 to "Very high importance" = 6. The criteria are as follows:

1- The timeliness of their task accomplishment
2- The extent of the effort put into their work
3- The extent of students' satisfaction with them
4- Their attitudes to their tasks and the university

5- Their concern with costs and budgets
6- The punctuality and amount of time spent in their workplace
7- Their concern with quality

4-7-10. Improvement in Reward Systems

As was mentioned in the hypotheses development section, the reward system in Iran's universities differs for academic and non-academic staff. The reward system for faculty members comprises three parts and, for other staff, it includes four sections. Based on that, by putting two distinct questions to all recipients, the researcher has tried to gauge the extent of improvement in reward system in those universities. The extent of improvement here means how much different component of reward systems are appropriately linked with employees' performances. The first question asked them to express their opinion about the faculty members' reward system by choosing a score in the continuum of "Strongly disagree" = 1 to "Strongly agree" = 6 with reference to the following statements:

- Fixed salaries are appropriately related to job performance.
- Other earnings are appropriately related to job performance.
- Annual promotions are appropriately related to job performance.

A similar question was put to them regarding the non-academic staff by adding a fourth criterion concerning the appropriateness of the relationship between their overtime payments and their job performance.

4-7-11. Use of Accounting Information in PM

Using the formats and anchors employed by Cravens and Guilding (2001), Guilding (2002) and Cadez and Guilding (2008), a four-section question was put to all managers to assess the extent of their usage of accounting information for performance management. The aspects of performance management were adapted to Iran's circumstances based on the framework proposed by Otley (1999). The recipients were asked to estimate the extent of their use of accounting information, reports and abilities in the following aspects of performance management in their area of management:

1- Goal definition and standard-setting
2- Performance measurement and comparing to the targets
3- Expenditure controlling and decision-making

4- Rewarding and compensation

Their answers could range from "Nothing" = 1 to "Very large extent" = 6.

4-7-12. Departmental Performance

In many different studies on Higher Education, diverse criteria and aspects of their performance have been the subject of measurement. This means that the key performance indicators are quite varied in different countries (Tambi et al., 2008). This diversity is partly related to the complexity of universities' objectives and, to a certain extent, because of the conflicts in different stakeholders' views (Johnes, 1992). Johnes (1992) has investigated the degree quality, student attrition and research performance as three important criteria of universities' performance. Sizer *et al.* (1992) reviewed the key performance indicators used in five European countries including Denmark, Netherlands, Norway, Sweden and the UK, and the role of these indicators in universities' management. They categorized these criteria into teaching, research, and service groups. According to the governmental requirement in Australia, universities should assess and demonstrate their performance in four aspects including financial viability, teaching and learning achievement, research performance and quality outcomes (Guthrie and Neumann, 2007). Also, Suryadi (2007), proposing a framework for measuring key performance indicators in higher education institutions, categorized these criteria into three groups: academic, research and supportive ones.

It should be clarified that the main department in Iran's governmental universities that can be classified in terms of supportive performance is the Financial Department (Gharun, 2007). Financial Departments do not merely perform simple accounting or financing tasks (although these shape some parts of it); many other supportive activities including Administrative Affairs, Procurement and Overhaul Services, Information Technology Services, and libraries are parts of Financial Departments. However, in some of the universities this department is entitled "Financial and Administrative Department"; therefore, in the Persian language version of the questionnaire the title of Financial/Financial and Administrative Manager has been used. Another point is that the head of these departments, like other departments, should be one of the faculty members (Education, 1995). Therefore, in many cases they are not accountants or do not have management and accountancy backgrounds;

for example, in universities which concentrate on Medical Sciences no-one with a management or accountancy background could be a faculty member. Thus, it seems that choosing Financial Departments besides Education and Research Departments would fulfil the entirety suggested by Guthrie and Neumann (2007) and Suryadi (2007). Based on the aforementioned points, it was decided to measure universities' performance in Iran in three main categories, namely educational performance, research performance and financial (supportive) performance.

In many of the contingency-based accounting studies in which performance has been measured as an variable, the instrument of Mahoney *et al.* (1965) has been employed (for example see: Kren, 1992, Brownell and McInnes, 1986 a). As it is quite subjective and involves self-rating, there are some criticisms regarding its potential bias of leniency, but it has continued to be used because, in many areas, there are insufficient objective criteria, especially when a kind of comparison is going to be made (Govindarajan and Fisher, 1990). On other occasions it is used for the sake of confidentiality (Brownell and McInnes, 1986 a). Moreover, it has been argued that the risk of leniency is not as great as many researchers and critics believe (Venkatraman and Ramanujam, 1987). However, the researcher has attempted to propose some objective indicators for performance measurement in each department rather than leaving it very general. Nonetheless as it was assumed that, owing to confidentiality and sensitivity issues, they would not express the exact figures, the self-rating was adopted. It seemed that the instrument of Merchant (1981), which has been used by other researchers such as Brownell and Merchant (1990) and Dunk (1995), would be suitable for adaptation and use for Iranian universities' departmental performances. Therefore, in three different areas of activity, five key performance indicators and one overall assessment have been used to measure the performance of each department. Most of the criteria are chosen from the studies by Suryadi (2007) and Guthrie and Neumann (2007).

4-7-12-1. Educational Performance

Education Managers were requested to rate the performance of their area of responsibility in five main dimensions of activity or components of good performance in the universities. These dimensions are as follows:

1- The rate of graduation during the planned period for each level of study,

2- Quality of instructors which can be measured based on combination of faculty members (more lecturers=1, more full professors=6),
3- Graduates' success in passing entrance exams to study at upper levels, compared to other universities,
4- Quality of programmes and courses (if there is any external measure for this, please specify),
5- Graduates' success in finding jobs, compared to other universities.

In another question they were asked to rate the overall level of their universities' performance compared to other governmental universities in terms of educational position. They could choose answers ranging from "Very below average" = 1 to "Very above average" = 6.

4-7-12-2. Research Performance

To measure the performance of Research Departments, the Research Managers were asked to assess the performance level of their university in research areas with reference to five key performance indicators including "number of national publications"[52], "number of international publications[53]", "number of applied research projects and contracts", " amount of research income", and "number of registered patents and inventions". A question to discover their opinions regarding overall performance of Research Departments was also included in their questionnaires. The anchors were the same as for educational performance.

4-7-12-3. Financial Performance

As was mentioned earlier (section 4-7-12), the third main area of performance in universities is supportive performance (Suryadi, 2007) which is rooted in Financial Departments in Iran's universities. The following criteria were chosen as key performance indicators of financial performance in Iran's universities to be put to Financial Managers:

1- Ability to meet expenses and liabilities on time,
2- New investment in constructing or purchasing new buildings,
3- New investment in teaching, research and experimental assets and facilities,

[52] The paper is published in a Scientific Research Journal which has been registered with Ministry of Science, Research, and Technology of Iran.
[53] The paper is published in an indexed international Scientific Research Journal such as ISI.

4- Growth in other revenues including research income besides governmental budgets,
5- The extent of your budget saving in the end of each year to be used in the next year.

The anchors and overall performance assessment were repeated in this questionnaire too. In the next section, statistical programmes and techniques that have been employed in this study - to analyse the data - are briefly explored. More explanation and justification regarding the main statistical means, which is called SEM, are provided in the Chapter 5.

4-8. Data-Analysing Techniques

Different approaches of fit including selection, interaction, and system approach in contingency-based studies were explored in the Chapter 3, section 3-2-2. Also was revealed that based on different approaches of fit employed statistical techniques have varied amongst that kind of research. The present study could be classified in the system approach group to some extent according to that classification. The researcher has attempted to consider all important, but newly emerged factors that play a role in accounting system and performance management system in Iran's governmental universities. However, as performance in public sector organizations is not one-dimensional, particularly in Higher Education organisations, it could be affected not only by variables such as external environment, budgets, structure, management and accounting systems, but also by many other factors such as political decisions, cultural atmosphere, subject mix, location, student-staff ratio and scale of operation (Johnes, 1992). It seems reasonable to propose that, for this study, owing to practical limitations (Langfield-Smith, 1997) it is not possible to take into account all of the above-mentioned variables to gauge their effects on universities' performance. Therefore, in this sense, the approach of fit for this study could be identified as Cartesian in opposite of Configuration[54] (Gerdin and Greve, 2004).

For the data analysis, at the first stage using SPSS software, collected data are analysed descriptively. Finally, Structural Equation Modelling (SEM), which is a

[54] In the Cartesian paradigm, just some limited variables are included in the model whereas in the Configuration paradigm it is attempted to insert all related variables in the model (Gerdin and Greve, 2004).

much more robust statistical technique (Kline, 2005), is employed to try to confirm or reject relationships between variables and determine the veracity of the research hypotheses and proposed models. SEM is adopted as the main technique of data analysis for this study because it has many advantages over other statistical techniques (for more explanation, see the next chapter, section 5-4-10). SEM is a systematic approach that is employed to test models' fit by carrying out factor analysis and linear regression simultaneously (Williams et al., 2009). This technique could take the measures directly from the questionnaires as indicators or observed variables to gauge the relevant concepts or latent variables[55] (Hoyle, 1995). In other words, when the variables are not observable in a theoretical framework such as in most social science studies, it should first be confirmed that the indicators or questions properly convey the main concepts or variables that comprise the model. Then the relationship between these variables can be examined; otherwise, the test of a model whose variables have not passed the reliability test does not sound meaningful (for more explanation regarding observed and latent variables, refer to the next chapter, section 5-4-2). The first part is referred to as measurement model and the second one as structural model[56] (Williams et al., 2009).

By using this technique, a combination of moderating and intervening models can also be tested and some changes in the initial model will be possible. The most important ability of SEM is that, if the primary model does not confirm the collected data, it is possible for the researcher to alter the model slightly and suggest a more fitting model. In addition, SEM can assess which of two or more competing models has the better/best fit. One prerequisite for employing SEM, similar to many other estimation-based statistical techniques, is a large sample to minimise the sampling errors. With a large sample the analysis of the results is more reliable and there is a greater likelihood of finding a fitting model (Bagozzi and Heatherton, 1994). To solve the problem of limited sample size owing to low response rate, some studies have assumed latent variables as observed variables (Van der Stede, 2000, De Ruyter and Wetzels, 1999, Rogers and Schmitt, 2004). Another solution for dealing with a small

[55] Observed variables refer to the variables that can be measured directly, e.g. here each question in the questionnaire is considered as an observed variable. Latent variables are unobserved variables that are estimated by co-variances of two or more observed variable as there is no direct measure for them (Hoyle, 1995).
[56] Measurement and structural models are explained in the next chapter, section 5-3-5.

sample size is the use of partial disaggregating[57]. Total disaggregating is the normal use of SEM taking all questions directly from the questionnaire, whereas partial disaggregating is a tactic which reduces the number of parameters to be estimated by aggregating some questions and building some parcels before doing any SEM analysis (Williams et al., 2009). It is suggested that, for every parameter to be estimated, at least 5 observations should exist and each question (indicator) should add two parameters (one measurement error and one factor loading[58]) to the model (Kline, 2005). By employing partial disaggregating the number of questions is reduced (by averaging them and building parcels); consequently the number of parameters to be estimated is reduced and, finally, a smaller sample size might be acceptable (Williams et al., 2009).

Another advantage of SEM is its exploratory ability which could be very useful in a situation where there is no adequate theoretical support to develop a particular model (Bloemer et al., 1999). However, this ability is more useful for exploratory and inductive approach studies (Williams et al., 2009). As SEM is the main statistical instrument for data analysis, in the next chapter the principle and practices of this technique are discussed in more detail.

4-9. Summary and Conclusion

In this chapter, the philosophy, paradigm, strategy and approach of the research are declared. Fifteen hypotheses and two theoretical models are also developed, mostly based on contingency-based literature. The first model addresses the accounting aspects while the second explains some parts of the performance management system. As was expected, much more support for the first model could be found in the literature than for the second one. Consequently, this is also the case for the measurement of variables. Before explaining the analysis of the collected data, it might be useful to discuss the data analysis techniques which could and will be employed in this study in more detail. Therefore, the next chapter is about the multivariate data analysis techniques, and the bases and behaviour of SEM as the main data analysis technique of this study.

[57] In SEM, researchers can either use all the items in the questionnaire as indicators to measure latent variables, which is called "total disaggregating", or use a combination of relevant items as parcels for each latent variable, which is called "partial disaggregating" (Williams et al., 2009).
[58] These terms are explained in chapter 5, section 5-2-7.

Chapter Five
Bases and Behaviours of SEM

5-1. Introduction

One of the most important sections of any empirical study is the data analysis. Adopting a suitable data analysis technique is one of the crucial decisions facing the researcher; otherwise, the results of the study might produce some misleading findings even though the data collection method was quite accurate and acceptable. Therefore, the researcher has endeavoured to find and adopt the best possible statistical technique for analysing the data of this research project.

Before proceeding to the actual data analysis, the researcher will attempt to exploit evidence from the literature to show the prevalent statistical techniques which have been used in this field, and will then review the salient statistical procedures that can be used in contingency-based accounting studies. This chapter will then continue with an introduction to and discussion of the principles and practices of Structural Equation Modelling as the main statistical approach to data analysis in this study. In later sections, superiority of SEM over other techniques, steps of SEM, specification and identification of models, necessary conditions for implementing SEM, indices of model fit, measurement and structural models, confirmatory factor analysis, and basic estimation in SEM will be discussed.

5-2. Multivariate Data-Analysing Techniques

It seems that the use of multivariate data-analysing techniques is widespread in quantitative management and accounting research and this is obviously because they are assessing the relationship between two or more variables at the same time (Anderson, 1984). When the association of two or more variables is to be investigated, multivariate analysis can be employed as a very helpful instrument by researchers. In univariate analysis, most of the important features are means which reveal the situation of each observation and standard deviation that is a criterion of the variability of each observation. In multivariate analysis, besides the importance of mean and standard deviation of each observation, the essential aspect is the dependence of the variables on one another (Anderson, 1984). As it can be found

from the literature review (see section 3-2-2) it seems that most studies in the area of contingency theory have employed one or two of the statistical techniques. These techniques are mainly Correlation analysis, Simple and Multiple regression analysis, Moderated regression analysis, Path analysis or regression analysis for mediation, Analysis of Variance (ANOVA), Structural Equation Modelling (SEM), and Cluster analysis. In addition, due to the essence of variables in contingency studies which are mostly latent variables and the use of questionnaires to measure variables, many studies have had to use Factor analysis to assess the reliability of their measurement instruments. In this section, the main techniques of multivariate analysis which have been employed in contingency-based studies are concisely explained.

5-2-1. Correlation Analysis

Covariance, which is calculated based on variables' deviation from their relevant means, is considered an important index for showing the extent of relationship between them. However, there is a big problem with covariance as a measure of dependence and that problem is the employment of different scales for measuring different variables, so different covariances cannot be compared in an objective manner (Field, 2005). The correlation coefficient of variables is in fact the standardized covariance which is computed based on standard deviation [59]. Dependence between variables can be measured and analysed on three levels, namely between all variables, different groups of variables, and some variables and different groups of variables (Anderson, 1984). Correlation between variables might be linear, a direct relation, either positive or negative, curvilinear, which is a combination of positive and negative relationships such as quadratic and cubic equations, or interaction, which consists of at least three variables where the third variable, the moderator variable, may cause different directions in the relationship between the other two. The latter, the interaction relationship, is also called partial correlation while the linear or curvilinear relationships are called bivariate correlation (Kline, 2005).

The research has extensively discussed and warned that the correlation coefficient should not be considered or interpreted as an indicator of directional causation. There

[59] Standard deviation is "a measure of the average deviation from the mean" (Field, 2005, p 110).

are at least two reasons for this. First, if there is a strong correlation between two variables, this does not necessarily mean that this relationship is not a consequence of any other variables that could have been added to the model, so this relationship might be the result of other unconsidered variables. The second reason is that the correlation coefficient does not show the direction of variables. In other words, based on that coefficient, it cannot be claimed that one variable is the cause of the other. Nonetheless, the correlation coefficient squared (R squared) can be used to explain the extent of variability of those variables, so the remainder could be interpreted as providing room for other deleted variables to play a role in that relationship (Field, 2005).

5-2-2. Regression Analysis

Correlation analysis can be employed as a strong research tool but it cannot say anything regarding directional causation between variables, as mentioned earlier, and cannot create a predictive model about the relationship between variables. Predictability of a model is very important because it gives the researcher an opportunity to generalize the findings of the study and forecast the behaviour of that variable in other situations rather than confining the results just to the collected data. Regression analysis creates a model which predicts the behaviour of one variable based on the behaviour of another variable (Simple Regression) or several other variables (Multiple Regression). The basis of regression is the estimation of a most suitable line which explains the effect of one or more variables as predictors on another variable as criterion (Field, 2005). In the real world, data cannot be fitted into just one exact line; therefore the term of residual is added to the model. Residual is the indication of discrepancy between what value the model estimates for an observation and what that observation really obtains. In other words, if the association between predictor and criterion were perfect, which is not normally the case with real data, the residual would be equal to zero (Kline, 2005).

Before passing any judgement about the results of a regression analysis, it is necessary to assess the goodness of fit of that model to gauge the reliability of the predictions. To do so, calculation of R square and analysis of variances (ANOVA) can help. To analyse the variance statistics, software computes the F ratio which is in fact "the mean of sum of square of differences between mean of the criterion variable and

regression line" divided by "the mean of sum of square of differences between observed data and regression line". If the F ratio is big enough, bigger than 1, and this is not due to chance (based on critical value of F distribution) the model can be considered good enough for its results to be relied upon (Field, 2005). Multiple Regression is a more complex and useful version of Simple Regression. In this method, two or more predictor variables are entered into the model to explain the behaviour of the criterion variable. In multiple regression three extra main points including the method of predictor selection, a check for necessary assumptions, and diagnostic investigation of the model should be considered important by the researcher. Regression analysis is also employed by researchers to estimate moderation and mediation models, which are explained in next two sections.

5-2-3. Moderation and Regression Analysis

As many contingency-based studies have employed Moderated Regression analysis (Gerdin and Greve, 2004), it seems useful to introduce it briefly. A moderator[60] variable in fact divides the independent variable into two or more subgroups to change the strength and/or direction of its relationship with the dependent variable (Baron and Kenny, 1986). Moderated Regression analysis is an estimation approach of multiple regression which compares two least square equations to either support or reject the existence of one moderating variable affecting a main given relationship between two other variables (Aguinis, 2004). To estimate the moderation effect of a variable on the main relationship, a new variable needs to be generated. This new variable is in fact the product of moderator variable and independent or predictor variable. Two equations below show the differences between a normal Multiple Regression and a Moderated Regression:

Equation 1: $\mathbf{Y} = \alpha + \beta_1 \mathbf{X} + \beta_2 \mathbf{Z} + \varepsilon$

Equation 2: $\mathbf{Y} = \alpha + \beta_1 \mathbf{X} + \beta_2 \mathbf{Z} + \beta_3 \mathbf{X*Z} + \varepsilon$

Where:

Y is dependent variable

[60] "In general terms, a moderator is a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of a relation between an independent or predictor variable and a dependent or criterion variable" (Baron and Kenny, 1986).

α is constant amount or intercept

β_1, β_2, and β_3 are regression coefficients

X is independent variable

Z is another independent variable in equation 1 and a moderator variable in equation 2.

ε are residual values

To assess the moderating effect of a variable on the relationship between dependent and independent variable, β_3 should be investigated; if the β_3 is significant in a statistical test it could be said that the moderating effect of z on the relationship between Y and X is significant (Hartmann and Moers, 1999). A better interpretation of moderation effect would be possible where there is no significant correlation between moderator and both the independent and dependent variables. It should be borne in mind that the moderator variable is always at same level of predictor in terms of causation on criterion variable, so the predictor is not the antecedent of the moderator (Baron and Kenny, 1986). The next section explains the use of regression analysis in estimating mediation models.

5-2-4. Mediation and Regression Analysis

Many other researchers have used multiple or simple regression analysis to investigate the mediation effect of some variables on equivocal relationships between main variables in contingency-based studies. By definition, a mediator variable as a third factor creates an opportunity for the independent variable to be able to affect the dependent variable (Baron and Kenny, 1986). Basically, a mediator variable is treated as dependent variable for the independent variable and as independent variable for the dependent variable[61]. For example, in contingency-based studies "motivation" as a mediator variable has been investigated to explain a part of the essence of the relationship between "participative budgeting" and "performance" (Brownell and McInnes, 1986 a). In other words, it can be argued that motivation, which might be generated by participative budgeting, could in turn create a situation in which performance might be improved.

Baron and Kenny (1986) suggested four conditions for a relationship to be accepted as a mediation. First, there should be a significant relationship between independent and

[61] Independent, dependent, and mediating variables were defined in footnote 37, page 85.

dependent variables; second, there should be a significant association among dependent and mediator variables; third, association between mediator and dependent variables should be significant; and fourth, after controlling for the effect of mediator variable on the relationship between independent and dependent variables, the strength of that relationship should decrease. To assess these four conditions, two simple regression analyses and one multiple regression analysis should be performed. In the first simple regression, the association between mediator (as dependent variable) and independent variable is tested. By the second simple regression, the association among dependent and independent variables is assessed. Multiple regression tests the associations of dependent variable with both independent and mediator as two independent variables. So far, three conditions out of four can be investigated but, for the fourth condition, the association between dependent variable and independent variable in the second simple regression and multiple regression should be compared. If the associations in three analyses are significant and the association between independent and dependent in the multiple regression is less than the simple regression, it can be concluded that the mediating relationship does exist (Holmbeck, 1997). However, subsequent studies have claimed that compliance with conditions 1 and 4 is not necessary in all cases, so when just conditions two and three are met, mediation can be confirmed (Kenny et al., 1998) . In the next section, another statistical technique, analysis of variance, which is used in contingency-based studies is explored.

5-2-5. Analysis of Variance (ANOVA)

Although Analysis of variance (ANOVA) is mainly known as an instrument to compare the ratio of systematic variance to unsystematic variance (F-ratio) in an experimental study (Field, 2005), it has also been used in many contingency-based studies which have looked at moderation models (Chenhall, 2003). ANOVA is in fact the generalized form of t-test for comparing means, as t-test is able to compare just the means of two groups whereas ANOVA can compare the means of more than two groups (Jobson, 1992a). To obtain a reliable result from an Analysis of Variance, certain conditions such as normality of distribution, fairly similar variances (homoscedasticity), independent observation, equal sample size for each group, and non-categorical measurement for dependent variables should be fulfilled (Field, 2005).

The logic of ANOVA is based on calculating three sums of squares including sum squares of differences between all observations and "grand mean"[62] (SST), sum squares of differences between mean of each group with "grand mean" (SSM), and sum squares of residuals which is computed by deducting SSM from SST (SSR). To eliminate the bias of number of cases, averages of SSM and SSR are calculated by dividing them by their degrees of freedom[63] . The F-ratio is calculated by dividing the SSM by the SSR (Wright, 1997).

If the amount of the F-ratio is significant it indicates that, the means of groups are not statistically equal. It should be borne in mind that the significant amount of F-ratio does not indicate which group mean is higher and which one is lower. There are two alternative ways of discovering this: either testing the difference between two specific means according to the developed hypothesis (planned contrasts) or testing the significance of differences between all possible pairs of groups (post hoc tests) (Field, 2005).

In some cases, researchers find it interesting and necessary to assess the effect of other continuous variables as covariates on the outcome of research besides the main given variable, and then the differences between means of groups are tested. This kind of analysis is called Analysis of Covariance (ANCOVA). By entering that kind of variable into the model, it will be possible to explain some part of the unexplained variance and reduce the error variance of the study. In addition, by measuring the effect of the new variable (covariate), the effect of the main variable can be measured more accurately (Jobson, 1992a). Where the use of ANOVA extends to the case of more than one dependent variable the technique is called Multivariate Analysis of Variance (MANOVA). In ANOVA, means of groups are calculated and analysed while in MANOVA means of vectors are computed and investigated (Jobson, 1992b).

5-2-6. Cluster Analysis

As was mentioned earlier, in some contingency studies cluster analysis has been employed to investigate the system approach (Drazin and Van de Ven, 1985, Chenhall,

[62] Grand mean is the average of all observations of all groups in the study (Wright, 1997).
[63] Degree of freedom is the number of groups minus 1 for SSM and product of the number of groups and total number of observations minus 1 for SSR (Wright, 1997).

2003) or configuration approach (Gerdin and Greve, 2004) of fit. The aim of cluster analysis is quite simple as it attempts to classify different cases in a rational way and group those cases which are more analogous to one another. Two problems can complicate this situation, including measurability of criterion of resemblance and proliferation of criteria that exist in an object or observation and can be used for classification.

There are two broad methods of cluster analysis: Hierarchical and Non-hierarchical. In the Hierarchical approach, the clustering process results in a pecking order in which subgroups at each level are accumulated to shape the next cluster with a higher level of inclusiveness. The Hierarchical method, in turn, is divided into two methods, namely Agglomerative and Divisive. The Agglomerative method assumes each object as a cluster with one element, and then puts these clusters together in rational steps; however, once two clusters are put together they are not allowed to be separated. Conversely, in the Divisive method all members are assumed to be in one cluster and are then divided into two clusters, with each one of the new clusters being divided into two other clusters in turn. After the clusters have been divided into sub-clusters in each step, they cannot be merged again in a reverse manner. In a Non-hierarchical approach, clusters are formed by taking members from the pool of elements or from other clusters; therefore, members of each cluster can vary until the final stage of the process (Bartholomew et al., 2002).

In the system or configuration approach of contingency theory, this analysis could be very useful to discover whether or not a wide range of variables including environmental and contextual variables, as well as organizational performance as another variable, in different clusters are matched (Chenhall and Langfield-Smith, 1998b).

5-2-7. Factor Analysis

As was mentioned earlier, most contingency-based studies have employed questionnaires for data collection (Chapman, 1997) and most of the variables in this area of knowledge are latent variables which cannot be measured directly, so the use of observed variables for measuring latent variables indirectly seems to be quite prevalent in this field. Having done that, a debate would ensue around the validity and

reliability of those observed variables for gauging the related latent variables. It is crucial for a researcher to be scientifically confident that those several observed variables reproduce one single variable as latent variable. Factor analysis is one of the widespread statistical techniques employed by researchers in the social sciences to solve this problem. This technique could help the researcher in at least three situations: designing a questionnaire for measuring latent variables; discovering the construction of a set of variables; and decreasing the number of variables to make them more manageable without losing the relevant and distinct information (Field, 2005).

The main logic of factor analysis is the high correlation between each group of observed variables, which are the questions or items of the questionnaire, and low or zero correlation with the variables outside of that group, so each group would be regarded as a common factor or latent variable (Jobson, 1992b). Each factor or latent variable could be assumed as a dependent variable in terms of regression model in which that variable is predicted by several independent variables as observed variables. In fact, the factor analysis technique suggests several different lines or regression models using all observed variables, so each of those lines can be considered as common factors.

To decide how many factors are statistically important the criterion of Eigenvalue is employed. Eigenvalue indicates how much each factor contributes to explaining variance; therefore, only the factors with large Eigenvalues, of at least one or greater, are considered meaningful. However, it is argued that a scree plot of Eigenvalues and factors is a better way of determining the number of factors by looking at the inflexion of the plot and selecting the factors before the scree plot becomes flat, provided the sample size is larger than 200 (Stevens, 2002). Another criterion for selecting the number of factors is communality [64] . When fewer factors are chosen, the communalities are lower; thus, to avoid having very small communality, sufficient factors should be selected. Communalities which are more than 0.5 for a sample size larger than 100 are considered sufficient (Field, 2005).

[64] Communality is in fact the ratio of common variance to total variance of a variable. The variance of each variable consists of two parts: common variance and unique variance; the common variance is that part of the variable's variance that is shared with the other variables and the remainder is unique variance (Field, 2005).

To specify the related observed variables for each factor the technique of factor rotation is employed. Two main types of factor rotation can be used, namely orthogonal and oblique rotation, which are uncorrelated and correlated factor rotation respectively. Therefore, if it is theoretically supposed and expected that factors are related, oblique rotation should be chosen otherwise orthogonal rotation may be better solution (Field, 2005). Another criterion to accept any observed variable as an underlying measure for a latent variable is the significance of its factor loading[65]. In rough terms, a factor loading larger than 0.3 could be considered significant; however, Stevens (2002) suggested that the sample size should be considered important in the significance of factor loading. He believes that, for small sample sizes such as 50 and 100, factor loadings of 0.72 and 0.51 respectively could be assumed significant whereas, for larger sample sizes, for example 600 and 1000, the loadings could be more than 0.21 and 0.16 respectively. In the next section, Structural Equation Modelling, one of the statistical techniques used in contingency-based studies and the main statistical technique of the present project, is reviewed in more detail.

5-3. Structural Equation Modelling

From the 1970s onwards, a new vocabulary in the quantitative approach to social science research, with terms such as "covariance structure", "latent variables", "multiple indicators", "path analysis" and "LISREL" has gradually become widespread. Structural Equation Modelling (SEM) is not just one of the aforementioned terms and expressions, however; it somehow encompasses all of them. It is in fact a combination of factor analysis, path analysis, and regression analysis (Bollen, 1989). In other words SEM is a compilation of statistical procedures which can be used for assessing the relationships between more than one dependent and independent variable, while these variables can be observed or latent (Tabachnick and Fidell, 2001).

The comprehensiveness and robustness of SEM has caused a rapid growth in its application in management research; for example, the number of published management papers using SEM has increased from 9 during the period of 1978-1987 to 91 during the recent period of 2001-2008 (Williams et al., 2009), a tenfold growth

[65] The regression coefficient in factor analysis model is usually called factor loading (Anderson, 1984).

rate. There should be something in SEM that makes it so popular and encourages researchers to adopt this technique for data analysis in spite of certain difficulties and tricky aspects such as specification, identification, and fit problems (see following sections). This section will attempt to capture the unique capabilities of SEM. In the following subsections, principles, practices and preferences of SEM are reviewed. In particular, the steps of SEM, sample data issues, estimation in SEM, the concept and criteria of model fit, different models, factor analysis and path analysis with SEM, and common employed software for SEM as well as the advantages of SEM in other techniques are all explored.

5-3-1. Steps of SEM

Kline (2005) has categorized the main steps of performing SEM into eight phases: model specification; identification of the model; selection of measures and data collection; estimation of the model with software; revising the model if necessary; reporting the results; replication of the results; and, finally, the implementation of the results. Of course, the final two steps appear to be somewhat ambitious as Kline himself describes them as "two optimal steps that could be added to the basic ones". Specification, identification, and selection of measures and data collection, which are very important in SEM models, are explored in the next subsections.

Performing the model using a computer program, which is the fourth step of SEM according to Kline (2005), resulted in a number of reports concerning fit of the model, modification indices, test of normality of the data, variable and parameter summary, and several estimates including both forms of standardized and non-standardized estimations. In this step, outcomes should be reviewed, assessed, checked and interpreted. Equivalent models should also be considered as the researcher has to be able to explain the advantages of the main model over others, based on the related literature and rational reasons. It might be necessary for the researcher to change the main model slightly based on modification indices to obtain a better model in terms of fitness and compatibility with the collected data, but it should not be beyond the area of the proposed hypotheses.

5-3-2. Model Specification

It is quite crucial in the early stages for a researcher who wants to use SEM to design a reasonable model. It has been argued that the number of wrong models surrounding each issue is very large, but there is only one correct model and recognizing it from amongst the wrong ones in all situations is not always so easy (Duncan, 1975). For specification of the model, the researcher attempts and has to propose the hypotheses in terms of a structural model; therefore, the hypotheses are, in fact, a set of related equations. The basic concepts of these equations have mostly been obtained from the related literature. A simple model of SEM could be analogous to the Figure 5-1.

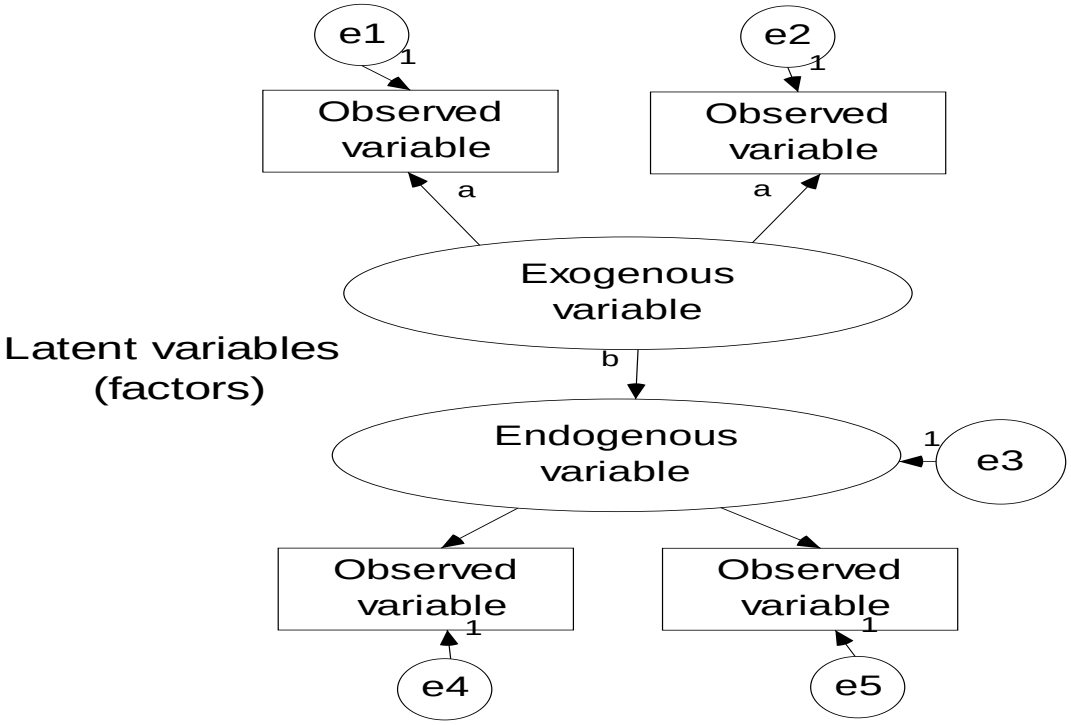


Figure 5-1) a simple SEM model

Each of the shapes in the diagram is typically used to represent a kind of variable and these shapes are approximately standard in SEM literature. Boxes or rectangles are used for observed variables which are measured directly. These variables in social science are mostly indicators or questions from the questionnaire. Ovals are employed to show the latent variables which are concepts or factors that cannot be gauged directly and have to be estimated by observed variables. In each observed or measured variable there could theoretically be some amount of error that is stated by “e” and

represented in a circle. As it is assumed that the amounts of endogenous variables are predicted by exogenous[66] variables, the probable amount of error in this prediction is also expressed by "e". Arrows, lines labelled with "a", from the ovals (latent variables) to the rectangles (observed variables) indicate the regression coefficient, also known as factor loading, between observed variables and latent variables.

Lines between latent variables, for instance line "b" in the above diagram, are proxies of association among them. Based on different kinds of relationships between latent variables, two main sorts of models are designed: so-called recursive and non-recursive ones. In recursive models there are no reciprocal relationships between variables so the direction of associations is one way, whereas in non-recursive models there is at least one reciprocal relationship between latent variables either directly or indirectly (Bollen, 1989). Therefore, it is necessary for the researcher to specify his or her model according to the literature and personal insights which are reasonably defendable in terms of the components that were explained earlier as the elements of SEM models.

5-3-3. Model Identification

The second step of SEM according to Kline (2005) is model identification. Identification here means that the model's parameters can be estimated and the equations in the model can be solved and computed. In simple language the equation of X=Y+2 cannot be solved because it is figuratively unidentified. To make this equation solvable, there need to be some boundaries for X or Y; for example, Y could be made equal to 2X, and then the amount of X could be computed. Three statuses might be created in terms of identification after defining an SEM model: over-identified, just-identified, or unidentified models. There should be enough known parameters that can be used to estimate unknown parameters, so when there are more known parameters than unknown ones the model is over-identified; otherwise the model would be either just-identified (known and unknown parameters are equal) or under- identified where there are fewer known parameters than unknown ones (Skrondal and Rabe-Hesketh, 2004). For example, by having only two questions to measure a latent variable, it is not possible to carry out factor analysis for such in an

[66] An exogenous variable is one whose value is completely independent from the model, but affects other variables in the model, whereas an endogenous variable's value is changed or estimated by other variables including exogenous variables and/or other endogenous variables (Kline, 2005).

SEM model. Because, there are just three known amounts (the variances of two observed variables and a covariance between them) and five unknown parameters (2 error estimations, 1 estimation of latent variable, and 2 estimations of factor loading between observed variables and latent variable), so that model would be unidentified.

Although a just-identified model, in which the number of known and unknown variables is equal, is considered an identified model, it should be noticed that this kind of model is very fragile in terms of identification. At least two cases can render such a model unidentified. The first is designing that model as a non-recursive model. The second is the consequences of empirical identification, where one observed variable has to be set aside due to multicollinearity[67] or other possible problems such as very low degree of factor loading. Therefore, it seems crucial for any researcher wishing to use SEM to be aware of the identification problems in the early stages of the study as it might not be possible to resolve them in the final stages, particularly for the smaller models. The researcher should assess the risk of coming across an under-identified or just-identified model (in both Measurement and Structural Models). On encountering such positions, the researcher should go back to the before step (model specification) and re-specify the model (Kline, 2005).

5-3-4. Traits of the Data Needed for SEM

Apart from the usual requirements for data such as reliability, validity, not being highly correlated, and independency in observations, some aspects of data are of much more importance in SEM. Normality, proper treatment of missing values, homogeneity of variances, and large sample size are the most necessary features of collected data to be used in SEM analysis.

Data that are used in SEM are assumed to be normal[68], as statistical estimations in SEM are mostly based on the normality of distribution assumption. Not only should data have univariate normality, but their multivariate distribution should also be close to normal. Multivariate normality can be attributed to a set of data when three conditions are met: first, data already have univariate normal distribution; second, the joint distribution of any pair of variables is bivariate normal; and, finally, scatter plots

[67] Multicollinearity refers to the high correlation (more than 90%) between two variables (Field, 2005).
[68] When the histogram of frequency of a set of data or observations is bell-shaped, the distribution of that data is called normal (Field, 2005).

of those distributions are linear and their variances are equal (Kline, 2005). A distribution may deviate from normality because of Skewness, Kurtosis, or both. When most of the observations are below (positive skew) or above (negative skew) the mean, the distribution is considered non-normal.

Likewise, if the observations are mostly situated around the mean to make a higher peak for the distribution histogram (positive kurtosis) or if they are highly distributed away from the mean to make a flat form of histogram (negative kurtosis) the normality is not perfect. Of course, the deviation from perfect normality is not summarised in an absolute value and it depends on standard error of the data. It has been argued that, for samples containing more than 200 cases, critical degrees of less than 3.29 could be considered not too far from normal distribution (Field, 2005). There are several remedies for non-normal data, such as transformation of variables, setting aside some extreme outliers (Kline, 2005) and use of parcels or factors instead of items as observed variables to increase the normality of the data (Williams et al., 2009).

Dealing with missing data is another challenge for SEM and other multivariate analyses. Missing values could be considered systematic or random, which are categorized into missing at random (MAR) and missing completely at random (MCAR) (Kline, 2005). Systematic missing values should be investigated and analysed carefully because respondents may have wanted to make a point by not answering certain questions and this could result in selectivity bias (Bollen, 1989); however, randomly missing values might be ignored in analysis. However, it is important in SEM for the issue of missing values to be treated properly before conducting the computer program, as estimation of data sets with missing values cannot be performed by SEM (Kline, 2005). Besides, it is important for any researcher who has used SEM analysis to explain the approach which has been used to deal with the missing values.

Large sample size is another requirement for SEM analysis to produce reliable estimations and outputs. It is an accepted rule for all statistical analysis that when

sample size is larger the risk of sampling error or standard error[69] is decreased, so sampling error is directly affected by sample size (Field, 2005). The need for a large sample size, apart from the above-mentioned point, is due to two other reasons: the usual complexity of SEM models and the use of more than one type of estimation in SEM (Kline, 2005). It has been argued that SEM needs at least a medium-sized sample which contains more than 100 cases; so, a small sample size (less than 100 cases) cannot produce reliable results while the results of large samples (samples with more than 200 cases) are more reliable (Breckler, 1990). Of course, the complexity of the SEM model could increase the need for larger samples; therefore, it is believed that the desirable number of cases for each parameter is 20, but if the number of cases for each free parameter is less than 5 the outcomes of SEM cannot be trusted. The power of a statistical test is also increased when the sample size is larger (Kline, 2005).

5-3-5. Measurement and Structural Models

Each SEM model normally comprises two models: the so-called measurement model and the structural model. The measurement model refers to that part of the model which is dealing with observed variables to measure latent variables, but that part of the model which investigates the relationships between latent variables is called structural model or general model in SEM (Goldberger, 1973). Measurement models are predecessors of the structural models, so the probable serious flaws in measurement models could damage the reliability of structural models (Graham et al., 2003). To test the reliability of a measurement model, the technique of confirmatory factor analysis is employed, so this is explored in the next subsection.

5-3-6. Confirmatory Factor Analysis

Exploratory factor analysis was discussed earlier in section 5-2-7; however, confirmatory factor analysis (CFA) is employed when it is believed that some particular items are suitable for measurement to gauge a latent variable, and this is usually supported by previous evidence from the related literature. For each standard CFA model, three conditions should be met. First, it is assumed that an indicator is a

[69] Sampling or standard error refers to the differences between attributes of a chosen sample and the related population, so a high sampling error indicates that the selected sample is not a good representative of the population (Field, 2005).

continuous variable which is causing two groups of motives - the latent variable to be measured and others which are referred to as errors; second, the errors are not assumed to be dependent on each other and latent variables; and third, relationships between latent variables are not analysed (Kline, 2005). Before any CFA takes place, its model needs to be specified and identified as was discussed earlier (sections 5-3-2 and 5-3-3).

After designing a specified and identified model for CFA, the model is conducted by computer programme and the results are assessed and interpreted. Two main categories of reports result from conducting the CFA. The first one is about the goodness of fit of the model, which is the same as the reports for the general model and is reviewed in the next section. The second one is the report of estimations for the model. Four main reports are usually produced as estimations for CFA models including non-standardized regression coefficients, estimates of variances for exogenous variables, standardized regression coefficients, and squared multiple correlations. The first report explains the factor loading of each indicator for related latent variable. This amount can be tested in terms of statistical significance; however, most software will compute the result of this test as well. If any indicator has been constrained for model identification, its coefficient will be equal to 1 and no statistical test would be computed for it (Kline, 2005). The second table reports the variances of measurement errors and related latent variables. This is in fact the explained variance by the measurement error, so one minus this variance would be the explained variance by the associated observed variable (Goldberger, 1973). Standardized regression coefficients (standardized amounts of factor loading), which are illustrated in the third table, are just the standardized form of the first report. They state the correlation between indicators and latent variables in terms of standard deviation measure; these amounts are also called structure coefficients (Graham et al., 2003). The squared amounts of these figures are the contents of the fourth report which shows the strength of the associations between indicators and their affiliated factors. It is argued that indicators with squared multiple correlation of more than 0.60 for small samples are acceptable; however, for larger samples this amount could be less, something around 0.30 (Field, 2005).

5-3-7. Model Fit, Concept and Criteria

Perhaps the most important part of an SEM model, after specification and identification, is obtaining a fit model because not every specified and identified model is necessarily an acceptable model in terms of goodness of fit; therefore, estimations resulting from such a model might not be sufficiently reliable. The purpose of assessing the fit of an SEM model is to explore the extent to which a designed or proposed model is compatible with a set of data. This compatibility can vary in a range from zero to full conformity (Mulaik et al., 1989) which might be very difficult to achieve in the real world. It should be mentioned that the goodness of fit can only be computed for the over-identified[70] models, but not for under-identified or just-identified models (Bollen, 1989).

There are several indices to assess model fit and they are categorized into two groups, namely absolute fit indices and incremental fit indices. Absolute fit indices are calculated based on maximum likelihood (ML) estimation regarding the conformity of the observed model with the expected model; however, incremental fit indices are based on a comparison between Chi-squares of the tested model and null model or baseline model[71] (Hu and Bentler, 1999). The minimum value of discrepancy, C, (CMIN) which is also referred to as model Chi-square, the ratio of CMIN to degree of freedom (CMIN/DF), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), parsimony goodness of fit index (PGFI), parsimony ratio (PRATIO), root mean square residual (RMR), root mean square error of approximation (RMSEA), Akaike information criterion (AIC), and Hoelter critical N (HOELTER) are examples of absolute fit indices. Incremental fit index (IFI), normed fit index (NFI), comparative fit index (CFI), and relative fit index (RFI) are the most important indices in the incremental fit category. The aforementioned indices are just some (not all) of the indices that are reported by SEM software including Amos. Some of the fit indices are quite generally accepted in SEM literature and it is recommended that they be reported and interpreted by researchers who use SEM as their data analysis technique (Kline, 2005). Therefore, in this section the indices of fit including CMIN, CMIN/DF, RMR, RMSEA, AIC, CFI, and NFI are reviewed.

[70] See definition of over, under, and just-identified models in section 5-3-3.

[71] The baseline model or null model is the simplest model where it is assumed that all possible restrictive parameters exist in it and there are no co-variances among the observed variables (Bollen, 1989).

The minimum value of discrepancy, C (CMIN) or Chi-square of the model, is the most basic yardstick for model fit. The Chi-square of a model is in fact the product of its "degree of freedom" and "statistical criterion minimized in maximum likelihood (ML) estimation". Therefore, the Chi-square for a just-identified model is equal to zero and it cannot be computed for a non-identified model (Bollen, 1989). It should be borne in mind that the application of Chi-square here runs counter to its traditional use in research as researchers normally suggest significant differences between their proposed hypotheses and null hypotheses; a higher degree of Chi-square is more favourable in that situation. However, in the case of model fit in SEM, the lower degree of Chi-square means that the observed model is closer to the expected model, and is thus more desirable.

There are three problems with using Chi-square as the only criterion of fit. First, Chi-square increases with an increase in the size of the model and the number of its parameters. In addition, a higher correlation between variables causes a higher degree of Chi-square. Moreover, the larger sample size which is needed for statistical tests enlarges the degree of Chi-square. To overcome these problems, many researchers have proposed a new index which is Chi-square divided by the model's degree of freedom (Kline, 2005). Although there is no clear and exact generally accepted value for Chi-square/DF (CIMN/DF) index, values of less than 3 or even less than 5 can be considered indicators of a good fit (Bollen, 1989).

Another important index for assessing the goodness of fit is "Root Mean Square Error of Approximation" (RMSEA). The importance of this index is partly due to the fact that there is a corrective mechanism in its formula to deal with the complexity of the model. This is crucial, because many of the other indices worsen as the model becomes larger and more complex; so, relying only on them could be misleading in some situations where the models are highly large and complex. In fact, RMSEA estimates a non-central Chi-square distribution which can assume that the null hypothesis is not necessarily true and could be false. Therefore the degree of possibility of the null hypothesis being false is measured by a parameter such as δ and is computed by subtracting the degree of freedom (DF) of the model or zero (whichever is higher) from the Chi-square of the model. In other words, it is the extent

of error in model specification by the researcher, so it shifts from estimation errors (sample-based) to approximation errors (population-based). As the total error results from estimation and approximation errors, RMSEA takes into account both of these errors by dividing the computed δ by DF of the model. It has been argued that an RMSEA greater than 0.10 shows that the model fit is poor, but values equal to or less than 0.05 mean the model fits well enough (Browne and Cudeck, 1992).

Another population-based index of model fit is Akaike Information Criterion (AIC) which is based on a data analysis approach that mixes model selection and estimation in a unique framework. AIC could be referred to as a parsimony-adjusted index of fit as it is in favour of simpler models rather than over-complex ones. In Amos software, AIC is computed by adding 2 times the number of free parameters of the model to the Chi-square of the model (Arbuckle, 2007); however, in other SEM literature it has been computed by deducting 2 times the number of degrees of freedom from the Chi-square of the model (Kline, 2005). Although AIC and these kinds of indices are used to judge competing models, they can also be used for just one model. As long as the AIC index for the observed model is less than the AIC for the saturated model (which contains a maximum number of possible parameters), the observed model can be considered in a good position in terms of model fit (Blunch, 2008a).

There are many indices that are computed based on a comparison between baseline or independent model and expected model. Comparative Fit Index (CFI) and Normed Fit Index (NFI) are the most popular indices in this category. Due to the assumption in baseline model that there is no correlation between variables, the Chi-square of that model would be very much larger than the model proposed by the researcher, so the smaller the Chi-square of the researcher's model compared to the baseline model the better. Thus, CFI is calculated by the following formula:

CFI= 1 - ((expected model's Chi-square – its degree of freedom or zero) / (baseline model's Chi-square – its degree of freedom or zero))

Also, NFI is computed by comparing the Chi-squares of expected model and baseline model, but it does not take into account the degree of freedom for each of the models. So the formula for NFI is as follows:

NFI= 1 - (expected model's Chi-square / baseline model's Chi-square)

It has been argued that values greater than 0.90 for all incremental fit indices including CFI and NFI show that the model fit is acceptable and, if the value is equal to or more than 0.95, the fitness of the model is good and model is reliable (Hu and Bentler, 1999). It should be borne in mind that NFI is not corrective in terms of model complexity, so when the model is more complex the CFI could be considered a better index of fit as it is corrective in terms of model complexity (Kline, 2005).

To assess the goodness of fit of a model by relying on just one or two indices could be misleading and it is recommended that a range of indices be computed and considered (Hu and Bentler, 1999). In addition, care should be taken with interpretation of the implication of fit indices as all of them have several limitations. The indices show only the average fit of the model, so it is possible that some part of the model has a poor fit while other parts have a good fit. Moreover, it is obvious that the fitness of a model does not also mean that the outcomes are plausible and consistent with the literature or related theory. Furthermore, goodness of fit is not necessarily a sign of a model's high predictive power, as part of the predictive power is due to the extent of model disturbances. After determining that the model is fit enough to rely upon, the estimations that are produced for that model can be reviewed and analysed. In the next section the basis of estimation and different kinds of estimations provided by SEM are explored.

5-3-8. Estimation in SEM

There are many options for estimation in statistical techniques and procedures. In most SEM software including Amos there are several options that can be employed for discrepancy estimations such as Generalized Least Square, Unweighted Least Square, Scale-free Least Square, and Maximum Likelihood; however, the default option is Maximum Likelihood (ML)(Arbuckle, 2007). ML is based on the derivation of parameter estimates which maximize the likelihood that the observed covariance of the data illustrates the reality of the population. It also estimates maximum likelihood of all parameters simultaneously and, due to this trait, it is called a full-information method whereas other methods are partial-information or limited-information methods (Kline, 2005). ML tries to minimize the discrepancies between the co-variances of observed data and the model which is proposed by the researcher. As the method is very intricate, SEM software usually performs an iterative estimation; this

means that an initial solution or estimation is carried out first, and then the software tries to find a better solution, this process being repeated until no further progress could be seen in the estimation (Kline, 2005).

Much output and many estimations result from an SEM program which can be used in data analysis by the researcher. Amos, like most of the other software, produces regression weights of all variables, standardized regression weights, covariance and correlation of exogenous variables, variances of exogenous and disturbance variables, squared multiple correlation of both observed and latent variables (except for exogenous variables), and direct, indirect, and total effect of all independent variables on dependent variables (Arbuckle, 2007). According to these outputs, the hypotheses of the research can be tested and interpreted.

Another important output that is mainly employed to gain a better model fit is Modification Indices. This estimation is performed for all parameters and associations that can be computed based on a definition of baseline or null model. If the researcher allows those parameters to be estimated in the model, it shows how much improvement would occur through decreasing the Chi-square of the model (Byrne, 2001). Care should be taken in the use of these indices as only those paths that are compatible with the related literature and theory can be added to the model. In addition, the temptation to use those indices excessively may cause an over-fitting problem for the model. Finally it could change the nature of a confirmatory study for an exploratory investigation (Graham et al., 2003). In the next section, the best-known SEM software is briefly introduced.

5-3-9. Commonly-used Software in SEM

There are several computer programmes used by researchers to run SEM analysis. Kline (2005) has introduced eight of them including LISREL, Amos, EQS, Mplus, Mx Graph, RAMONA of SYSTAT, CALIS of SAS, and SEPATH of STATISTICA. The above-mentioned programmes can perform all the functions of SEM; however their power, user-friendliness, and cost can vary. LISREL, which stands for Linear Structural Relationships, is probably the oldest program for SEM, and many may use it interchangeably with SEM. LISREL can deal with missing observations, generate bootstrap samples, and produce correlation matrices for discrete variables such as

categorical or ordinal[72] indicators. The graphic version of LISREL is called SIMPLIS and it is not necessary to specify disturbance variables as the programme does this automatically (Jöreskog and Sörbom, 1993).

Amos, which is a contraction of Analysis of Moment Structure, has two main modules, namely Amos Graphic and Amos Basic. Amos Graphic is a very user-friendly programme and contains all the tools required for drawing and correcting model charts while preventing the researcher from making obvious mistakes in model specification. Amos is very impressive in giving the researcher the ability to use trial and error as it is quite possible to select a parameter, change its value and observe its effect on the model fit; it is thus very useful for exploratory analysis. It is also able to estimate standard errors by a bootstrapping [73] technique and create confidence intervals for all parameters. Amos is usually considered a part of SPSS and can easily read data from SPSS files. With Amos it is also possible to split data into two or more categories based on certain unique characteristics and observe their differences in one model at the same time (Arbuckle, 2007).

Another programme, EQS (short for Equations), is a powerful piece of software for SEM and has a comprehensive ability to perform statistical analysis including data entering and screening, conditional case selection, transformation of variables, and coding of missing values. In addition, many other statistical techniques such as regression, ANOVA, factor analysing and interclass correlation can be performed by EQS. One of the special merits of EQS is that it can perform analyses for non-normal data, although it needs a very large sample size (Byrne, 2006). Mplus, as other software, can estimate statistics and standard errors for non-normal raw data in the case of large sample size and is able to deal robustly with missing observations at random. There is a method in Mplus called Monte Carlo which can create virtual random samples according to the researcher's proposed model and report the outcomes for all samples (Kline, 2005).

[72] In categorical data, numbers just indicate the name of groups whereas ordinal data give more information such as order and extent regarding the variables (Field, 2005).
[73] Bootstrapping is explained in the Chapter 7, section 7-4-1-1.

Perhaps the most highlighted feature of Mx Graph software, further software for SEM, is that it is available free of charge on the Internet. It is also able to compute confidence intervals and perform a statistical power analysis for all parameter estimates. RAMONA (Retailer Action Model or Near Approximation) is another programme that has no drawing editor, so it is based on certain syntax commands. In spite of that, RAMONA is a comprehensive statistical package and its commands are quite simple and straightforward. The most important feature of SEPATH (Structural Equation Modelling and Path Analysis), another computer programme for SEM, is that it has several options for estimation that can be chosen by the user at the beginning of the analysis (Kline, 2005). In this study, Amos programme is employed for this study as it offers several advantages for the researcher. Close link with the SPSS, user friendliness, bootstrapping capability, and availability at the University are some of the reasons for this selection. In the next section, the advantages of SEM over other statistical techniques are concisely reviewed.

5-3-10. Priorities of SEM over Other Techniques

Having now reviewed many statistical techniques and SEM, the researcher can point out several advantages of SEM over other techniques. One of the most important advantages of SEM compared to traditional methods such as Multiple Regression is that SEM is able to take observed variables directly as main input and then measure them as latent variables to assess their relationships. For other techniques it is necessary to build up latent variables or factors beforehand and separately through exploratory factor analysis or other procedures and then use them for the main analysis (Kline, 2005). Moreover, this could cause the problem of ignoring the measurement errors which have been computed in first phase, and computing latent variables based on observed variables separately by the traditional techniques; SEM, however, takes into account the effect of measurement errors in the whole analysis. SEM accounts for two kinds of errors in the model including measurement errors pertaining to observed variables and prediction errors relating to dependent variables (Bollen, 1989). In addition, SEM creates the opportunity for the researcher to solve and analyse several structural equations simultaneously. This characteristic is very helpful where dependent variables in some equations are used as independent variables in a series of equations (Smith and Langfield-Smith, 2004).

Another important advantage of SEM over other techniques, especially Multiple Regression, is that in SEM it is possible to have several dependent variables in the model whereas in Multiple Regression only one dependent variable can be defined for each model (Field, 2005). It is obvious that this merit could improve the ability of researchers to analyse the more complex cases which are more analogous to situations in the real world. The fifth advantage of SEM is the greater robustness of the model because its goodness of fit is assessed from different perspectives including absolute fit indices, comparative or incremental indices, and parsimony indices, while the index of fit for Multiple Regression, for instance, is just one criterion (Smith and Langfield-Smith, 2004). Therefore, if the researcher can rely on a combination of indices and all of those indices confirm the goodness of fit for the model, the researcher can expect to have a more reliable model.

Finally, it has been argued by many scholars in contingency-based research (see for example: Chenhall, 2003, Van de Ven and Drazin, 1985) that it is preferable to look at contingency-based cases in a comprehensive and holistic way, which they call system approach. It seems that adopting a system approach requires the researcher to take into account many different variables and analyse their interactions with one another at the same time. Therefore, it appears that SEM is one of the most suitable statistical techniques for providing this service for researchers in this area of study. Thus, according to the above-mentioned points the most reasonable statistical approach to adopt for this project as a data analysis technique is SEM. In the next section, clear links between the capabilities of SEM and the characteristics of this study are explained.

5-3-11. Appropriateness of SEM for This Study

Smith and Langfield-Smith (2004) argue that SEM is a quite suitable statistical instrument to be used in management accounting studies looking at relationships between environment, structure, control systems and organizational performance. Several points shape the communality between the suitability and abilities of SEM and the needs and characteristics of the present study. Firstly, SEM is a proper statistical technique to be used for data analysis when the effects/associations of several variables on/with one another in a model are investigated (Schumacker and Lomax, 2004, Kline, 2005); in this study 12 latent variables in two models

(accounting system and performance management) are examined. Secondly, this method is most suitable for studies that collect data through surveys and questionnaires as it can take measurements (observed variables) directly from the questionnaire and deal with measurement errors more robustly as well as constructing more reliable factors in the phase of the Measurement Model (Kline, 2005, Echambadi et al., 2006, Williams et al., 2009). In this study data are collected via questionnaire, and some of the measures in the instrument are newly adopted and adapted to the context of the study (Governmental Universities of Iran); therefore, a more sophisticated technique can help to build more reliable factors.

The third point is that SEM is generally used to assess complex models with many different direct and indirect relationships, mediation and moderation effects, and the existence of two or more dependent variables in the model (Shook et al., 2004, Smith and Langfield-Smith, 2004). For example, a mediation effect can be assessed simultaneously and by a single execution by SEM rather than two simple regressions and one multiple regression in regression techniques (Williams et al., 2009). In two models of the present study many of the above-mentioned traits can be found as the models are relatively complex with three dependent variables in some parts and defined mediation relationships. Finally, SEM is mostly employed for theory-testing (Byrne, 2001, Echambadi et al., 2006) and takes a holistic approach to the subject under examination as the whole model can be assessed in one run, considering and estimating the effects and relationships of all included variables simultaneously, and giving a broader perspective which is more similar to the real world (Kline, 2005). As one of the objectives of this study is to test the core ideas and postulates of Contingency Theory in the context of Iran's Higher Education rather than just testing several individual hypotheses, this capability of SEM could help the researcher to achieve that aim. Therefore, it seems that SEM is a more suitable statistical technique to be utilized in this study and is therefore adopted.

5-4. Summary and Conclusion

This chapter's main focus was to explore the bases and behaviour of SEM as the main statistical technique used for data analysis. To do so, first the commonly-used statistical methods in contingency-based studies were reviewed and then those

prevalent procedures were concisely explained. In this regard, “correlation analysis”, “regression analysis”, “regression analysis for moderation and mediation”, “analysis of variances (ANOVA)”, and “cluster analysis”, as well as “factor analysis” were briefly reviewed. In the final section of this chapter, the key concepts and principles of SEM including main steps of SEM, model specification, model identification, characteristics of data needed for SEM, confirmatory factor analysis, model fit concept and indices, main basis of estimation in SEM, and widely-used computer programmes for SEM were introduced.

Subsequently, six points and merits were stated as reasons for the researcher to choose SEM as the main statistical data analysis procedure. The possibility of inputting observed variables (questions from the questionnaire) directly into the model, simultaneous analysing, taking care of both measurement errors and prediction errors, possibility of inserting several dependent variables into the model, great robustness of results, and a holistic approach to the variables are important advantages of employing SEM to analyse data in the present study. Finally, by exploring several matches between capabilities of SEM and the traits and needs of the present study adoption of SEM was justified. In the next chapter, the collected data are presented and descriptively analysed.

Chapter Six

Descriptive Data Analysis

6-1. Introduction

This chapter presents and classifies the data collected through questionnaires and illustrates the descriptive statistics pertaining to the observed and latent variables of this study. The main sections of this chapter are about the overall information concerning the collected data, descriptive statistics of variables, and results of exploratory factor analysis of the collected data.

6-2. Overall Information about Collected Data

In this section some information about responses and questionnaires received, some statistics regarding the respondents who filled out and returned the questionnaires, and some overall information extracted from the questionnaires concerning the subject of the study but not directly conveyed in the variables, is presented and discussed.

6-2-1. Response Rate and Distribution of Responses

As mentioned in the Methodology chapter (section 4-6), the population of this study comprises all the Iranian governmental universities, a total of 126. The questionnaires were sent to three main departments of each university including Education Department, Research Department, and Financial Department, so the population number was 378 (126×3). During the four months from the initial distribution of the questionnaires until the receipt of the last completed questionnaire, one follow-up letter was sent to about 60 per cent of the population and many of them were pursued by telephone. Finally, 275 completed questionnaires were collected from all universities; however, just 262 of them were fully completed in terms of information that was required for the main variables of the model. This means that there were other missing answers, but they were about extra information which did not affect the main variables of the proposed models and hypotheses. In addition, after screening the data and in order to achieve an acceptable level of normality in distribution, it was

necessary to set aside 16 completed questionnaires as outliers[74] from the data analysis. To find the outliers, "Explore" command of SPSS 17 was used and the cases that were common as outliers for the vast majority of the variables were spotted. Therefore, the final number of usable responses for this study is 246 and the response rate can be computed as 65.1%. This response rate is much higher than the response rates commonly achieved in most contingency-based studies in accounting, as their response rates mostly vary from 47% to 56% (Soobaroyen, 2007). However, some of them have rates either well below this range (for example the response rate of Gul et al., 1995b is 22%) or well above it (for instance the response rate for Shields et al., 2000 is 75%).

Thus, the aforementioned response rate seems to be quite acceptable for this kind of study and for normal postal questionnaires. In fact, it was beyond even the researcher's expectation, bearing in mind the extra problems associated with scientific research in developing countries (Vose and Cervellini, 1983). In spite of that, the response rate of this study can be attributed to two factors. First, the context of the study, which was the academic area, helped to produce more responses as the academic community is much more familiar with research issues and problems and is likely to be more cooperative. The second factor concerns the former position of the researcher as deputy chancellor in a governmental university for about five years and his friendship with many of the managers. It allowed the researcher to call and ask them to fill out and return the questionnaires (of course care was taken to avoid any sense of influence as some of them did not reply even after that kind of follow-up process). Table 6-1(next page) illustrates the distribution of received responses from different parts of the country.

It shows that the highest rate was among the universities located in smaller cities, but a lower rate was achieved from the universities in Tehran. Surprisingly, the final response rates from different categories of managers are virtually the same, as 82 cases were Education Managers, 81 cases were Research Managers, and 83 cases were Financial Managers. In the next subsection, some information is provided regarding the respondents from the universities.

[74] "An outlier is a case that differs substantially from the main trend of the data". (Field, 2005, P 162)

Table 6-1) Distribution of responses among cities

Groups of cities Information of	Capital-Tehran	Province centre	Other cities	Total
Total universities	29	73	24	126
Number of departments	87	219	72	378
Received responses	46	142	58	246
Response rate	.53	.65	.81	.65

6-2-2. Some Statistics Regarding the Respondents

As was mentioned before, 275 managers from 109 out of 126 universities completed and returned the questionnaires, although eventually just 246 questionnaires could be used in final data analysis. However, in this subsection some information is provided regarding these universities and related managers. One question asked each Education manager to state their university's total number of students and as can be seen in the Table 6-2 (below) 56 per cent of them have less than 3000 students and just five universities have 15000 or more students.

Table 6-2)The number of students

Categories	Frequency	Per cent	Valid per cent	Cumulative per cent
less than3000	47	43.1	56.0	56.0
3000 to 5999	16	14.7	19.0	75.0
6000 to 8999	5	4.6	6.0	81.0
9000 to 11999	6	5.5	7.1	88.1
12000 to 14999	5	4.6	6.0	94.0
15000 or more	5	4.6	6.0	100.0
Missing	25	22.9		
Total	109	100.0	100.0	

Based on responses by Financial Managers to another question, it was found that 35 universities are run by just 500 employees or less and more than 55 per cent of universities in the sample have less than 1000 employees. On the other hand, 28 of the universities have 1500 or more employees. The following bar chart (Figure 6-1) illustrates the frequency of different types of universities in terms of the number of employees. If these statistics were to be compared to the number of students, it might

be concluded that the number of students and employees are not commensurate. There are several reasons for and consequences of the aforementioned point which are beyond the scope of this study.

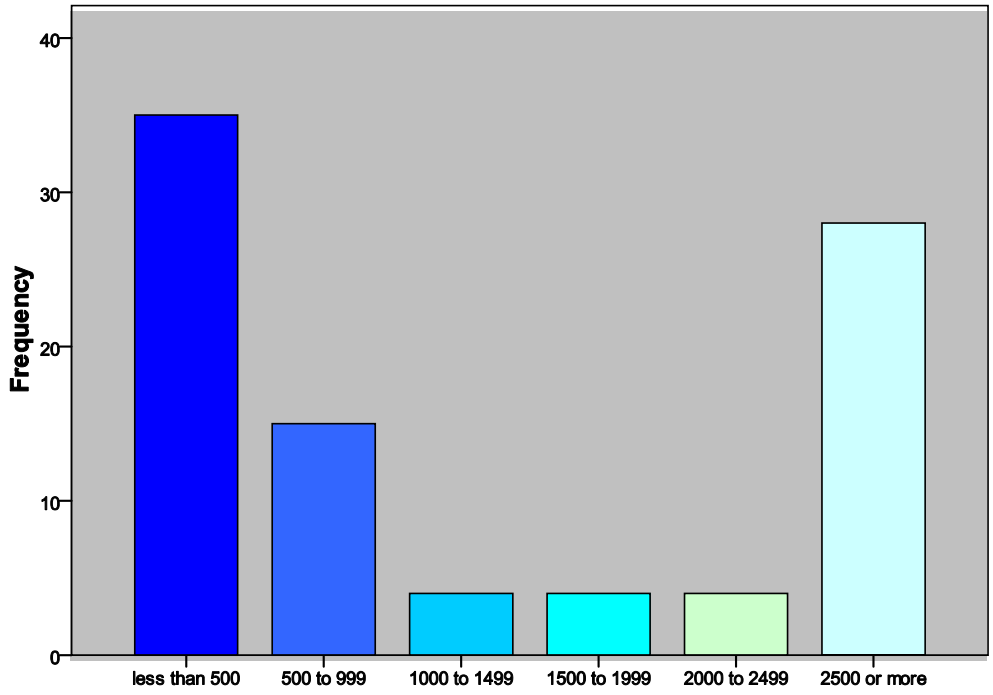


Figure 6-1) Number of universities' employees

According to the results of this survey, most of the respondents have less than five years' experience in their positions. This issue is much more serious for the Research managers (67 per cent of them have less than five years' tenure in their present job) but slightly better for the Financial Managers at 46 per cent. Among the Research managers, none has more than 20 years' experience and among the Education Managers just one has more than 20 years' experience; however, 10 of the Financial Managers in the sample stated that they had more than 20 years' experience. Tables and figures relating to these statistics have been presented in **Appendix C** in the appendices section.

6-2-3. Extra Information Regarding the Issue

In this subsection some extra information gained through open questions is classified and presented in brief as it is not analysed in the main models of the study and has no

effect on the acceptance or rejection of the proposed hypotheses. This information is about other factors that have affected universities in recent years in addition to the proposed prevalent contingent variables (such as financial pressures, competitive position and decentralisation), adopting an accrual basis instead of cash basis in accounting system, and the name and mechanism of their performance management system if any.

As other factors which have been affecting Iranian governmental universities besides the main factors (which are being investigated by this study), pressure from the Government to increase capacity and admit more students, pressure to change direction much more towards research rather than teaching activities, pressure to boost capacity in postgraduate studies, inconsistency in supervision and measurement of universities' performance, and lack of qualified employees and managers have been mentioned by the respondents.

Table 6-3) Change in accounting basis from cash to accrual

Values	Frequency	Per cent	Valid per cent	Cumulative per cent
very bad	3	2.8	6.8	6.8
slightly bad	7	6.4	15.9	22.7
slightly good	8	7.3	18.2	40.9
good	17	15.6	38.6	79.5
very good	9	8.3	20.5	100.0
Total	44	40.4	100.0	
Missing	65	59.6		
Total	109	100.0		

Table 6-3 shows that 44 out of 109 Governmental universities, around 40 per cent of this sample, have changed their accounting basis from cash to accrual; therefore the others are still using a cash basis accounting system. The interesting point is that 77 per cent of those who adopted the accrual basis are happy with their decision as their opinions about its effects on efficiency of accounting system vary from slightly good to very good.

The respondents were asked to state whether there is or not an active performance management system at their universities. Out of 106 universities who answered this question just 8 (7.5 per cent) confirmed that there is a kind of performance management system in their universities; however, of those universities which admitted that there is no systematic performance management in their organization, 79 stated that they intended to design and implement a performance management system in the near future. Just three kinds of performance management system have been mentioned by those 8 universities, including budgeting system (one case), peer review (one case), and key performance indicators (6 cases). Of course, it seems that most of the universities are using some kind of performance management system, either via budgeting control or through key performance indicators but, as they are not classified and systematic, the respondents did not mention them as a systematic performance management system.

Only 30 managers briefly explained the mechanism of performance measurement in their related area of activities in answer to the final question of the questionnaire. Points mentioned by Education managers include "rate of graduation during the planned period for each level", "graduates' success in passing entrance exam to study in upper levels", "seeking the opinion of students regarding instructors at the end of each semester", and "completing annual promotion form for all faculty members at the end of each year". The latter form consists of several key performance indicators about faculty members in teaching, research, and executive activities. All of the Research managers stated that the research performances are measured and evaluated based on several predefined key performance indicators by the university and related Ministry. "Check with budgets", "preparing financial statements at the end of year and sometimes quarterly", "internal and independent auditing", "computing financial ratios and comparison with previous years' performance", and "sending financial statements to the Ministry of Treasury to be checked with the regulations" have been declared as procedures for measuring and evaluating the financial performance of Iranian governmental universities. In the next section, the descriptive statistics regarding the questions which are used as observed variables for measuring latent variables of this study are presented.

6-3. Descriptive Statistics of Variables

In this section, the items that construct the main variables of this study are presented, described and assessed in terms of validity and reliability. Construct validity, external validity and internal validity are the three parts of a study's total validity. Construct validity, which is concerned with whether there is sufficient accuracy in reflection of theoretical concepts in definitions and measures of the study, is to some extent the basis of internal and external validity (Modell, 2005). The survey is one of the most dubious methods of research in management accounting studies in terms of validity and reliability; however, in past decades around 30 per cent of published studies have employed this method. It has been argued that the problem with the survey method is not its nature, but about the difficulty of conducting a good and reliable survey (Van der Stede et al., 2005). As was mentioned in the Methodology chapter (section 4-7), the researcher has attempted to use and adapt existing instruments in contingency-based studies as far as possible, and it seems that these efforts have resulted in sufficient validity and reliability for the items and questions of the present study. The twelve main factors or latent variables of this study, outlined in Chapter Four, are as follows:

1- Competitive Position
2- Financial Pressure
3- Decentralization
4- Participative Budgeting
5- Improved Accounting Systems
6- More Budget Emphasis
7- Satisfaction with Budgets
8- Competitive Advantage
9- Improvement in Reward Systems
10- Comprehensive Performance Measures
11- Use of Accounting Information in PM
12- Universities' Departmental Performance

Therefore, in this section statistics about items which have been employed for variable measurement is presented.

6-3-1. Competitive Position (Factor 1)

The Table 6-4 shows the descriptive statistics regarding the questions measuring the "competitive position" of universities in Iran. It should be recalled that the theoretical minimum and maximum values of each answer are 1 and 6, varying respectively from "nothing" to "very large" for questions 1 and 2 and from "strongly disagree" to "strongly agree" for question 3. As can be seen in the table, the means for all variables

are quite close to one another and in favour of accepting some amount of competition for the universities.

Table 6-4) Descriptive statistics for items measuring "competitive position" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Extent of competitive position in education issues	2.00	6.00	4.1057	.91082	-.244	-.513
-Extent of competitive position in research issues	2.00	6.00	4.1098	1.05373	-.074	-.715
-Existence of competitive position at whole	2.00	6.00	4.1829	.81508	-.120	-.368

The digit 4 indicates a moderate amount of competition in education and research activities and that the respondents "slightly agree" with the existence of competition as a whole in terms of this questionnaire. The indices of normality also indicate an accepted level of normality of distribution for all 3 indicators as the critical amounts are less than the absolute value of 3 (Field, 2005). Tables regarding the frequencies of all observed variables can be found in **Appendix D.** To test the reliability of the items as one factor, the statistic of Cronbach's Alpha[75] was computed as 0.76, and it has been accepted that amounts greater than 0.70 show adequate consistency between variables (Merchant, 1981). By averaging[76] these three variables as one factor, the following statistics are obtained (Table 6-5).

Table 6-5) Descriptive statistics for factor of "competitive position" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Competitive position	3	.76	4.1328	.76871	-.277 (.155)	-.475 (.309)

[75] Cronbach's Alpha was proposed by Cronbach in 1951; it is in fact a coefficient employed as a measure of factor reliability. This coefficient estimates the extent of consistency between different questions or indicators which are used to measure a factor (Field, 2005).

[76] After achieving an acceptable level of Cronbach's Alpha, the values of related questions were averaged using the "Compute Variable" command in SPSS 17. In this process the values of different related questions for each case or respondent are added and then divided into the number of questions.

6-3.2. Financial Pressure (Factor 2)

As Table 6-6 illustrates, four items were used to measure the factor of "financial pressure" on Iranian governmental universities during the past five years. The means of variables indicate that most of the respondents admitted that universities are struggling with budget constraints. The figure of 4.06 as the mean of the first item indicates that the respondents have, on average, assessed the extent of overall financial pressure on universities as moderate, but neither low (3 or less) nor significant (5 or more). The mean of the third item is slightly higher than the other items and indicates that the growth in public funding for universities to cover inflation has been decreasing instead of increasing, although this is a small decrease, not a moderate (5) or significant (6) decrease. The critical values for index of normality of distribution for all items, except for item 2 which is slightly higher than 3, are within an acceptable range.

Table 6-6) Descriptive statistics for items of "financial pressure" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Extent of overall financial pressure on university's activity,	1.00	6.00	4.0650	.88285	-.307	.244
-How often do they have to postpone or ignore some expenditures	1.00	6.00	4.0528	.88597	-.601	1.004
-Trend of budget increase to cover inflation	2.00	6.00	4.2764	.86944	-.381	-.015
-Existence of financial pressure in universities	2.00	6.00	4.1220	.84356	-.152	-.218

The amount of Cronbach's Alpha as the index of internal consistency for these items is 0.85. By averaging the aforementioned observed variables to build the factor of "financial pressure", the following statistics (Table 6-7) are obtained. It should be mentioned that averaging makes the normality distribution worse than the individual position and this could have resulted from the effect of the non-normality of item 2 on other items.

Table 6-7) Descriptive statistics for factor of "financial pressure" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Financial pressure	4	.85	4.129	.72447	-.665 (.155)	1.187 (.309)

6-3-3. Decentralization (Factor 3)

To measure "decentralization" which is used here as the proxy of delegation of authority in legislation and decision-making from the government to the Boards of Trustees and Chancellors of the universities, seven indicators were designed. The descriptive statistics regarding these questions which are illustrated in Table 6-8 shows that the maximum amounts of most of them are 5 whereas they could be 6 theoretically. Their means are also mostly less than the theoretical mean of variables (3.5), ranging from 2.85 to 3.48.

Table 6-8) Descriptive statistics for items measuring "decentralization" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Change in law to give more autonomy to the universities	1.00	5.00	3.219	.98177	-.114	-.668
-Authority for decision making in your special area	1.00	6.00	3.345	1.06834	.084	-.730
-Authority for legislation in your special area	1.00	5.00	3.158	.92321	-.101	-.598
-Authority for decision making in administrative issues	2.00	6.00	3.479	.92890	.106	-.568
-Authority for legislation in administrative issues	1.00	5.00	3.191	.95195	.124	-.744
-Authority for decision making in recruiting staff	1.00	5.00	3.142	1.01824	.155	-.977
-Authority for legislation in recruiting staff	1.00	5.00	2.849	1.12383	.022	-.862

This could be interpreted as showing that decentralization has not been implemented in Iranian universities as deeply as was required by the law, as was discussed in the Background (sections 2-4-2 and 4-5-1-1) and Methodology chapters. By comparing the means in the table below it can be seen that delegation of authority in decision-making is higher than that for legislation, and delegation of authority in recruiting staff including faculty members and others has been lower than in other areas such as administrative, financial, education, and research activities. Statistics on the normality of distribution indicate that all variables are fairly normally distributed, as critical values for all of them are below 3 except for the kurtosis of the sixth item, whose critical value is 3.16 (.977/.309). The amount of Cronbach's Alpha for these items was computed at 0.91 (Table 6-9) thus showing high internal consistency between observed variables. By averaging these variables, a summary of statistics for "decentralization" as a construct can be seen in the Table 6-9.

Table 6-9) Descriptive statistics for factor of "decentralization" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Decentralization	7	.91	3.198	.81328	.148 (.155)	-.910 (.309)

6-3-4. Participative Budgeting (Factor 4)

The instrument for measuring "participative budgeting" is quite well-defined in the literature, as is discussed in the Methodology chapter. Using the adapted form of that instrument resulted in the following statistics (Table 6-10) which show a very good distribution of frequency in terms of normality. Although the means of all variables, which vary from 2.88 to 3.37 (less than theoretical mean of 3.5), illustrate that participative budgeting is not yet prevalent in Iranian governmental universities, the means of the second and fourth items are statistically different from the other items (t values are 6.2 and 3.6 respectively). It seems that these differences are quite reasonable for the nature of the question regarding the second item and the case of budgeting in Iranian governmental universities concerning the fourth question.

Table 6-10) Descriptive statistics for items measuring "participative budgeting" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Your involvement in finalising your budget	1.00	6.00	3.3049	.93489	.202	-.439
-How convincing is budgeting manager's reasoning for revising your budget	1.00	6.00	2.8821	1.05672	.217	-.114
-How often do you need to discuss about your budget	1.00	6.00	3.3699	.94186	.204	-.577
-How often does budgeting department seek your suggestion regarding your budget	1.00	6.00	3.0813	.95271	.350	.127
-The extent of your influence in your final budget figures	1.00	6.00	3.3049	.94358	.120	-.423
-Importance of your participation in budget to have reasonable budget	1.00	6.00	3.3008	.87070	.123	-.174

The index of reliability or internal consistency which is shown by Cronbach's Alpha is 0.86, which is well above the acceptable value. Summary statistics for averaged amounts of these six variables can be found in Table 6-11.

Table 6-11) Descriptive statistics for factor of "participative budgeting" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Participative budgeting	6	.86	3.20	.72838	.309 (.155)	.109 (.309)

6-3-5. Improved Accounting System (Factor 5)

Eleven items were employed to measure "improvement in accounting system" of Iranian governmental universities over the past five years. An examination of the means of these variables in Table 6-12 reveals that they can be divided into two groups based on their means.

Table 6-12) Descriptive statistics for items measuring "improved accounting system" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Demand for different accounting reports	2.00	6.00	4.4593	.83077	-.257	.035
-Frequency of accounting reports	2.00	6.00	4.3943	1.04345	-.303	-.574
-Speed of preparing accounting reports	2.00	6.00	4.4472	.92761	-.355	-.120
-Use of internal auditing	1.00	6.00	3.9187	1.41764	-.211	-.867
-Use of independent auditing	2.00	6.00	4.3252	.96887	-.176	-.636
-Accuracy of accounting reports	2.00	6.00	4.5000	.95083	-.632	.194
-Qualification of accounting reports	2.00	6.00	4.4268	.93062	-.060	-.622
-Use of non-financial information	1.00	6.00	3.5203	1.09059	-.005	-.371
-Use of new techniques of management accounting	1.00	6.00	3.7276	1.18967	-.222	-.601
-Computerising accounting practices	2.00	6.00	3.8902	1.13576	-.035	-.648
-Automatic reporting	1.00	6.00	3.5366	1.26357	.033	-.722

The first group's means are more than 4.3, but the second group's means are less than 3.9. The first group of indicators are mostly about the general aspects of accounting system such as speed of preparation, accuracy, and qualification of accounting reports, whereas the second group is mainly concerned with the technical features of the accounting system, for example use of new techniques of management accounting, computerisation, and automatic reporting. Anyway, the indices of normality for these items confirm that all variables' distribution could be considered normal to some extent as all critical values are less than 3. The value of Cronbach's Alpha (Table 6-13) illustrates a satisfactory level of internal consistency between variables to be employed as the factor of "improvement in accounting system". Therefore, these variables were averaged and the Table 6-13 conveys the descriptive statistics in that regard.

Table 6-13) Descriptive statistics for factor of "improved accounting system" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Improved Accounting System	11	.86	4.10	.69953	.141 (.155)	-.501 (.309)

6-3-6. More Budget Emphasis (Factor 6)

There was no well-defined instrument to gauge the concept of "budget emphasis" as it is meant in a public organization; however, three items designed for this purpose are illustrated in Table 6-14. Fortunately, the harmony between the results shows that these indicators can be considered reliable. Comparing their means revealed no meaningful difference between them statistically, although each of them gauges one dimension of budget emphasis in Iranian governmental universities. The statistics in the Table 6-14 also confirm the normality of distributions regarding the variables.

Table 6-14) Descriptive statistics for items measuring "more budget emphasis" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Extent of budget emphasis	1.00	6.00	4.3293	1.08106	-.451	.033
-Restriction for department managers to transfer budget funds	1.00	6.00	4.3780	.98528	-.456	.196
-Importance of compliance between actual and budgeted figures	2.00	6.00	4.2967	.90652	-.258	-.125

Before averaging the items as a proxy for "budget emphasis" in the context of this study, the reliability index of Cronbach's Alpha was computed and it is 0.82 which is well above the acceptable degree. Table 6-15 indicates the descriptive results for this factor as the averaged amounts of the three above-mentioned variables. It should be recalled that the normality of the factor departs slightly towards the higher critical

value in terms of Skewness (.607/.155= 3.9); however, it still seems acceptable based on Figure 6-2.

Table 6-15) Descriptive statistics for factor of "more budget emphasis" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
More budget emphasis	3	.82	4.33	.85050	-.607 (.155)	.709 (.309)

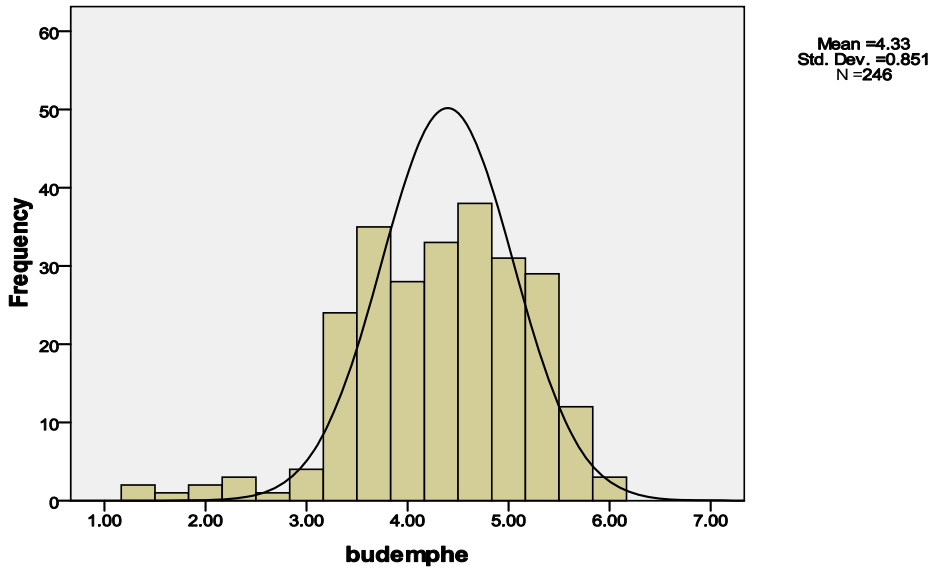


Figure 6-2) Histogram of normality for factor of "budget emphasis"

6-3-7. Satisfaction with Budgets (Factor 7)

Four items were used to measure the extent of "satisfaction with budgets" in the universities, including completeness, fairness, flexibility and overall opinion of staff concerning the budget figures. Means resulting from this survey (Table 6-16) show that the satisfaction with budgets is less than the theoretical mean (3.5). In other words, respondents have stated that, on average, they are a little above the anchor of "slightly dissatisfied = 3". Of course it should be noted that the managers' satisfaction with the flexibility of budgets is statistically higher than completeness and fairness of budgets (t value is 2.55) and this could be to some extent consistent with their answers

implying high financial pressure on the universities. However, the statistics confirm that the distribution of these variables is normal and they can thus be used for other statistical analyses which need normally distributed variables. Table 6-17 illustrates the descriptive statistics for factor level of these observed variables.

Table 6-16) Descriptive statistics for items measuring "satisfaction with budgets" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Satisfaction with completeness of budgets	1.00	6.00	3.2236	1.02759	.154	-.785
-Satisfaction with fairness of budget figures	1.00	6.00	3.2642	.98110	.076	-.371
-Satisfaction with flexibility of budgets	1.00	5.00	3.3780	.96857	-.059	-.478
-Staff's satisfaction with budgets	1.00	5.00	3.3252	.90798	.135	-.642

Table 6-17) Descriptive statistics for factor of "satisfaction with budgets" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Satisfaction with budgets	4	.84	3.30	.80242	.082 (.155)	-.363 (.309)

6-3-8. Competitive Advantage (Factor 8)

Based on the statistics presented in Table 6-18, around 70% of the respondents have stated that they are using accounting information and reports to deal with their competitors at a very low or low extent. As the means of these variables are in the region of 2, it might be helpful to recall that choosing 2 to answer these questions indicates their belief that the usage of accounting information to gain competitive advantages in Iranian governmental universities is carried out to a low extent compared to 3=moderate extent, 4=significant extent, or 6=very large extent. However, their use of accounting information to offer competitive prices in research or teaching contracts is statistically (t value is 1.99) higher than other suggested aspects such as competitors' cost assessment and strategic costing. The indices of normality in the table below show that the distribution of variables is highly skewed

towards the lowest amounts, although the kurtosis of distribution is within an acceptable range for all variables.

Table 6-18) Descriptive statistics for items of "competitive advantage" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Use of accounting for competitors' cost assessment	1.00	5.00	2.1057	1.06762	.761	-.332
-Use of accounting for competitors' position monitoring	1.00	5.00	2.2073	.98235	.667	.134
-Use of accounting for strategic costing	1.00	5.00	2.1707	.89175	.354	-.457
-Use of accounting for offering competitive price in proposals	1.00	5.00	2.2236	.97038	.592	-.341

Before averaging the variables to build a new factor of competitive advantage, the Cronbach's Alpha was computed and this confirmed that it is suitable for consideration as one factor for this purpose. The summary of information about this scale is presented in Table 6-19. The critical value of normality for this factor also shows that it deviates strongly from normality in terms of skewness (.785/.155= 5.06). It is hoped that this problem of normality can be smoothed with the aid of SEM facilities and analyses as will be discussed in more detail in the next chapter.

Table 6-19) Descriptive statistics for factor of "competitive advantage" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Competitive advantage	4	.91	2.18	.87291	.785 (.155)	-.201 (.309)

6-3-9. Improvement in Reward System (Factor 9)

The reward system in Iranian governmental universities is different for faculty members and other staff members**,** as mentioned in the Methodology chapter (section 4-5-2-2), so three items for faculty members and four items for other staff were

employed to gauge the appropriate relationship between rewards and performance of employees in the universities. As the information in the Table below shows, the means of items 1 and 4 are clearly lower than the other variables; this means that the managers believe there is a less appropriate relationship between employees' fixed salary and their job performance. This issue is more meaningful for faculty members whose attendance is not monitored or restricted as much as other employees; the mean for faculty members is 2.75, but for other staff it is 2.93 which are statistically different.

Table 6-20) Descriptive statistics for items measuring "improved reward system" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Relation between faculty members' salary and job performance	1.00	6.00	2.7561	1.31764	.502	-.562
-Relation between faculty members' other earnings and job performance	1.00	6.00	3.3008	1.30890	.243	-.807
-Relation between faculty members' annual promotion and job performance	1.00	6.00	3.3252	1.29360	.163	-.597
-Relation between other staff's salary and job performance	1.00	6.00	2.9268	1.31037	.323	-.461
-Relation between other staff's overtime payments and job performance	1.00	6.00	3.2195	1.13236	.393	-.155
-Relation between other staff's other earnings and job performance	1.00	6.00	3.3537	1.11067	.131	-.484
-Relation between other staff's annual promotion and job performance	1.00	6.00	3.2642	1.17078	.272	-.092

Indices of normality confirm that distribution is normal (except for item one which is slightly more skewed); this is to some extent necessary for the statistical analyses in this study. Cronbach's Alpha is 0.83 for these seven variables so they can then be averaged as a proxy of "improvement in reward system" based on this criterion. The

Table 6-21 indicates the statistical information regarding this factor. Although critical values for normality are slightly higher than the upper level for this variable (3.6 for kewness and 3.18 for kurtosis), it seems that the deviation can be ignored (based on Figure 6-3) at this stage and it is hoped that this problem will solved by exploratory factor analysis and SEM amendments in the next stages.

Table 6-21) Descriptive statistics for factor of "improved reward system" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Improvement in reward system	7	.83	3.16	.86675	.561 (.155)	.985 (.309)

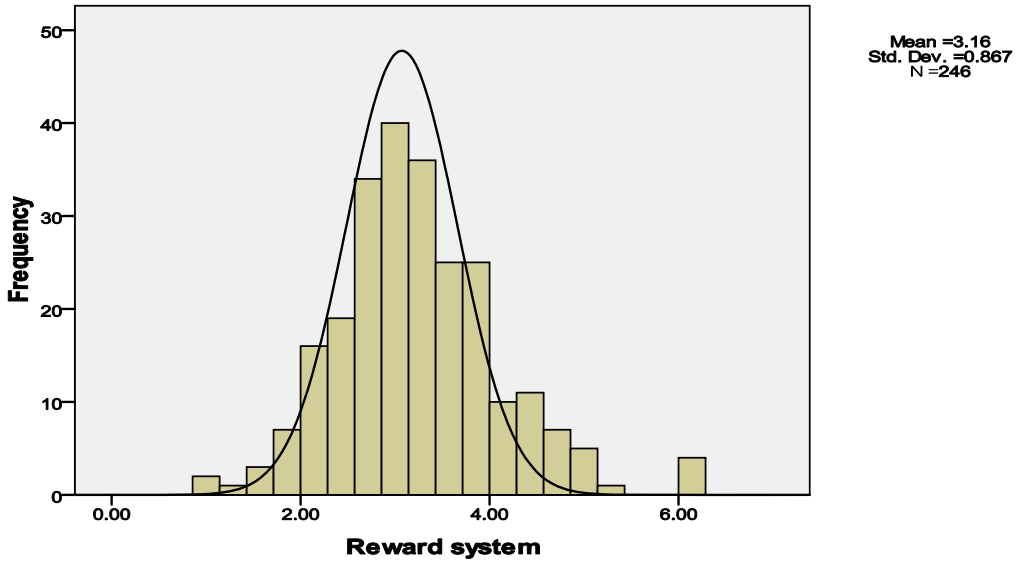


Figure 6-3) Histogram of normality for "improved reward system"

6-3-10. Comprehensive Performance Measures (Factor 10)

To assess whether the use of a combination of performance measures is important for the managers to evaluate the performance of their employees, seven different measures including quantitative and non-quantitative measures were defined as the proxy of "comprehensive performance measures". Table 6-22 illustrates that all measures have been considered important by the respondents as the average mean is

4.42 and it might be interpreted that use of comprehensive performance measures is significantly (4) to highly (5) important for the managers. However, still the priority in performance measures is for quantitative measures, as means of quantitative measures such as "task accomplishment on-time", "punctuality and length of their presence at their workplace", and "their concern with costs and budgets" are slightly higher than means of qualitative measures in terms of statistical tests.

Table 6-22) Descriptive statistics for items measuring "comprehensive performance measures" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Task accomplishment on time	1.00	6.00	4.5650	1.17188	-.603	-.291
-Extent of effort put into their jobs	1.00	6.00	4.4837	1.12383	-.568	.105
-Extent of students' satisfaction with them	1.00	6.00	4.1098	1.12855	-.321	.010
-Their attitudes to their work and university	1.00	6.00	4.1341	1.10393	-.122	-.322
-Their concern with costs and budgets	2.00	6.00	4.5528	1.04357	-.457	-.242
-Punctuality and length of their presence at their workplace	1.00	6.00	4.6911	1.09641	-.655	-.062
-Their concerns with quality	1.00	6.00	4.3699	1.20091	-.417	-.374

In terms of normality, there is a problem with skewness for items 1, 2, and 6 which have critical values of 3.89, 3.67, and 4.23 respectively. It is hoped that this problem can be solved by exploratory factor analysis and SEM amendments and aids in the next stages. Nonetheless, based on statistics in Table 6-23 the normality of the averaged amount of these variables as a whole is at an acceptable level. Furthermore, the index of internal consistency between the variables confirms that they are quite suitable to underlie the measurement of "importance of comprehensive performance measures".

Table 6-23) Descriptive statistics for factor of "comprehensive performance measures" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Comprehensive measures	7	.88	4.42	.86415	-.453 (.155)	.083 (.309)

6-3-11. Use of Accounting Information in PM (Factor 11)

Four main dimensions of Performance Management were chosen based on the framework proposed by Otley (1999) to measure the extent of usage of accounting information in performance management at Iranian governmental universities. Based on the average amount of all variables' means in this regard, it could be claimed that the extent of usage of accounting information in performance management is slightly above "low" and less than "moderate" in term of the questionnaire's anchors. However, as can be seen in Table 6-24, it seems that use of accounting information for "controlling expenditures and decision-making" and "rewarding to the employees" is higher than its use in other aspects (t values are respectively 2.72 and 3.62). The indices of normality for these variables indicate a reasonable position for their distribution, although positive Skewness indices show that they have tended to record lower scores in the questionnaires.

Table 6-24) Descriptive statistics for items measuring "usage of accounting information in PM" (n=246)

Content of question	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-Goal definition and standard-setting	1.00	6.00	3.0732	.99115	.283	-.390
-Performance measurement and comparing to targets	1.00	6.00	3.1463	.90064	.484	-.163
-Controlling expenditures and decision-making	1.00	6.00	3.2846	1.06538	.228	-.111
-Rewarding to the employees	1.00	6.00	3.3293	.99453	.280	-.025

Cronbach's Alpha for these variables is 0.89 which means that internal consistency between variables is well above the acceptable level, so the items are averaged to build a factor as a surrogate for the extent of usage of accounting information in performance management. Table 6-25 illustrates the statistical information regarding this factor. Indices of normality are still showing an acceptable position for this factor.

Table 6-25) Descriptive statistics for factor of "usage of accounting information in performance management" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Usage of Accounting in PM	4	.89	3.21	.85657	.474 (.155)	-.015 (.309)

6-3-12. Universities' Departmental Performance (Factor 12)

Five key performance indicators and one question for overall assessment of Departments' performance were designed to measure departmental performance of Iranian governmental universities. Hence, the key performance indicators for each of the Departments are different; the questions in this regard were different for different managers. Aggregation of a variable with different measures for different departments (different key performance indicators in three types of departments) may seem not to be sound. However, as was mentioned in the Methodology Chapter (section 4-7-12), it is argued that a more suitable way of assessing universities' performance is based on the evaluation of key performance indicators (Suryadi, 2007, Guthrie and Neumann, 2007). In fact, the measures do not differ in that sense as five prevalent key performance indicators were selected based on interviews with Departmental Managers and the contents of the annual performance reports which are sent by the governmental universities to the related Ministry of Higher Education. It is obvious that the key performance indicators in different types of departments, for example Research Departments and Education Departments, are different. In addition, had identical questions been employed, those questions would have been quite subjective and could have threatened the validity of this variable. Moreover, one question regarding the overall performance of each department is unique for all types of department. Finally, the computed value of internal consistency (Cronbach's Alpha in

Table 6-27) shows that the results of those questions have a good level of internal consistency.

Anyhow, the descriptive information regarding the indicators of this factor is shown in Table 6-26. As the means of variables indicate, although this has been a self-assessment exercise the managers have expressed, on average, that the performances of their related Departments are around average.

Table 6-26) Descriptive statistics of items measuring "departmental performance" (n=246)

Content of questions	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
-First key performance indicator	1.00	6.00	3.6463	.93946	-.192	-.190
-Second key performance indicator	1.00	6.00	3.4878	.93342	.066	-.063
-Third key performance indicator	1.00	6.00	3.6585	.96746	.267	-.084
-Fourth key performance indicator	1.00	6.00	3.4553	.92363	.101	-.541
-Fifth key performance indicator	1.00	6.00	2.8659	1.27547	.409	-.682
-Overall level of departmental performance	2.00	6.00	3.8252	.84632	-.066	-.690

The interesting point here is that the mean of the fifth key performance indicator, which was considered the hardest one to achieve in all departments, is some way below the average of other means. It might be useful to recall that the fifth key performance indicator for Education managers was "graduates' success in finding jobs", while for Research managers it was "number of patents and inventions" and for Financial Managers it was "the extent of fund saving at the end of each year". Nevertheless, the information in Table 6-26 confirms that distribution of the variables is normal enough to be suitable for further statistical analysis. The summary of statistics for the factor of "universities' departmental performance", which is the averaged amount of above-mentioned variables, is presented in Table 6-27.

Table 6-27) Descriptive statistics for factor of "departmental performance" (n=246)

Factor	N of items	Cronbach's Alpha	Mean	Std. Deviation	Skewness (Std. Err.)	Kurtosis (Std. Err.)
Departmental performance	6	.83	3.49	.73262	-.048 (.155)	-.055 (.309)

This section has reported the main statistical features including minimum, maximum, mean, standard deviation and indices of normality (skewness and kurtosis) regarding all the items (questions) measuring the twelve main factors of this study. In addition, the averaged amount of this kind of information besides an index of internal consistency (Cronbach's Alpha) is presented for all factors. This information in fact summarizes the collected data and will necessarily form the basis of further analyses. In the next section, correlations between the computed constructs (factors) are cast using the SPSS statistical software.

6-4. Correlation between Variables

It seems useful at this stage to establish the correlation matrix based on factors which have been built according to the above-mentioned variables. Table 6-28 illustrates the Pearson coefficients correlation between variables based on 2-tailed bivariate test. It shows that "competitive position" is significantly correlated with "decentralization", "participative budgeting", "Improved accounting system", "satisfaction with budgets", "comprehensive performance measures", usage of accounting information in performance management" and "universities' performance". It also indicates that "financial pressure" is positively related to "more budget emphasis" and "improved accounting system", but is negatively related to "participative budgeting". The significant correlation of "decentralization" with "participative budgeting", "budget emphasis", "improved accounting system", "satisfaction with budgets", "reward system" and "usage of accounting in PM" is confirmed.

It might be interesting to note that, based on this information, "universities' performance" is significantly correlated with "competitive position", "participative budgeting", "satisfaction with budgets", "use of comprehensive performance measures" and "usage of accounting information in performance management".

Finally, the high correlation between "improved accounting system", "appropriateness of reward system", and "use of comprehensive performance measures" might be worthy of attention. In the next section the results of exploratory factor analysis regarding the data collected by this survey are presented.

Table 6-28) Correlations between the latent variables (n=246)

Factors	1	2	3	4	5	6	7	8	9	10	11	12
1-Com. Pos.	1											
2-Fin. Pre.	.033	1										
3-Decntraliz.	.156*	.087	1									
4-Par. Bud.	.127*	-.175**	.317**	1								
5-Emp. Bud.	.039	.417**	.163*	-.118	1							
6-Impr. Acc.	.427**	.151*	.261**	-.018	.213**	1						
7-Com. Adv.	.009	.017	.061	.148*	.002	.003	1					
8-Sat. Bud.	.144*	-.109	.151*	.366**	-.079	.060	-.042	1				
9-Com. Per.	.350**	.031	.046	.121	-.012	.277**	-.077	.282**	1			
10-Rew. Sys.	.084	.022	.350**	.192**	.023	.168**	.015	.073	.083	1		
11-Us. Acc.	.154*	.008	.278**	.297**	.018	.105	.035	.260**	.063	.140*	1	
12-Dep. Per.	.146*	-.005	.036	.354**	-.059	.085	.097	.380**	.327**	.125	.259**	1

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Although this is a confirmatory study and the above-mentioned factors were mostly adopted and adapted from existing literature, as a kind of triangulation, an exploratory factor analysis would seem to be helpful in increasing reliability and validity of the instrument. Thus, in the next section the results of exploratory factor analysis are reported.

6-5. Exploratory Factor Analysis

To ensure that the items which have mostly been adapted from existing instruments in the literature (see section 4-7 in the Methodology chapter) can really underlie several different factors, an exploratory factor analysis (EFA) was performed by SPSS software version 17 for all questionnaire data. As theoretical issues regarding the exploratory factor analysis were concisely discussed in the previous chapter, here just

the results of the conducted EFA are presented. A look at the correlation matrix resulting from EFA confirms that there is no problem of singularity; however, as the determinant of the correlation matrix is less than 0.00001 there might be a certain amount of multicollinearity (Field, 2005). Scanning the correlation matrix shows that, in two cases, there is a correlation of more than 0.8 between items. The first case is between items 1 and 3 of "decentralization" (0.83) and the second case is between items 1 and 2 of "comprehensive performance measures" (0.82); however, they are still lower than the critical limits (Hair et al., 2006). The result of Kaiser-Meyer-Olkin and Bartlett's tests regarding this EFA is illustrated in the Table 6-29.

Table 6-29) Results of KMO and Bartlett' s tests (n=246)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.802
Bartlett's Test of Sphericity	Approx. Chi-Square	10270.201
	Degree of freedom	2145
	Significance level	.000

KMO, as an index of sampling adequacy, indicates that this survey is in the range of great, but not superb, in terms of sufficiency of sampling. Besides the KMO index for overall data, this index is usually computed for all items individually and it should not be less than 0.5 for each variable (Field, 2005). For this data, except for the fourth item of "improved accounting system" which is "extent of change in use of internal auditing" with a KMO of 0.48, all other values are greater than 0.66. It has been recommended that variables with a KMO of less than 0.5 be excluded from further analyses (Field, 2005). Bartlett's test is about the existence of relationships between factors in further analyses (Field, 2005). If the result of the test is significant, as it is in the present case, it means that EFA is appropriate and some relationships between factors will be explored in additional analyses.

By choosing Principal Component Method and Kaiser's criterion of retaining factors with Eigenvalues of more than 1, the EFA resulted in 16 components with information presented in Table 6-30. As can be seen from this Table (Table 6-30), 72.3 per cent of total variances are explained by these 16 factors.

Table 6-30) Number of factors extracted from EFA (n=246)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings [a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	9.621	14.578	14.578	9.621	14.578	14.578	6.037
2	6.055	9.175	23.752	6.055	9.175	23.752	4.842
3	5.308	8.043	31.795	5.308	8.043	31.795	4.807
4	3.561	5.395	37.190	3.561	5.395	37.190	3.442
5	3.353	5.080	42.270	3.353	5.080	42.270	3.349
6	2.971	4.502	46.772	2.971	4.502	46.772	3.290
7	2.617	3.965	50.737	2.617	3.965	50.737	4.226
8	2.142	3.245	53.982	2.142	3.245	53.982	4.395
9	1.924	2.915	56.897	1.924	2.915	56.897	5.020
10	1.859	2.817	59.714	1.859	2.817	59.714	4.526
11	1.770	2.681	62.395	1.770	2.681	62.395	4.703
12	1.559	2.362	64.757	1.559	2.362	64.757	2.781
13	1.475	2.235	66.992	1.475	2.235	66.992	3.141
14	1.302	1.973	68.965	1.302	1.973	68.965	3.121
15	1.172	1.776	70.740	1.172	1.776	70.740	1.405
16	1.046	1.585	72.325	1.046	1.585	72.325	1.850

It was argued earlier (section 5-3-7) that items with factor loadings of less than 0.4 do not represent considerable value (Stevens, 2002), so the programme was set up to exclude values of less than 0.4 from the output of factor loadings or pattern matrix. According to this limitation the result of EFA for categorizing factors is as shown in Table 6-31. As can be seen in that Table, 16 factors were extracted from the data while the number of defined factors in this study was just 12, as explained earlier in this chapter (section 6-3). It should be clarified that, based on the result of EFA, 10 out of 12 of factors were confirmed as designed by the researcher; however, just two factors including “improved accounting system” and “improvement in reward system” divided into three and two factors, respectively.

"Improved accounting system" was separated into three factors by the programme, presented in columns 2, 11, and15 in Table 6-31. Column 2 with five items is mostly about technical aspects of accounting systems such as "use of new techniques of management accounting", "automatic reporting" and "computerised systems". Column 9 consists of four items mostly regarding the general features of improvement in accounting systems, for instance "speed in preparing accounting reports" and "frequency of accounting reports". Column 15 contained just one item, "use of internal auditing". Also one item, "accuracy of accounting reports" with a factor loading of less than 0.4, was removed from the output by the analysis.

Another discrepancy concerns the "improvement in reward system" factor which was separated into two factors by EFA, showing in columns 6 and 14. This separation seems quite reasonable as items regarding "faculty members' reward system" (three items in column 14) were detached from items concerning "other staff's reward system" (4 items in column 6). Therefore, changing the number of latent variables from 12 to 15 can be reconciled by this explanation; however the 16^{th} factor is not a real factor as it is made up of three heterogeneous repeated factor loadings which are mostly less than the factor loadings in their main column (see column 16 in Table 6-31 and compare it to columns 3 and 6). Thus, based on the result of this EFA, it can be said that the employed instrument for data collection achieved the main criteria of EFA and can be relied upon. These results could also be useful for building the measurement models in Structural Equation Modelling, which will be discussed in the next chapter, especially regarding the "improved accounting system" and "improved reward system" factors.

Table 6-31) Results of factor rotation and factor loading of each item (n=246)

Items \ Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Competitive position-1													**-.705**			
Competitive position-2													**-.811**			
Competitive position-3													**-.715**			
Financial pressure-1					**.897**											
Financial pressure-2					**.771**											
Financial pressure-3					**.674**											
Financial pressure-4					**.856**											
Decentralization-1	**.803**															
Decentralization-2	**.829**															
Decentralization-3	**.828**															
Decentralization-4	**.720**															
Decentralization-5	**.703**															
Decentralization-6	**.780**															
Decentralization-7	**.787**															
Improved acc. sys.-1											**.643**					
Improved acc. sys.-2											**.865**					
Improved acc. sys.-3											**.790**					
Improved acc. sys.-4															**-.779**	
Improved acc. sys.-5											**.859**					
Improved acc. sys.-6																
Improved acc. sys.-7		**.545**														
Improved acc. sys.-8		**.808**														
Improved acc. sys.-9		**.879**														
Improved acc. sys.-10		**.887**														
Improved acc. sys.-11		**.862**														
Budget emphasise-1												**-.785**				
Budget emphasise-2												**-.752**				
Budget emphasise-3												**-.802**				
Participative budgeting-1									**.763**							
Participative budgeting-2									**.478**							
Participative budgeting-3									**.693**							
Participative budgeting-4									**.744**							
Participative budgeting-5									**.815**							
Participative budgeting-6									**.784**							

Satisfaction with budgets-1							**.733**									
Satisfaction with budgets-2							**.790**									
Satisfaction with budgets-3							**.828**									
Satisfaction with budgets-4							**.799**									
Competitive advantage-1				**.908**												
Competitive advantage-2				**.918**												
Competitive advantage-3				**.848**												
Competitive advantage-4				**.883**												
Comprehensive PMs-1			**-.490**													**-.510**
Comprehensive PMs-2			**-.559**													**-.447**
Comprehensive PMs-3			**-.771**													
Comprehensive PMs-4			**-.798**													
Comprehensive PMs-5			**-.724**													
Comprehensive PMs-6			**-.575**													
Comprehensive PMs-7			**-.761**													
Proper reward system-1														**-.700**		
Proper reward system-2														**-.852**		
Proper reward system-3														**-.701**		
Proper reward system-4						**.562**										**.489**
Proper reward system-5						**.824**										
Proper reward system-6						**.804**										
Proper reward system-7						**.708**										
Use of accounting in PM-1								**-.888**								
Use of accounting in PM-2								**-.847**								
Use of accounting in PM-3								**-.859**								
Use of accounting in PM-4								**-.844**								
Departmental performance-1										**-.733**						
Departmental performance-2										**-.640**						
Departmental performance-3										**-.845**						
Departmental performance-4										**-.704**						
Departmental performance-5										**-.580**						
Departmental performance-6										**-.694**						

a. Rotation converged in 18 iterations.

6-6. Summary and Conclusion

This chapter has tried to present the collected data as they stand, and has categorised them, described them and analysed them preliminarily. Overall information about responses and respondents, descriptive presentation and statistics regarding the main variables of the study, and the production of a correlation matrix as well as the conducting of exploratory factor analysis are the key parts of this chapter. As overall information it was stated that the pure response rate is 65.1 per cent; also, some statistics regarding distribution of responses among universities in the capital city, big cities and small cities are provided. Some interesting findings based on open-end questions concerning other factors affecting Iranian universities, existing performance management system, and shift from adjusted cash basis to accrual basis in accounting are presented.

In the descriptive statistics section, by categorizing 66 indicators as bases for measuring 12 variables, statistics such as minimum, maximum, mean, standard deviation, skewness and kurtosis for all indicators are computed and their frequency tables are illustrated in **Appendix D**. These statistics in addition to Cronbach's Alpha as the index of internal consistency between indicators are computed for 12 measured variables. Correlations between all 12 are variables calculated and described concisely; then, the outcomes and explanations regarding the EFA are presented. It was reasoned that the differences between the number of designed variables (12 variables) and factors extracted by EFA could to some extent be considered rational. In the next chapter the results of data analysis and hypotheses-testing with SEM will be presented.

Chapter Seven
SEM Data Analysis and Hypotheses Testing

7-1. Introduction

The previous chapter presented the main dimensions of the collected data for this study. It also tried to build and assess the latent variables which will be used in further analyses at other stages and look at the correlation between the variables in a general way. However, in this chapter the screened and purified version of the data is put under the scrutiny of the main statistical data analysis technique which has been adopted for this project. In the following sections the different approaches to SEM model construction are explained, and then the results of design and assessment of the Measurement Models are presented. In the fourth section, based on the outcomes of the Measurement Models, Structural Models are built and tested with the collected data. This is followed by the proposed findings and outcomes of the hypotheses-testing according to the statistical values that will result from the aforementioned Structural Models of SEM. Finally, the summary of results and some concluding remarks are stated.

7-2. Design and Test of SEM Models

To conduct a SEM analysis or test a proposed model with SEM, three approaches, namely one-step modelling, two-step modelling, and four-step modelling, can be employed (Kline, 2005). In one-step modelling, the whole model including measurement and structural parts is constructed in one turn. This approach is not highly recommended because problems with the model in case of poor fit cannot be readily spotted. In two-step modelling, the model is built in two steps, constructing and assessing measurement models in the first step and structural model in the second step; here, any problems with the whole model can be decomposed and will be more detectable (Anderson and Gerbing, 1988). In four-step modelling, each of the steps in the above-mentioned approach (second approach) is divided into two steps which are, in fact, exploratory and confirmatory analyses respectively. In other words,

measurement models are built by an exploratory factor analysis followed by a confirmatory factor analysis for items resulting from the previous step. The third step involves testing the structural relationships between factors with a similar set of zero pattern coefficients resulting from the second step; finally, in the last step hypothesised structural relationships are designed and tested. The last approach requires at least four indicators for measuring every latent variable (Hayduk, 1996). Although each of these approaches has its proponents and opponents (Kline, 2005), it seems the best approach for this study is the two-step modelling: on the one hand it has a more confirmatory basis and, on the other hand, there are not four observed variables for all factors in this study. Moreover, the exploratory factor analysis regarding the indicators of this study conducted in the previous chapter means that the first step of four-step modelling would be somewhat redundant for this analysis. Therefore, adopting the two-step modelling approach, the results of the first step of building and evaluating the measurement models are presented in the next section.

7-3. Measurement Models

As discussed earlier in chapter 5 (section 5-4), the Measurement Model is that part of SEM that deals with measuring the latent variables based on observed variables (Goldberger, 1973). Since the Measurement Models are the bases and foundations of Structural Models, it seems obvious that any defect and problem could directly affect the reliability and validity of the Structural Models' outcomes (Graham et al., 2003). It is argued that no-one can rely on the results of a structural model that has been built on measurement models that may not have achieved a satisfactory degree of fit (Blunch, 2008b); therefore, it is worth taking maximum care to design the Measurement Models as accurately as possible. To build the measurement models, the results of EFA (section 6-5) are used. If any of those models fail to attain an acceptable level of fit they should be re-specified and re-estimated (Anderson and Gerbing, 1988, Schumacker and Lomax, 2004). To find out what has caused a specification error in the model, resulting in failure to achieve an acceptable level of fit, the researcher might look at Standardized Regression Coefficients or Squared Multiple Correlations (Loehlin, 1987, Schumacker and Lomax, 2004, Shook et al., 2004, Simm, 2010). The latter approach is adopted for this study. In fact, the indices of fit announce whether or not the model fits with the data. The researcher can judge

whether to accept or modify it to further improve the level of fit (Byrne, 2001, Blunch, 2008a).

Thus, the researcher is attempted to design the best possible Measurement Models for all 12 latent variables of this study with the aid of the confirmatory factor analysis technique which is a subsidiary analysis in SEM. The results of Confirmatory Factor Analysis and the construction of Measurement Models for all latent variables are as follows.

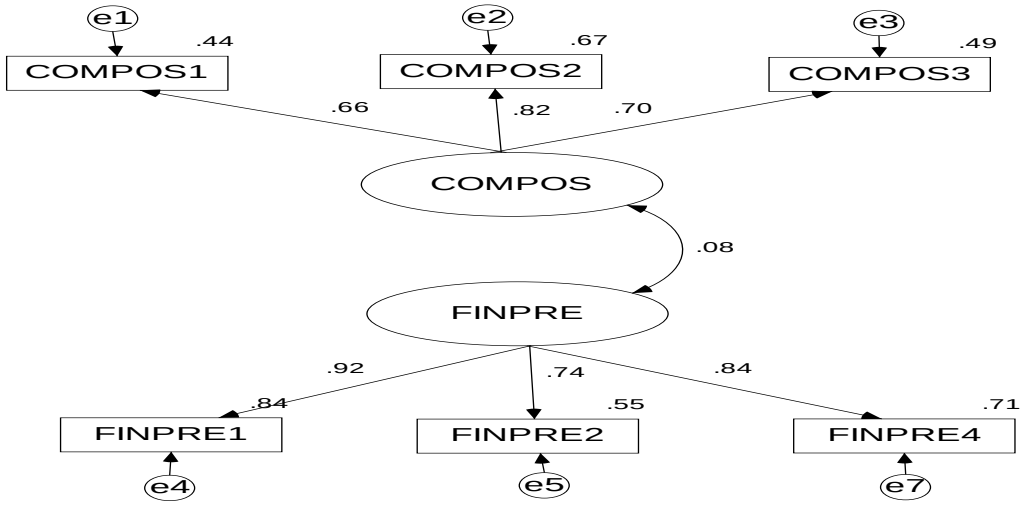
7-3-1. Competitive Position and Financial Pressure (Factors 1 & 2)

As was explained in chapter 5, section 4-3, for every model, including Measurement Models, to be solvable by SEM, the model should be either just-identified or over-identified (Skrondal and Rabe-Hesketh, 2004); however, as a just-identified model is supposed to have a perfect fit with the data, SEM cannot give any idea about its goodness of fit. Based on the above explanation, in terms of Confirmatory Factor Analysis (CFA) by SEM an unidentified model cannot be estimated and a just-identified model cannot be assessed in term of fitness, although its parameters can be calculated by SEM. A Measurement Model with just two items or questions is considered an unidentified model while one with just three items would be a just-identified model; therefore a CFA model for one latent variable needs to have at least four items (Kline, 2005). To solve this problem regarding those latent variables with less than four indicators (for example "Competitive Position" and "Budget Emphasis") it is possible to combine them as a model with two latent variables (factors).

It is acceptable to combine two or more factors with the same statistical position for CFA in SEM (Kline, 2005); so, as "Competitive Position" and "Financial Pressure" are both exogenous variables in the proposed SEM model, it was decided to combine them to produce a CFA model with two factors. The bases of CFA were reviewed in chapter 5, section 5-4-6, so they are not repeated here; however, it was explained that two groups of outputs regarding each CFA model are usually analysed and interpreted to assess the reliability and validity of that model. The first group is about indices of model fit while the second concerns the estimations of relationship between observed and latent variables.

After constructing the aforementioned model using Amos 17 as SEM software, several outputs regarding the model fit and other estimations were achieved. These results show an acceptable fitness for the model according to all the indices of fit, but the Squared Multiple Correlations table implies that the statistic for the third item of "financial pressure" is just 0.35 which does not indicate a satisfactory strength in this regard (satisfactory level of Squared Multiple Correlations is adopted as 0.4 for this study). The content of the third question regarding the "financial pressure" is about the "trend of universities' budget growth to cover inflation rate in the past 5 years". Anyway, to achieve a more reliable model it is accepted and recommended (Shook et al., 2004) that the item be removed from the model and the analysis repeated (see explanations in section 7-3). Figure 7-1 illustrates the model with just three indicators for each factor. It might be useful to clarify that, in this diagram and other diagrams, only standardized estimates of squared multiple correlations (near the boxes) and factor loadings (near the arrows) are shown.

Figure 7-1) Measurement model for "competitive position" and "financial pressure" (n=246)



The summary of indices regarding model fit is shown in table 7-1. As can be seen in the Table, all indices of fit confirm the goodness of fit for the designed model (a discussion of the concept of fit and indices is presented in chapter 5, section 5-4-7). Values in the first row of the table are about the designed model with collected data, whereas the amounts in the second row belong to the saturated[77] model and can be

[77] Saturated model is a version of the model with 0 degree of freedom, so it is a just-identified model

considered the base of comparison. The third row shows the values which are acceptable for each index according to the literature of SEM (see section 5-4-7 in chapter 5).

Table 7-1) Indices of fit for "competitive position" and "financial pressure" measurement model (n=246)

Model \ Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**RMSEA**	**AIC**
Designed model	7.58	8	.947	1	.000	33.6
Saturated model	.000	0	N/A	1	N/A	42
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D[78] model less than S[79]

The most important indices for assessing the goodness of fit in CFA models are CMIN (Chi-square), CMIN/DF (Chi-square divided by degree of freedom), CFI (comparative fit index), RMSEA (root mean square error of approximation), and AIC (Akaike information criterion) (Byrne, 2001). As can be seen, all of the fit indices relating to the CFA model of "competitive position" and "financial pressure" are at a good level of acceptance, so that model can be considered acceptable.

After assessing the goodness of fit and verifying the acceptability of the model in those terms, the estimations of the relationships among observed variables and related factors should be noted. The Amos programme provides four main reports on this matter including "regression weights", "standardized regression weights", "variances of all variables", and "squared multiple correlation". The meaning and implication of each report was explained in section 4-6 of chapter 5. Table 7-2 (next page) is the combination of "regression weights" and "squared multiple correlations" of the "competitive position" and "financial pressure" measurement model.

[78] D stands for the Designed Model by the researcher.
[79] S stands for the Saturated Model, see footnote 74.

Table 7-2) Regression weights for "competitive position" and "financial pressure" measurement model (n=246)

Items		Factors	Estimate	S.E.	C.R.	P	Squared Multiple Correlations
FINPRE2	<---	FINPRE	.811	.062	13.120	***	.548
FINPRE4	<---	FINPRE	.880	.058	15.041	***	.712
FINPRE1	<---	FINPRE	1.000				.840
COMPOS1	<---	COMPOS	.702	.085	8.257	***	.442
COMPOS2	<---	COMPOS	1.000				.669
COMPOS3	<---	COMPOS	.660	.079	8.384	***	.488

Estimates in the above table are in fact the non-standardized values of factor loading for each observed variable; the standardized amounts can be seen in Figure 7-1. Squared multiple correlations, which are the squared values of standardized factor loadings, indicate the strength of each factor loading. Although it is believed that, for larger sample sizes (more than 200), squared multiple correlations (SMC) of more than 0.30 are acceptable (Field, 2005), for the sake of caution, items with SMC of less than 0.4 have been removed from the measurement models of this study. Bollen (1989) believes that measurement models with acceptable values of fit indices and standardized factor loadings equal to or above 0.70 are assumed to be valid models, so the validity of above models is confirmed.

7-3-2. Decentralization (Factor 3)

To build the measurement model for "decentralization", first all 7 items were put into the model. The results for the goodness of fit for that model with 7 observed variables showed that the model could not be considered acceptable one. These statistics are presented in Table 7-3. As can be seen from the Table, all indices of fit are poor, so this model has to be rejected and modified by removing less compatible items (Anderson and Gerbing, 1988). As explained in section 5-4-6, a good measurement model needs to meet two conditions: an acceptable level of fit indices and an acceptable number of estimations regarding the relationships between observed and latent variables; otherwise the measurement model should be re-specified and modified by deleting less compatible questions (Anderson and Gerbing, 1988, see also explanations in section 7-3). In fact, in this process the observed variable with a large degree of measurement error (Schumacker and Lomax, 2004) is deleted. Evidently, deletion of a number of questions indicates a loss of data and may narrow the

measuring aspects of the construct (factor). However, it is necessary to reproduce a more valid and reliable Measurement Model which is crucial for building a better fit of Structural Model in SEM and more reliable estimations of relationships between the main variables in the model (Kline, 2005).

Table 7-3) Indices of fit for "decentralization" measurement model (first attempt) (n=246)

Model \ Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**RMSEA**	**AIC**
Designed model	176.8	14	12.63	.810	.218	204.8
Saturated model	.000	0	N/A	1	N/A	56
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

An examination of the Squared Multiple Correlations output for this model (Table 7-4) soon reveals which items are weaker and should be removed from the measurement model. Items 5, 6, and 7 were deleted from the model in three rounds, respectively; finally a measurement model with 4 items was able to meet the acceptable criteria of goodness of fit.

Table 7-4) Squared Multiple Correlations for "decentralization" measurement model (first attempt) (n=246)

Items	**Item 1**	**Item 2**	**Item 3**	**Item 4**	**Item 5**	**Item 6**	**Item 7**
Squared Correlations	.764	.687	.782	.628	.428	.440	.483

It might be interesting to look back and see what those deleted items are about. The content of the 5th item is about "the extent of the universities' authority to legislate in administrative affairs" whereas two other questions concern the delegated authority for decision-making (6th item) and legislation (7th item) in recruiting staff including faculty members and others. Deletion of these three items at this stage is linked to the statistics in the previous chapter (section 6-3-3) which showed that decentralization for the universities in staff recruitment and administrative legislation is even less than other areas and dimensions. Nevertheless, the diagram of the final model is as shown in Figure 7-2 and outcomes regarding the fit indices can also be found in Table 7-5.

All indices are at a good level, so the model can be considered a good one in terms of fitness with the data.

Figure 7-2) Measurement model for "decentralisation" (n=246)

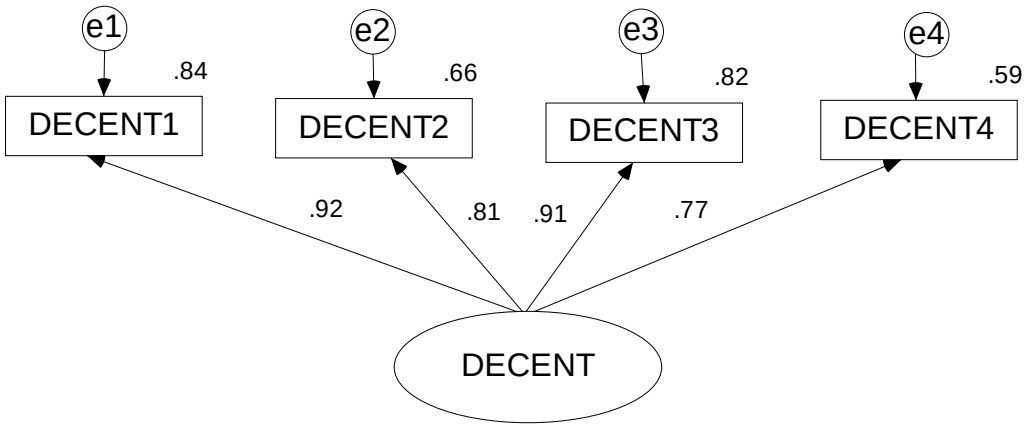


Table 7-5) Indices of fit for "decentralization" measurement model (final attempt) (n=246)

Model \ Index	CMIN	DF	CMIN/DF	CFI	RMSEA	AIC
Designed model	1.8	2	.906	1	.000	17.8
Saturated model	.000	0	N/A	1	N/A	20
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

To assess the strength of relationships between observed variables and related latent variable, other estimations should be considered and analysed. According to the estimations outcomes for this model (Table 7-6) it can be claimed that those four observed variables are strongly conveying the related factor as "decentralization".

Table 7-6) Regression weights for "decentralization" measurement model (n=246)

Items Factor	Estimate	S.E.	C.R.	P	Squared Multiple Correlations
DECENT2 <--- DECENT	.962	.055	17.352	***	.659
DECENT1 <--- DECENT	1.000				.844
DECENT3 <--- DECENT	.927	.043	21.556	***	.819
DECENT4 <--- DECENT	.789	.051	15.550	***	.586

7-3-3. Participative Budgeting (Factor 4)

Six items regarding the "participative budgeting" factor were initially inserted in the measurement model, but the results were unsatisfactory as the Squared Multiple Correlation for the second item was just 0.19 which is well below the lowest acceptable value (0.40 adopted for this study). In addition, RMSEA and AIC, as two important fit indices, were well above the tolerable amounts in this regard (RMSEA 0.085 and AIC 49.11 when they should have been less than 0.05 and 42 respectively); however, other indices such as Chi-square/DF and GFI were reasonably good. Therefore, it was decided to remove those items from the model and rerun the programme (see explanations in sections 7-3 and 7-3-2). The new results showed that the model has a good enough fit; nevertheless, the squared multiple index, as an indicator of powerful relationships between items and latent variables, implied that item 4 should also be deleted from the model.

Figure 7-3) Measurement model for "participative budgeting" (n=246)

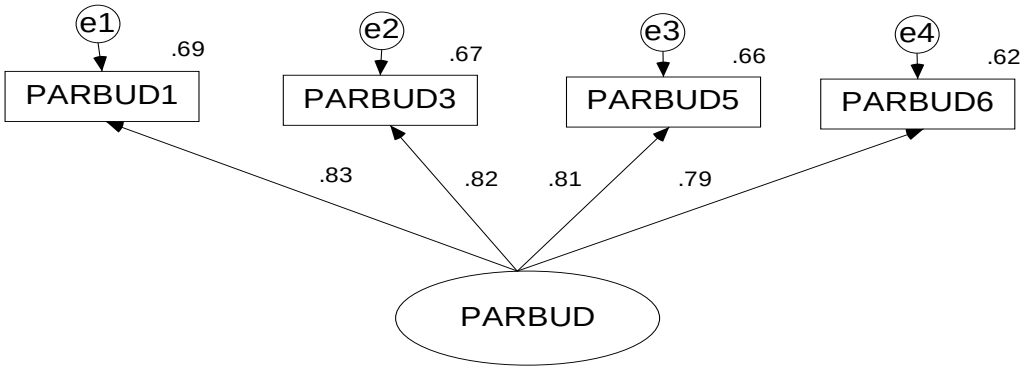


Table 7-7) Indices of fit for "participative budgeting" measurement model (n=246)

Model \ Index	CMIN	DF	CMIN/DF	CFI	RMSEA	AIC
Designed model	2.8	2	1.40	.998	.040	18.7
Saturated model	.000	0	N/A	1	N/A	20
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

Figure 7-3 and Table 7-7 show the outcomes of third run of the model in terms of model fitness. This statistics confirm that the model is quite fit and can be trusted as the measurement model of "participative budgeting". However, although the removal of two items from the original model might seem questionable, retaining four items out of six and building a more precise measure seems preferable (Shook et al., 2004). Moreover, consideration of the content of deleted items confirms that the nature of the second question is somewhat different from other items, and conditions for the fourth item for public organizations in Iran are not the same as for private companies in the West. The second question was seeking the respondents' opinion about how convincing they found their Budgeting managers' reasoning after revising their budgets, so it seems that the extent of this could not be the same as the extent of the importance of participative budgeting for them as the content of the sixth question. In the fourth item they were asked about the frequency with which Budgeting managers sought their suggestions; as the budgeting process in Iranian public organizations is conducted mostly once a year, it might seem reasonable for Budgeting Managers not to seek the opinions of other managers more frequently even if they believe in participative budgeting at all. Anyway, Table 7-8 illustrates the outcomes of factor loading and squared multiple correlations between the four remaining items and the given factor. As can be seen, all factor loadings are statistically meaningful and their power (squared multiple correlations) is considered to be well above the adopted level for this study (0.40).

Table 7-8) Regression weights for "participative budgeting" measurement model (n=246)

Items	factor	Estimate	S.E.	C.R.	P	Squares multiple correlations
PARBUD1	<--- PARBUD	1.000	.070	14.249	***	.685
PARBUD6	<--- PARBUD	.887	.066	13.427	***	.621
PARBUD5	<--- PARBUD	.988	.071	13.895	***	.656
PARBUD3	<--- PARBUD	1.000				.675

7-3-4. Improved Accounting System (Factor 5)

According to the results of Exploratory Factor Analysis (EFA) presented in the previous chapter, original items for measuring "improved accounting system" could and should be divided into two groups that might be called "general improvement in accounting systems" (GIMPACC) and "technical improvement in accounting

systems" (TIMPACC) for the purposes of this study. Therefore, items 1, 2, 3, and 5 as proxies of GIMPACC and items 7 to 11 as proxies of TIMPACC were subjected to SEM statistical test as two measures for gauging the improvement in Iranian universities' accounting systems. The results were unsatisfactory and did not produce a fit model, as is presented in Table 7-9.

Table 7-9) Indices of fit for "improved accounting system" measurement model (first attempt) (n=246)

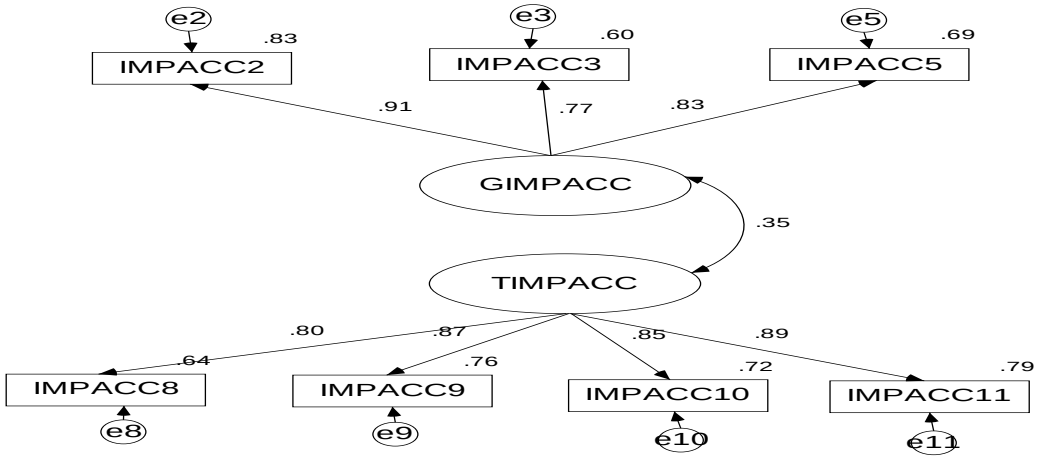
Model \ Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**RMSEA**	**AIC**
Designed model	102.8	26	3.95	.902	.110	140.8
Saturated model	.000	0	N/A	1	N/A	90
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

The results suggested that the first item be removed from the analysis (see explanations in sections 7-3 and 7-3-2). After deleting the first item, the outcomes were still not good enough and some indices became even worse; for example, the index of CMIN/DF changed from 3.95 to 4.42. Thus, it was decided to delete another item with lowest squared multiple correlation: item 7. The indices of fit for the final model in this regard are acceptable in all aspects except for RMSEA which is 0.065, slightly above the values suggested by most studies (0.05); however, it is argued that 0.07 might be tolerable and the combination of indices should be considered (Byrne, 2001). These statistics are presented in Table 7-10; also the diagram for that model can be found as Figure 7-4.

Table 7-10) Indices of fit for "improved accounting system" measurement model (final attempt) (n=246)

Model \ Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**RMSEA**	**AIC**
Designed model	25.5	13	2.04	.988	.065	56
Saturated model	.000	0	N/A	1	N/A	56
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

Figure 7-4) Measurement model for "improved accounting system" (n=246)



It seems more reasonable to choose the second measure, "technical improvement in accounting systems" (TIMPACC) as a better proxy of "improved accounting systems"; therefore, the final measurement model for "improved accounting system" would comprise four items including "use of non-financial information in accounting reports", "use of new techniques of management accounting", "computerising accounting practices", and "automatic reporting in accounting systems". The estimations concerning the factor loadings of the model and the strength of those relationships are presented in Table 7-11.

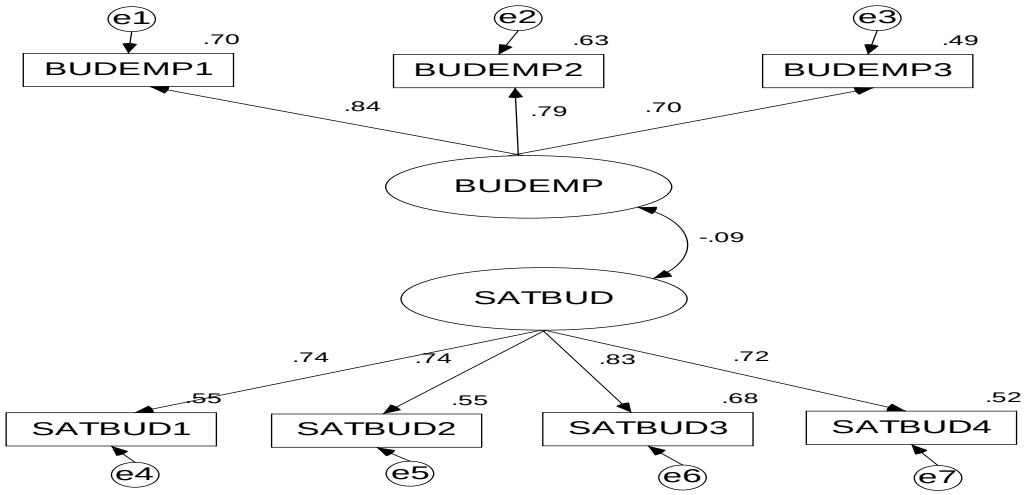
Table 7-11) Regression weights for "improved accounting system" measurement model (n=246)

Items	Factors	Estimate	S.E.	C.R.	P	Squared multiple correlations
IMPACC2	<--- GIMPACC	1.000				.826
IMPACC5	<--- GIMPACC	.851	.056	15.319	***	.695
IMPACC10	<--- TIMPACC	.861	.049	17.739	***	.723
IMPACC9	<--- TIMPACC	.925	.050	18.533	***	.760
IMPACC11	<--- TIMPACC	1.000				.788
IMPACC8	<--- TIMPACC	.778	.049	15.922	***	.640
IMPACC3	<--- GIMPACC	.758	.054	14.104	***	.601

7-3-5. "More Budget Emphasis" and "Satisfaction with Budgets" (Factors 6 & 7)

To carry out CFA for the "more budget emphasis" factor, it must inevitably be combined with another factor as it has just three observed variables (see the explanations in section 7-3-1 in this regard). Therefore, the model was designed as a combination of two factors which are deemed to be negatively related to each other; the other factor is "satisfaction with budgets". The diagram below (Figure 7-5) indicates the model resulting from the SEM test in CFA. Other outcomes presented in Tables 7-12 and 7-13 are about indices of fit for the proposed model and factor loadings of the variables respectively.

Figure 7-5) Measurement model for "budget emphasis" and "satisfaction with budgets" (n=246)



According to this information, the model fits very well with the collected data and the relationships between observed variables and latent variables are significant and powerful enough, so these measures are deemed appropriate proxies for the aforementioned factors. It should also be borne in mind that these two factors were confirmed by CFA without any removal of items; in other words, both factors were confirmed as they had been originally designed.

Table 7-12) Indices of fit for "budget emphasis" and "satisfaction with budgets" measurement model (n=246)

Model \ Index	CMIN	DF	CMIN/DF	CFI	RMSEA	AIC
Designed model	9.5	13	.733	1	.000	39.5
Saturated model	.000	0	N/A	1	N/A	56
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

Table 7-13) Regression weights for "budget emphasis" and "satisfaction with budgets" measurement model (n=246)

Items	Factors	Estimate	S.E.	C.R.	P	Squared multiple correlation
BUDEMP1 <---	BUDEMP	1.000				.699
SATBUD4 <---	SATBUD	.820	.072	11.338	***	.523
SATBUD1 <---	SATBUD	.952	.082	11.657	***	.552
SATBUD2 <---	SATBUD	.911	.078	11.685	***	.554
SATBUD3 <---	SATBUD	1.000				.684
BUDEMP2 <---	BUDEMP	.863	.080	10.841	***	.626
BUDEMP3 <---	BUDEMP	.703	.069	10.237	***	.491

7-3-6. Competitive Advantage (Factor 8)

A test of the data on the factor of "competitive advantage" in CFA resulted in an acceptable measurement model without having to drop any of the observed variables. Figure 7-6 and Tables 7-14 and 7-15 all indicate related information about this CFA test. Based on these statistics, the measurement model for "competitive advantage" can be considered reliable, so it can be inserted in the total model (structural model) in the next stages of the study.

Figure 7-6) Measurement model for "competitive advantage" (n=246)

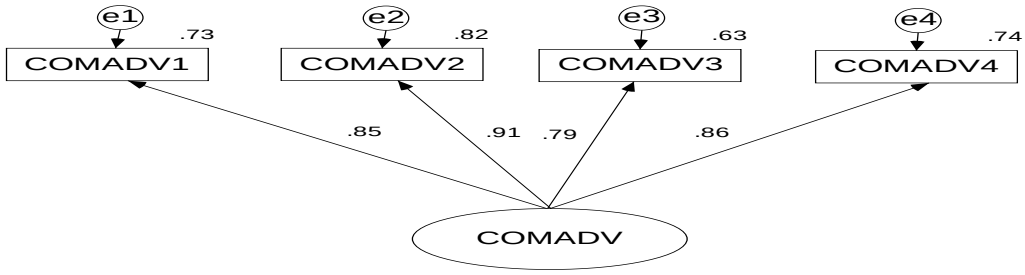


Table 7-14) Indices of fit for "competitive advantage" measurement model (n=246)

Model \ Index	CMIN	DF	CMIN/DF	CFI	RMSEA	AIC
Designed model	3.1	2	1.57	.998	.048	19
Saturated model	.000	0	N/A	1	N/A	20
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

Table 7-15) Regression weights for "budget emphasis" and "satisfaction with budgets" measurement model (n=246)

Items	Factor	Estimate	S.E.	C.R.	P	Squared multiple correlation
COMADV1 <---	COMADV	1.000				.728
COMADV2 <---	COMADV	.977	.053	18.467	***	.822
COMADV3 <---	COMADV	.776	.052	14.998	***	.630
COMADV4 <---	COMADV	.913	.054	16.996	***	.736

7-3-7. Improvement in Reward System (Factor 9)

The result of EFA in the previous chapter also indicated that those 7 items gauging the "improved reward system" have to be divided into 2 factors as 3 items are related to the reward system of faculty members (FREWSYS) and 4 items are about other staff members' reward system (SREWSYS). Therefore, those items in the two groups, namely FREWSYS and SREWSYS, were tested in CFA by Amos. The results showed that the model does not fit and one factor loading is less than the accepted value for this study (item 4). It was explained earlier that items 1 and 4 are about the appropriateness of the relationship between faculty members' and other staff's fixed salary with their performance and it is believed that the behaviour of this part of the reward system is quite different from other components such as overtime payment, other earnings and annual promotions. With this in mind, items 1 and 4 were removed from the measurement model and the results showed a significant difference as the very poorly fitting model became a very good model in that regard. Table 7-16 compares the models with 7 and 5 items and models with and without items concerning the component of fixed salary in the universities' reward system. So it was

decided to choose the final model as shown in the following diagram (Figure 7-7) which contains two items for FREWSYS factor and three items regarding the SREWSYS factor.

Figure 7-7) Measurement model for "reward system" (n=246)

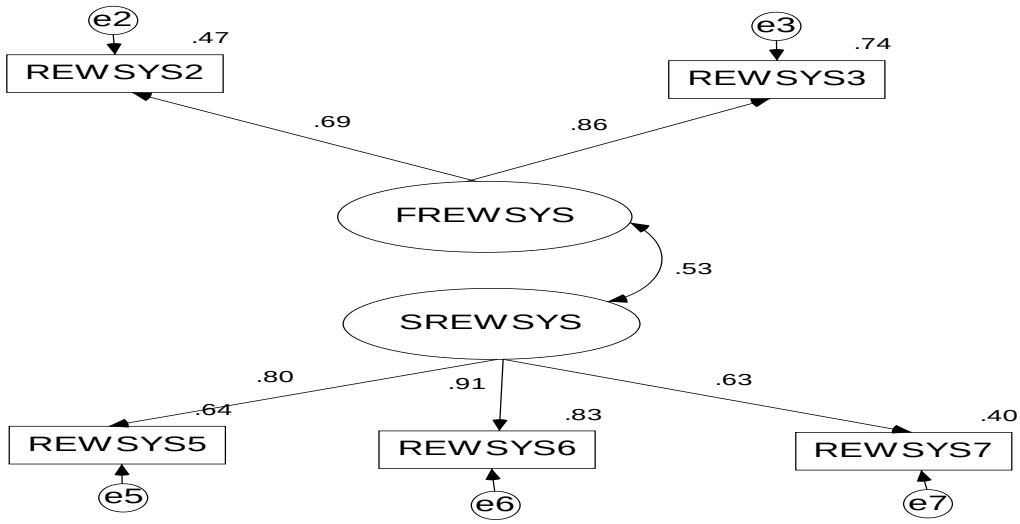


Table 7-16) Indices of fit for "reward system" measurement model (n=246)

Model \ Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**RMSEA**	**AIC**
Model with 7 items	89	13	6.87	.914	.153	118
Model with 5 items	3.2	4	.796	1	.000	25
Saturated model	.000	0	N/A	1	N/A	56
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

As expected, the factor loadings and squared multiple correlations for this model are within acceptable ranges as illustrated in Table 7-17. Perhaps the most important point to note here is that the analysis of the universities' reward system is based on all components of reward system except the component of fixed salary.

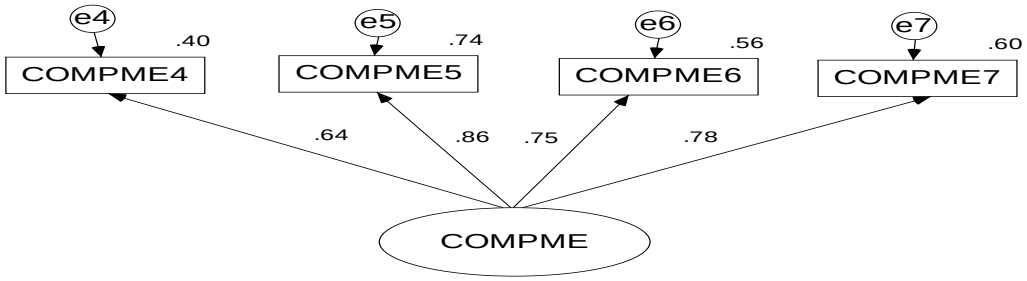
Table 7-17) Regression weights for "reward system" measurement model (n=246)

Items	Factors	Estimate	S.E.	C.R.	P	Squared multiple correlations
REWSYS6	<--- SREWSYS	1.000				.831
REWSYS7	<--- SREWSYS	.731	.073	10.068	***	.401
REWSYS2	<--- FREWSYS	1.000				.469
REWSYS3	<--- FREWSYS	1.243	.194	6.421	***	.743
REWSYS5	<--- SREWSYS	.896	.071	12.616	***	.642

7-3-8. Comprehensive Performance Measures (Factor 10)

Initially, 7 items which had originally been designed to measure "importance of comprehensive performance measures" were put into the CFA model as the proxies of that factor. The results were alarming and indicated that the model had completely deviated from a fit model, so some of the items were removed (see explanations in sections 7-3 and 7-3-2) and finally a measurement model with 4 observed variables remained, as can be seen in the diagram below (Figure 7-8).

Figure 7-8) Measurement model for "comprehensive performance measures" (n=246)



According to this model, 4 items including "employees' attitudes to their work and university", "their concern with costs and budgets", and "punctuality and length of their presence at their workplace" as well as "their concerns with quality" are employed as indicators for "comprehensive performance measures". In other words, the items such as "task accomplishment on-time", "extent of effort put into their jobs", and "extent of students' satisfaction with them" should be set aside from the analysis. Tables 7-18 and 7-19 present indices of fit and factor loadings for the aforementioned model; they are within a tolerable range except for the RMSEA index which has been discussed earlier in subsection 2-4.

Table 7-18) Indices of fit for "comprehensive performance measures" measurement model (n=246)

Model \ Index	CMIN	DF	CMIN/DF	CFI	RMSEA	AIC
Designed model	4.5	2	2.23	.994	.071	20
Saturated model	.000	0	N/A	1	N/A	20
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

Table 7-19) Regression weights for "comprehensive performance measures" measurement model (n=246)

Items	Factor	Estimate	S.E.	C.R.	P	Squared multiple correlations
COMPME7	<--- COMPME	1.000				.601
COMPME5	<--- COMPME	.961	.076	12.655	***	.735
COMPME6	<--- COMPME	.885	.077	11.511	***	.565
COMPME4	<--- COMPME	.754	.078	9.636	***	.405

7-3-9. Use of Accounting Information in PM (Factor 11)

As the diagram below (Figure 7-9) shows, all 4 original observed variables were employed to build a measurement model for "usage of accounting information in PM" and the outcomes confirmed it as a fit and reliable model. Other statistics in this regard are illustrated in tables 7-20 and 7-21. This information confirms the robustness of the model and shows that the employed original measures for this factor have no remarkable flaws, so none of the observed variables have had to be dropped from the model.

Figure 7-9) Measurement model for "usage of accounting information in PM" (n=246)

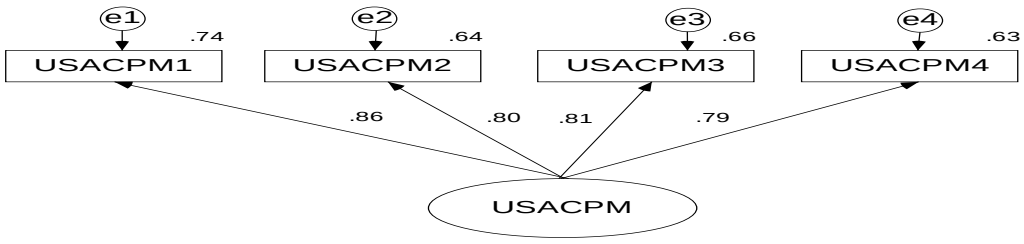


Table 7-20) Indices of fit for "usage of accounting information in PM" measurement model (n=246)

Model \ Index	CMIN	DF	CMIN/DF	CFI	RMSEA	AIC
Designed model	2.24	2	1.12	1	.022	18
Saturated model	.000	0	N/A	1	N/A	20
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

Table 7-21) Regression weights for "usage of accounting information in PM" measurement model (n=246)

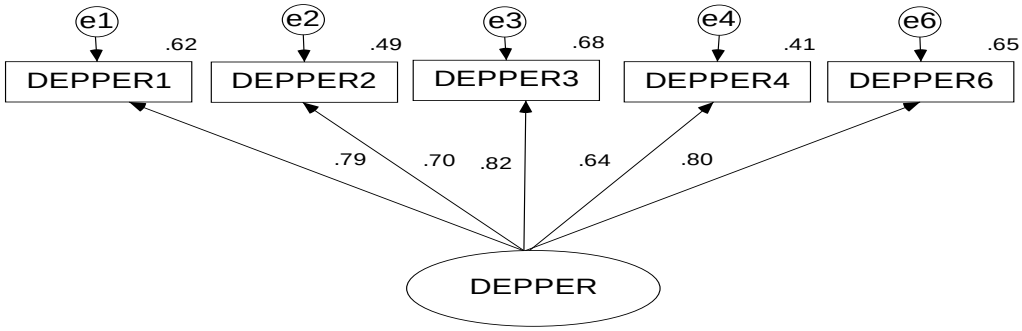
Items	Factor	Estimate	S.E.	C.R.	P	Squared multiple correlation
USACPM2	<--- USACPM	.834	.061	13.722	***	.643
USACPM3	<--- USACPM	1.000				.661
USACPM4	<--- USACPM	.911	.067	13.540	***	.629
USACPM1	<--- USACPM	.987	.066	14.918	***	.743

7-3-10. Universities' Departmental Performance (Factor 12)

Items to measure "universities' departmental performance" comprise six variables; however, by employing those variables it was not possible to achieve a fit and acceptable measurement model for this factor. Indices of fit for the model with all observed variables had far from good values in terms of RMSEA (0.069 compared to 0.05 or less) and AIC (43.4 compared to 42 or less). Moreover, the squared multiple correlation for the fifth item was computed as 0.194 which is considered well below the acceptable amount adopted for this study (0.40). Thus, the deletion of item 5 from the CFA model seemed unavoidable. It was argued in the Methodology chapter (section 4-7-12) that the items for gauging "departmental performance" are in fact key performance indicators of each department. It might be of interest to note that item 5 for Education Departments is "the extent of graduates' success in finding jobs". This item for Research Departments was "the amount of patents and inventions", and for Financial Departments, it was "the extent of their fund savings at the end of each year". Comparing item 5 with other items in each department reveals that item five is

the most difficult key performance indicator to achieve compared to the other indicators. Therefore, the accepted measurement model for "departmental performance" consists of 5 observed variables as shown in the Figure 7-10.

Figure 7-10) Measurement model for "departmental performance" (n=246)



Other information regarding the fit indices and factor loadings as well as the strength of those loadings is indicated in Tables 7-22 and 7-23 respectively. A quick look at those tables confirms that all fit indices are at the high level of acceptance and factor loadings are statistically significant and strong enough.

Table 7-22) Indices of fit for "departmental performance" measurement model (n=246)

Model \ Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**RMSEA**	**AIC**
Designed model	6.27	5	1.25	.998	.032	26
Saturated model	.000	0	N/A	1	N/A	30
Acceptable values	N/A	N/A	Less than 3	More than .9	Less than .05	D model less than S

Table 7-23) Regression weights for "departmental performance" measurement model (n=246)

Items	**Factors**	**Estimate**	**S.E.**	**C.R.**	**P**	**Squared multiple correlations**
DEPPER6 <---	DEPPER	.856	.063	13.549	***	.647
DEPPER4 <---	DEPPER	.747	.072	10.349	***	.414
DEPPER3 <---	DEPPER	1.000				.676
DEPPER1 <---	DEPPER	.929	.070	13.212	***	.620
DEPPER2 <---	DEPPER	.818	.072	11.404	***	.486

So far, all factors have had at least one "measurement model" that can be put together to construct the "structural models" which have been proposed earlier in the Methodology Chapter. It might be useful to imply that, according to the guidance of CFA and to build some better and more precise models, several items were deleted from the models; so, 50 of the original 66 items were retained to participate in "structural models" and hypotheses-testing in the next sections.

7-4. Structural Models

As was discussed in the Methodology Chapter (section 4-5), the hypotheses of this study are categorized into three groups according to their concepts and area of studies that are prevalent in contingency-based research. The first group is about different aspects of accounting system including:

1- improvement in accounting systems
2- participative budgeting
3- more budget emphasis

The second group takes just two dimensions of performance management:

1- comprehensive performance measures
2- improvement in reward systems;

It also includes their interactions with environmental factors (competitive positions, financial pressure, and decentralization), accounting information, and universities' performance. In the third group, which can be considered a subsidiary aspect or by-product of this study, different reactions from different Departments in each university in parts of both the aforementioned groups are investigated. For the purposes of this study, those groups are called:

a. Accounting System Model
b. Performance Management Model
c. Differentials among Departments.

So this section is followed by a presentation of the results of SEM analysis regarding the above-mentioned models.

Before going any further it might be necessary to answer a probable question that may arise regarding the separation of the SEM model into two models whilst the main independent variables (contingent variables) and the final dependent variable (departmental performance) are the same in both models. At least four reasons can be stated for this separation. First, the concept of each model is slightly different from the other one, as explained earlier (section 4-5 of Chapter 4). The first model is about different aspects of accounting system such as improvement in the system, participative budgeting, and budget emphasis, whereas the second system looks at two components of performance management including performance measures and reward systems. Second, the components of the first model are well-defined and well-researched in the literature of contingency studies, but this is not the case for the second model, so combining them could create some confusion if results are very different from the literature. Thus, if both models are combined and SEM analyses produce poor results in terms of fit indices and estimations, it will be difficult to track the cause of those poor outcomes. Third, all contingent variables relevant to the Accounting System Model are not theoretically applicable to Performance Management Model. Regarding the effect of "financial pressure" as one of the contingent variables on the chosen aspects of Performance Management, nothing could be found in the literature, so it had to be deleted from that model. Finally, combining both models would result in a very large and complicated model in the eye of SEM computer software. Most of the SEM programmes cannot execute very large and complicated models accurately; thus, this separation is deemed helpful and necessary for running the model and it would also boost the accuracy of estimations overall (Kline, 2005).

7-4-1. Accounting System Model

The Accounting System Model which is illustrated on the next page (Figure 7-11) includes 9 factors or latent variables. These variables can be categorised into four groups, namely ***contingent factors*** encompassing:

1- decentralization (DECENT)
2- financial pressure (FINPRE)
3- competitive position (COMPOS)

accounting system factors consisting of:

4- improved accounting system (IMPACC)
5- participative budgeting (PARBUD)
6- More budget emphasis (BUDEMP)

mediating factors including:

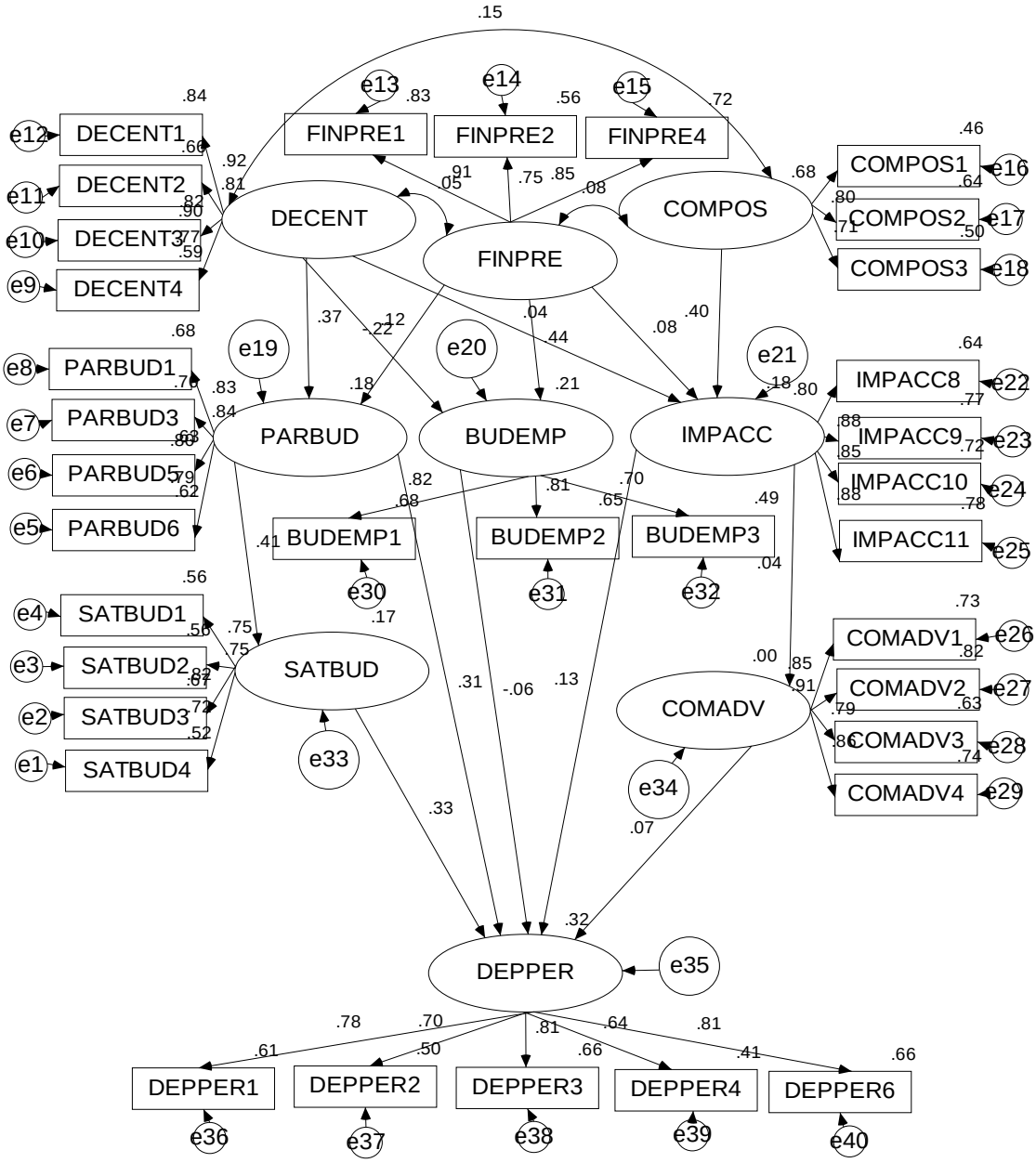
7- competitive advantage (COMADV)
8- satisfaction with budgets (SATBUD)

and finally ***performance factor*** which is

9- universities' departmental performance (DEPPER).

Construction of "Measurement Models", which is a prerequisite to design of "Structural Models", was explained in the previous section. As can be seen from the diagram below, the measurement models for this structural model consist of 34 items or observed variables (questions). It should be recalled that, for "improved accounting systems", two slightly different measures or factors resulted from exploratory (EFA) and confirmatory factor analyses (CFA) as explained earlier in section 7-3-4. Those two factors were called "general improvement in accounting system" and "technical improvement in accounting system". The aim of the above explanation is to clarify that the later version of "improved accounting system", which is "technical improvement in accounting system", has been inserted into this model.

Figure 7-11) Structural model for "Accounting System" (n=246)



One point that should be mentioned here regarding the Figure 7-11 and all SEM models like this is that the interpretation of **e** in Measurement Models is different from Structural Models. **e** in Measurement Models represents the measurement errors, whereas in Structural Models it is computed just for endogenous variables and signifies the share of other causes or drivers of that variable (Kline, 2005). All **e** statistics can be found in **Appendix E** for all of the Structural Models.

As was mentioned earlier on several occasions, before any interpretation of a model's outcomes resulting from an SEM program, its goodness of fit should be assessed, although having a fit model does not mean that the model is also plausible (Browne and Cudeck, 1992). Values of some fit indices for this model are illustrated in Table 7-24 (more detailed statistics regarding fit indices can be found in **Appendix E**). In this Table, Normed Fit Index (NFI), as one extra index, has been added to the reported indices compared to the measurement models in the previous section. Since NFI is highly sensitive to the size of the models (Kline, 2005), the NFI values for the measurement models are quite close to the CFI values and were deleted from the reported tables, whereas the NFI index for this structural model has the worst value compared to other indices due to the complexity and size of the model. Nonetheless, as Byrne (2001) believes, to assess the fitness of a model a combination of indices should be noted; therefore if one index is slightly below the acceptable level (the last row in Table 7-24), this does not mean that the given model should be rejected. Having said that, it can be claimed that the proposed model fits with the collected data according to the values of a variety of indices illustrated in Table 7-24; thus it would be possible to go one step further and look at the estimations that resulted from this model regarding the relationships between latent variables.

Table 7-24) Indices of fit for "Accounting System" structural model (n=246)

Model \Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**NFI**	**RMSEA**	**AIC**
Designed model	624.3	510	1.22	.975	.881	.030	794
Saturated model	.000	0	N/A	1	1	N/A	1190
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05	D model less than S

Based on squared multiple correlations of endogenous variables presented in Table 7-25, just 17.7% and 18% of variances regarding "participative budgeting" and "improved accounting system" are respectively explained by the proposed contingent variables, whereas this percentage for "more budget emphasis is slightly higher (21.3 %). According to the statistics it can be claimed that just 16.9 per cent of "satisfaction with budgets" might be due to the "participative budgeting"; however,

"improvement in accounting systems" could not explain any causation for creating "competitive advantage" (just 0.2%) in Iranian universities. Finally it could be declared that "participative budgeting", satisfaction with budgets", "improved accounting systems", and "budget emphasis" together explain 31.7% of "universities' departmental performance". The implication of these statistics is that many other variables can influence the investigated factors of this study. For example, based on this information it can be claimed that proposed influential factors such as improvement in accounting system, participative budgeting, and satisfaction with budgets can explain only 31.7% of the differences in performances of Iran's universities. So, the remaining 68.3% might be due to other factors such as culture, strategy, size, politics, infrastructures and policies, which have not been inserted into this model. Although an entirely similar model could not be found in the literature, findings on broadly similar models in this regard show that comparable R square varies from 30% (Tsui, 2001) to 42% (Miah and Mia, 1996). In the former study the effect of participative budgeting and management accounting systems on organizational performance in private companies was investigated, whereas in the latter study the effect of decentralization and accounting systems on organizational performance in governmental organizations was assessed.

Table 7-25) R square of endogenous variables in "Accounting System" structural model (n=246)

Items	**PARBUD**	**IMPACC**	**BUDEMP**	**SATBUD**	**COMADV**	**DEPPER**
R Square	.177	.180	.213	.169	.002	.317

The regression weights between latent variables can be found in Table 7-26. It should be borne in mind that these weights have been estimated based on Maximum Likelihood (ML) estimation which was discussed earlier in chapter five, so they might be slightly different from traditional regression results or even other bases of estimation, for example General Least Square (GLS) in SEM .

Table 7-26) Regression weights of "Accounting System" structural model (n=246)

Dependent Variables	Independent Variables	Unstandardised coefficients				Standardised coefficients
		Estimates	S.E	C.R.	P	
IMPACC	COMPOS	.723	.143	5.053	***	.400
IMPACC	DECENT	.055	.082	.673	.501	.044
IMPACC	FINPRE	.116	.092	1.259	.208	.083
COMADV	IMPACC	.033	.057	.578	.563	.040
PARBUD	DECENT	.323	.059	5.464	***	.368
PARBUD	FINPRE	-.219	.066	-3.313	***	-.223
SATBUD	PARBUD	.412	.073	5.638	***	.411
BUDEMP	FINPRE	.489	.080	6.094	***	.441
BUDEMP	DECENT	.114	.066	1.721	.085	.115
DEPPER	IMPACC	.078	.037	2.132	.033	.133
DEPPER	COMADV	.049	.045	1.100	.271	.068
DEPPER	SATBUD	.270	.064	4.240	***	.325
DEPPER	PARBUD	.259	.062	4.175	***	. 312
DEPPER	BUDEMP	-.047	.048	-.984	.325	-.064

7-4-1-1.Assessment of Normality and Bootstrapping

As has been mentioned on several occasions, one of the important assumptions for SEM and ML is that the related data are normally distributed or at that there is at least no extreme violation in that regard. Looking at the output of SEM analysis regarding the above-mentioned model, most of the variables meet the criterion offered by Kline (2005) and multivariate kurtosis is within an acceptable range (critical ratio is 0.224). However, there are just four variables with skewness of more than 3 items, items 1, 2 and 4 of competitive advantage and item 2 of Departmental performance (**Appendix E**). Nevertheless, because of the crucial importance of normality for SEM, the results are reassessed by applying a Bootstrapping technique.

To check the probable effects of any extent of deviations from normality on the results of the study, in many SEM programmes a corrective technique called bootstrapping has been devised (Kline, 2005). The basic idea of bootstrapping is to create many other samples from the data or original sample by random selection and replacement; then the parameter distributions of these new samples are computed and assessed (Byrne, 2001). Therefore, after performing a bootstrap in an SEM analysis,

in parallel with common estimates, another version of estimates and standard errors for each variable is produced, and this can help the researcher to obtain more accurate estimates and correct the inflated estimates that might have been created by non-normality (Zhu, 1997).

Requesting 500 samples and 90 per cent as the bias-corrected confidence interval (which are default sample numbers and confidence level in most SEM programmes), the results of bootstrapping (presented in **Appendix F**) for this model shows that most of the estimates are quite close to the estimates resulting from SEM analysis without bootstrapping. At least, in terms of statistical test results there is not such a remarkable difference between initial results and bootstrapped results. The only important difference is that the estimate of coefficient between "improved accounting system" and "departmental performance" has changed from a 0.05 level of significance to the 0.10 level (P value changed from .033 to .061) and this means that the relationship should be considered weaker than what was suggested by previous statistics.

Anyhow, statistics in Table 7-26 indicate that associations between 8 pairs of variables are significant at the level of 0.01, and two pairs of variables are associated at a 0.10 level of significance. In other words, the association of "improved accounting system" with "competitive position" is significant, but with "decentralization", "financial pressure", and "competitive advantage" it is insignificant. Moreover, the expected positive relationships among "participative budgeting", "decentralization" and "satisfaction with budgets" on the one hand and negative association of "participative budgeting" with "financial pressure" on the other hand are confirmed.

In addition, based on those statistics, although the effect of "financial pressure" on "budget emphasis" is considerable (0.01 level), the consequence of "decentralization" cannot be assessed as quite so significant (0.10 level). Finally, of the proposed effective variables on "universities' performance", the effect of "participative budgeting" and "satisfaction with budgets" at 0.01 level of significance, and "improved accounting system" at 0.10 level are confirmed, although no significant association with "competitive advantage" and "budget emphasis" could be concluded.

Although "size of Universities" has not yet been included in the model, in order to check its possible effects as a control variable on the results of the model the result of such a test is reported in the next section.

7-4-1-2.The Effect of "Size" on the Model

As was explained in section 4-5-1, the primary aim of this research is to assess the consequences of some recently emerging variables on systems and performance of the universities; other related variables were excluded from the model for various reasons, as explained in that section. However, as the data regarding the size of universities are available (two indicators, the number of employees and the number of students) it was decided to insert this variable into the model and assess its effects in a test.

According to the findings of previous studies in contingency-based research, size is associated with all aspects of the accounting systems model under investigation in the present study including "participative budgeting", "more budget emphasis", and "improvement in the systems", but not with the performance management model (Chenhall, 2003); therefore, the expected associations in all three directions were defined in the model. After execution of the programme, the outcomes showed that no changes in significance can be spotted compared to the previous results (section 7-4-1). Table 7-26-1 shows the indices of fit for the model. These indices imply that the goodness of fit for the model has slightly improved, thus confirming that the added data are compatible with the model and the indicators that were used to measure "size" are statistically acceptable.

Table 7-26-1) Indices of fit for "Accounting System" structural model, size included (n=246)

Model \Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**NFI**	**RMSEA**	**AIC**
Designed model	670.3	571	1.17	.979	.874	.027	860
Saturated model	.000	0	N/A	1	1	N/A	1332
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05	D model less than S

However, the estimation of relationships between variables (see Table 7-26-2) specifies not only that there no significant association between size and any aspects of accounting systems, but also that relationships between other variables do not change significantly. These results should be compared with Tables 7-24 and 7-26 in section 7-4-1 respectively. This outcome is perhaps not surprising as about 75% of responses received from the universities that are about the same in terms of size with less than 6000 students (see section 6-2-2). In the next subsection, the results of SEM analysis relating to the second model, called Performance Management Model are presented.

Table 7-26-2) Regression weights of "Accounting System" structural model, size included (n=246)

Dependent Variables	**Independent Variables**	**Unstandardised coefficients**				**Standardised coefficients**
		Estimates	**S.E**	**C.R.**	**P**	
IMPACC	COMPOS	.723	.143	5.050	***	.400
IMPACC	DECENT	.055	.082	.673	.501	.044
IMPACC	FINPRE	.116	.092	1.259	.208	.083
COMADV	IMPACC	.033	.057	.578	.563	.040
PARBUD	DECENT	.322	.059	5.460	***	.368
PARBUD	FINPRE	-.219	.066	-3.312	***	-.223
SATBUD	PARBUD	.412	.073	5.625	***	.411
BUDEMP	FINPRE	.489	.080	6.096	***	.442
BUDEMP	DECENT	.114	.066	1.721	.085	.115
IMPACC	SIZE	.000	.004	.034	.973	.001
PARBUD	SIZE	.000	.010	.036	.971	.003
BUDEMP	SIZE	.000	.008	.036	.971	.002
DEPPER	IMPACC	.078	.037	2.131	.033	.133
DEPPER	COMADV	.049	.045	1.100	.271	.068
DEPPER	SATBUD	.270	.064	4.238	***	.325
DEPPER	PARBUD	.259	.062	4.174	***	. 312
DEPPER	BUDEMP	-.047	.048	-.983	.326	-.064

7-4-2. Performance Management Model

Performance management model as shown in Figure 7-11 consists of seven latent variables including ***two contingent variables:***

1- decentralization (DECENT)
2- competitive position (COMPOS);

four variables relating to ***performance management (PM):***

3- comprehensive performance measures (COMPME)
4- improvement in faculty members' reward system (FREWSYS)
5- improvement in other staff's reward system (SREWSYS)
6- use of accounting information in PM (USACPM);

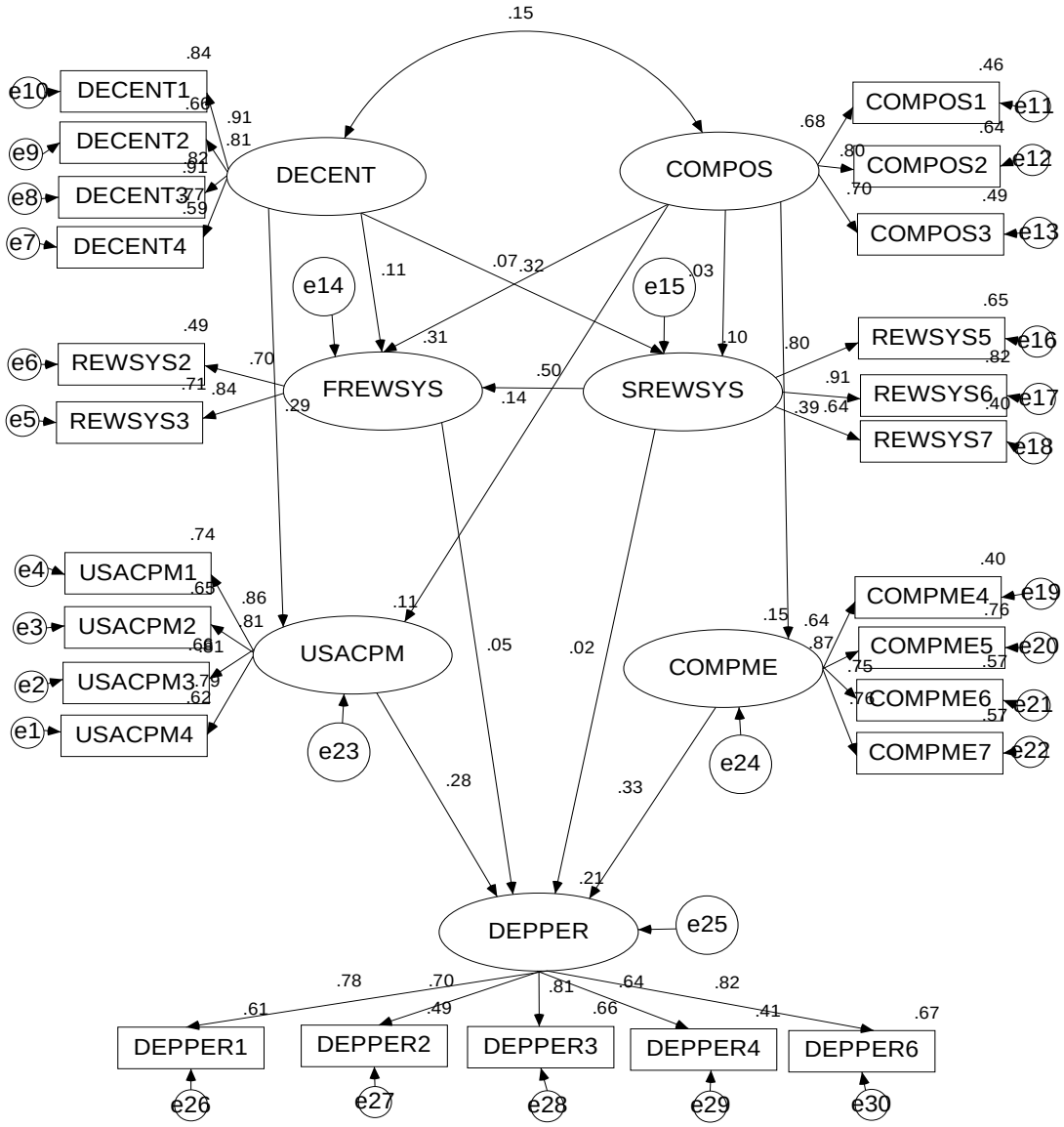
and ***one*** variable regarding the ***universities' performance:***

7- universities' departmental performance (DEPPER)

To measure these seven variables, 25 observed variables (questions) have been employed in the model.

It might be necessary to explain that the original model in this regard consisted of one variable regarding the reward system in the universities. However, as the items to measure that variable are classified into two groups of faculty members and other staff owing to the differences in rules, procedures and amounts of rewards for those two groups, the exploratory (EFA) and confirmatory (CFA) factor analyses suggested that the "reward system" would be better categorised into two variables. Therefore the final model for PM has seven latent variables even though only there were six variables in the first proposed model in this area.

Figure 7-12) Structural model for "Performance Management" (n=246)



According to the information resulting from SEM, it can be claimed that this proposed model fits with the collected data, so other analyses based on that can be performed. Statistics in Table 7-27, which is the summary of fit indices, show that most of the indices are within an acceptable range (for example CFI is 0.98 and RMSEA is 0.029, which are very good) and some of them are slightly better than the indices for the previous model. Although these two models (Accounting System and Performance

Management Models) are not competing models[80], the indices of fit indicate that the latter model is better fit with the collected data and proposed relationships between variables. In addition, the superiority of this model's fitness over that of the previous model in terms of NFI index (0.903 compared to 0.880) confirms the earlier explanation regarding the NFI, which is very sensitive to the complexity of the model. It is evident that this model is smaller and simpler than the earlier one.

Table 7-27) Indices of fit for "Performance Management" structural model (n=246)

Model \Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**NFI**	**RMSEA**	**AIC**
Designed model	317	262	1.21	.981	.903	.029	444
Saturated model	.000	0	N/A	1	1	N/A	650
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05	D model less than S

Achieving a fit model creates the opportunity to go a step further, looking at the structural relationships between proposed variables and analysing those relationships. The correlation between the exogenous variables "competitive position" and "decentralization" is 0.20 and their variances are 0.37 and 0.80 respectively. Table 7-28 indicates the squared multiple correlations of endogenous variables in this model. According to this information, about 12% of the extent of "usage of accounting information in PM" is explained by proposed contingent factors (competitive position and decentralization) and 15.2% of variances of "comprehensive performance measures" are related to "competitive position". The common variances between "improved reward system" and proposed contingent variables are around 10 per cent; however, the share of "faculty members' reward system" has increased by 20 per cent because of the direct effect of "other staff's reward system". In addition, it is important to notice that the common variance of PM variables with "decentralization" is greater than "competitive position". Finally, it can be stated that just 21.3% of "universities' departmental performance" can be addressed by the variables including "use of comprehensive performance measures", " use of accounting information in

[80] Competing models in SEM refer to the models that are built with roughly the same variables, but that are slightly different in defined association between variables or excluding some variables (Kline, 2005).

PM", and "improvement in reward systems", although the share of the latter is too small in this regard. The point of these statistics is to illustrate the weight of each variable in the study and highlight the space which is being left for other unknown or unaddressed variables in this study. The comparable R square of broadly similar previous studies varies from 19.7% (Ittner and Larcker, 1995) to 42% (Schulz et al., 2010) depending on the number of inserted variables into the models.

Table 7-28) R square of endogenous variables in "Performance management" structural model (n=246)

Items	**USACPM**	**COMPME**	**FREWSYS**	**SREWSYS**	**DEPPER**
R square	.115	.152	.308	.105	.213

Table 7-29) Regression weights of "Performance Management" structural model (n=246)

Dependent variables	**Independent variables**	**Unstandardised coefficients**				**Standardised coefficients**
		Estimate	**S.E.**	**C.R.**	**P**	
SREWSYS	COMPOS	.032	.111	.289	.773	.021
FREWSYS	COMPOS	.112	.111	1.013	.311	.075
COMPME	COMPOS	.621	.130	4.765	***	.374
USACPM	COMPOS	.200	.105	1.901	.057	.142
USACPM	DECENT	.278	.067	4.147	***	.288
SREWSYS	DECENT	.323	.072	4.457	***	.319
FREWSYS	DECENT	.114	.075	1.519	.129	.112
FREWSYS	SREWSYS	.499	.094	5.316	***	.496
DEPPER	SREWSYS	.029	.061	.477	.633	.041
DEPPER	FREWSYS	.030	.064	.474	.636	.043
DEPPER	COMPME	.204	.045	4.569	***	.319
DEPPER	USACPM	.200	.053	3.796	***	.267

The structural associations among latent variables in this model are illustrated in Table 7-29. Further explanation of the details of this Table will be more appropriate after the assessment of normality and bootstrapping test.

7-4-2-1.Assessment of Normality and Bootstrapping

Based on normality test results from Amos regarding this model (**Appendix E**), it can be said that the data for this model may also be considered normally distributed from an overall view. The critical ratio representing models' multivariate kurtosis is 3.29, which is far below the upper limit suggested by the literature (Kline, 2005). However,

in terms of univariate normality, three observed variables have a skewness critical ratio of more than acceptable amounts. These variables are items 1 (-3.84) and 2 (-3.62) of "comprehensive performance measures" and item 2 (3.08) regarding the "use of accounting information in PM". To ensure that this small deviation from normality assumption does not significantly change the estimates of this study, a bootstrapping test similar to that carried out with the previous model is performed. The outcome of this test can be found in **Appendix F**. According to this outcome the differences between bootstrapped analysis and the previous analysis are very minor: for three pairs of variables they are absolutely nothing and for two other pairs they are very small. The first pair of variables are "competitive position" and "use of accounting information in PM" and their association has become stronger (p value has changed from 0.057 to 0.045). The probability of a significant relationship between "decentralization" and "faculty members' reward system" has also increased as the p value has declined to 0.099 from 0.129.

Therefore, according to the estimations resulting from SEM analysis and modified by bootstrapping technique, no significant association could be found between two components of the "universities' reward system" and "competitive position"; however, the latter variable is associated with "comprehensive performance measures" and "use of accounting information in PM" at 0.01 and 0.05 levels of significance respectively. In addition, the effect of "decentralization", as another contingent variable, on "use of accounting information in PM" and "other staff's reward system" could be confirmed, but that effect on "faculty members' reward system" is very weak and near to rejection even at the 0.10 level of significance. Finally, based on those statistics it is evident that "universities' departmental performance" is related to the "use of comprehensive performance measures" and "use of accounting information in PM"; nonetheless, no considerable relationships could be discovered among "departmental performance" and "reward system" neither for faculty members nor for other staff. In the next subsection, the differences in results for two basic models, previously proposed, in three main departments are explored.

7-4-3. Differentials among Departments

At this stage, it seems interesting and even necessary to look at probable differentiations among outcomes of the two suggested models if data are divided into

three groups in accordance with the main departments of Iranian universities including Education, Research and Financial Departments. It is possible, using Amos, to create some subgroups based on any common characteristics between observations or cases of study (Arbuckle, 2007). Therefore, all cases are categorised into three groups by allocating a value as Department Number to each case, and the programme was repeated for both main models, Accounting System Model and Performance Management Model. Fortunately, the number of cases for each department is quite similar, so there is no risk of bias regarding the comparison between different sample sizes for each department. However, it is obvious that separating all the cases into three bunches could negatively affect the goodness of fit of the models, as it was explained earlier that SEM needs a large sample size. Anyhow, the outcomes of the analyses for two models are as below.

7-4-3-1. Differences in Accounting System Model

In this analysis, the proposed model regarding the accounting system is simultaneously tested across the data which have been divided into three groups based on chosen departments in Iranian universities. As discussed in the section 4-5-3 of Chapter 4, the aim of this analysis is to discover whether the values of the suggested model might vary across different groups. It can be considered a kind of test of moderation or interaction effect of discrepancy in departments on the model parameters and relationships between latent variables. The theory behind this moderation effect under the general expression of "difference in task nature" was explained in section 4-5-3 of the Methodology chapter. The differences might also be expected due to the differences in institutional culture; for example, the culture of academic area is more attributable to Education and Research Departments than Financial Departments.

The outcomes of the Amos programme for this analysis are presented here. Table 7-30 illustrates the indices of fit for this model test. The position of this model in terms of fitness indices compared to the simple model of accounting system will be worse in two directions. The first point is that the number of cases for each sample declines to around one third, so the standard errors will increase for the model. The second point is that the sample moments and parameters to be estimated by the whole model are tripled (Arbuckle, 2007); thus, the degree of Chi-square will increase more than

threefold. Nevertheless, of five fit indices indicated in the table below just one (NFI) could not meet the acceptable value, while the other four indices show tolerable amounts of fit for the model; however, the CFI index is not that good. Based on the above explanation, it can be claimed that the proposed model has the necessary level of fit indices overall.

Table 7-30) Indices of fit for structural model of "Accounting System in different Departments" (n=246)

Index Model	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**NFI**	**RMSEA**	**AIC**
Designed model	1910	1530	1.25	.921	.707	.032	2420
Saturated model	.000	0	N/A	1	1	N/A	3570
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05	D model less than S

The standardised regression weights of associations between main factors of the model for the three groups (Education Departments, Research Departments, and Financial Departments) as well as the total model are presented in Table 7-31. More detailed results for each of the groups can be found in **Appendix E**. Based on the statistics below, the main differences between Education and Research Departments occur in the relationships between "participative budgeting" and "satisfaction with budgets" on the one hand and the association of "decentralization" with "budget emphasis" on the other hand. In both areas, Research managers confirmed a significant association (at 0.01 and 0.10 levels of significance respectively), but Education managers did not.

Other than that, the most important discrepancies can be seen between Financial Departments and both Education and Research Departments. In the Financial Departments group, "financial pressure" is negatively associated with "participative budgeting" while that negative association in the other two groups is not significant statistically. Conversely, Education and Research managers confirmed a significant positive relationship between "decentralization" and "participative budgeting", although this is not the case in the Financial Departments group. Moreover, in the

view of Education and Research managers, "participative budgeting" could positively affect their related "departmental performance", whereas there is no relationship between "improved accounting system" and "departmental performance". Conversely, in the Financial Department group a significant association between "departmental performance" and "improved accounting system" was confirmed, but that kind of association with "participative budgeting" was not found. Interestingly, in regard to the two mediator variables of all three groups, relationships between "departmental performance" and "satisfaction with budgets" are considerable, but no significant association between "competitive advantage" and "departmental performance" could be found. More details of similarities and differences among these three groups as well as the total model can be seen in Table 7-31.

Table 7-31) Standardized regression weights for structural model of "Accounting System in different Departments" (n=246)

Dependent variable	Independent variable	Education Dep. (N=82)	Research Dep. (N=81)	Financial Dep. (N=83)	Total model (N=246)
IMPACC	COMPOS	.341**	.443***	.413***	.400***
IMPACC	DECENT	.051	.130	.021	.044
IMPACC	FINPRE	.115	.018	.099	.083
COMADV	IMPACC	.042	.107	-.110	.040
PARBUD	DECENT	.417***	.427***	.178	.368***
PARBUD	FINPRE	-.143	-.076	-.320***	-.223***
SATBUD	PARBUD	.082	.478***	.569***	.411***
BUDEMP	FINPRE	.401***	.495***	.357***	.441***
BUDEMP	DECENT	.073	.217*	.135	.115*
DEPPER	IMPACC	.020	.053	.319***	.133**
DEPPER	COMADV	.153	.163	-.026	.068
DEPPER	PARBUD	.385***	.256**	.161	.312***
DEPPER	SATBUD	.272**	.525***	.390***	.325***
DEPPER	BUDEMP	-.092	-.052	-.120	-.064

*Significant at .10 level, ** significant at .05 level, *** significant at .01 level

To summarise, based on that statistics (Table 7-31), it can be claimed that Education and Research managers are more interested in "participative budgeting" than "improvement in accounting systems", whereas "improvement in accounting systems" is preferred to "participative budgeting" by Financial managers. On the other hand, "financial pressures" and "more budget emphasis" could surprisingly affect Financial Departments more negatively than Education and Research Departments.

7-4-3-2. Differences in Performance Management Model

This subsection is about the results of execution of the Performance Management Model among the three different departmental groups of Education, Research, and Financial at the same time. The indices of fit for this model (Table 7-32) also confirm that the model is reliable to a certain extent as the low value of one index (NFI) cannot damage the fitness of a model provided the other indices are within an acceptable range (Shook et al., 2004, Byrne, 2001). Therefore, this model also seems reliable as four out of five indices confirm its goodness of fit.

Table 7-32) Indices of fit for structural model of "Performance management in different Departments" (n=246)

Index Model	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**NFI**	**RMSEA**	**AIC**
Designed model	1033	786	1.31	.923	.749	.036	1411
Saturated model	.000	0	N/A	1	1	N/A	1950
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05	D model less than S

Achieving a fit model to some extent allows the researcher to look at the other parameters and estimations. Similarly to the reported results for the previous model, for this model standardized regression coefficients are presented in Table 7-33 for all three groups and also the total model. According to this information, one of the most noticeable distinctions between the three groups concerns the effect of "competitive position" on "faculty members' reward system", which is only significant in the Research Departments group. A possible interpretation is that, in an intensified competitive position, faculty members' reward system (or at least some of its components) in the Research area has been forced to change and adjust. Interestingly, these statistics show that the association between "decentralization" and "use of accounting information in PM" is significant for Education and Research Departments, but insignificant for Financial Departments. This might be because Financial Departments had already been using accounting information before the recent

decentralization reform, but this reform has encouraged or forced the other two groups of departments to use accounting information more than before. Nevertheless, only in the Financial Department group is "use of accounting information in PM" strongly associated with "departmental performance" whereas, in other groups, that association is either insignificant or very weak in terms of statistical tests. After presenting the total models of SEM it is possible to test the proposed hypotheses in the next section.

Table 7-33) Standardized regression weights for structural model of "Accounting System in different Departments" (n=246)

Dependent variable	Independent variable	Education Dep. (N=82)	Research Dep. (N=81)	Financial Dep. (N=83)	Total model (N=246)
SREWSYS	COMPOS	.119	-.134	-.029	.021
FREWSYS	COMPOS	.115	.356**	-.108	.075
USACPM	COMPOS	.156	.205	.116	.141*
COMPME	COMPOS	.407***	.388***	.385***	.375***
USACPM	DECENT	.242*	.305**	.191	.288***
SREWSYS	DECENT	.299**	.380***	.302**	.319***
FREWSYS	DECENT	.116	-.054	.131	.112
FREWSYS	SREWSYS	.371***	.512***	.554***	.496***
DEPPER	SREWSYS	-.046	.107	.156	.041
DEPPER	FREWSYS	.164	.019	-.106	.043
DEPPER	USACPM	.193*	.109	.550***	.267***
DEPPER	COMPME	.360***	.345***	.328***	.319***

* Significant at .10 level, ** significant at .05 level, *** significant at .01 level

In this section the main Structural Models (in terms of SEM) of this study including Accounting System Model, Performance Management Model, and Differentials between Departments were designed, assessed and explained. The outcomes of performing these models by SEM can be seen as a pool of statistical evidence to judge the proposed hypotheses in this research project. Nevertheless, the next section reports the results of one-by-one hypothesis-testing in more detail.

7-5. Results of Hypothesis-Testing

By achieving models with good overall fit for Accounting System and Performance Management, testing them on different groups of Departments, and evaluating the significance of relationships between variables, it was implicitly revealed that many

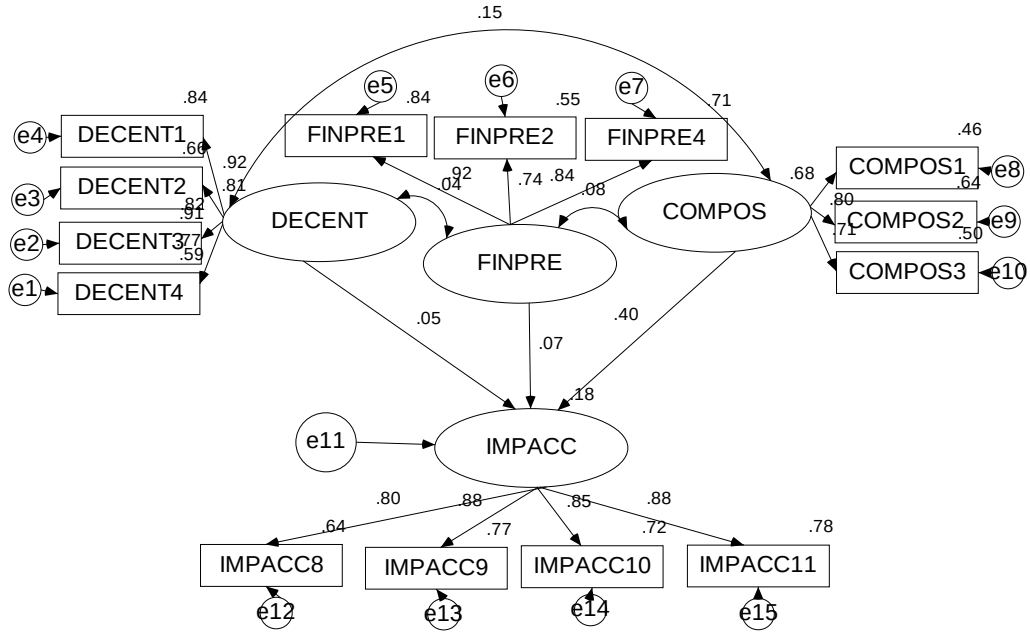
of the proposed hypotheses are confirmed; however some of them should be rejected. This section presents the results of individual tests of each hypothesis comparing with the results of total models related to that hypothesis.

7-5-1. Test Results of Hypothesis One

The first hypothesis claimed that "decentralization", "financial pressure" and "competitive position", as three relevant contingent variables in Iranian universities, are associated with "improvement in their accounting system". The exact wording of this hypothesis as proposed in the Methodology chapter is as follows:

H1. Iranian Universities which are (a) more "decentralized" and (b) facing more intense "competition" and (c) higher "financial pressure" have more "improved accounting system".

Figure 7-13) Exclusive structural model for hypothesis one (n=246)



This hypothesis can be shown individually by symbols of SEM as in Figure 7-13 which results from the execution of Amos on the collected data for this study. This kind of model, which contains just the variables pertaining to each hypothesis individually (Echambadi et al., 2006), is termed an exclusive structural model in this study. So, to test each hypothesis, an exclusive model is designed and tested and its results compared with the related total model. The indices of fit for this small model

in comparison to the total model confirm that most of the fit indices in SEM are sensitive to the size and complexity of models, but NFI is more responsive to that fact than the others, as is quite clear from Table 7-34.

Table 7-34) Indices of fit for exclusive structural model of hypothesis one (n=246)

Model / Index	CMIN	DF	CMIN/DF	CFI	NFI	RMSEA
Small model	88	71	1.24	.991	.958	.031
Total model	624	510	1.22	.975	.881	.030
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05

Nevertheless, the estimates of coefficients (Table 7-35) in both models are approximately the same and indicate that just one part of the hypothesis (part b) is supported by the data. In other words, based on analysed outcomes of these data, "improvement in accounting system" is only associated with the extent of "competitive position" that the universities are facing.

Table 7-35) Statistics regarding the test of hypothesis one (technical improvements in accounting systems) (n=246)

Dependent variable	Independent variable	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
IMPACC	DECENT	.048	.064	.747	.455	.055	.082	.673	.501
IMPACC	FINPRE	.078	.071	1.094	.274	.116	.092	1.259	.208
IMPACC	COMPOS	.563	.113	4.965	***	.723	.143	5.053	***

It should be recalled that, for measuring "improved accounting system", two distinct factors resulted from exploratory and confirmatory factor analyses. As was discussed earlier (section 7-3-4), the total model in this regard was constructed based on that factor which consists of items about the improvement in technical aspects of accounting system. Nonetheless, it seems worthwhile replacing that factor with the "general improvement in accounting system" to see the differences between them in terms of the proposed hypothesis. By employing the items emphasising the general features of accounting system, the results will be slightly different as the association

between "improved accounting systems" and "decentralization", as another contingent variable, is also confirmed. Table 7-36 shows the estimation of relationships between those variables.

Table 7-36) Statistics regarding the test of hypothesis one (general aspects of accounting system) (n=246)

Dependent variable	Independent variable	Estimate	S.E.	C.R.	P
IMPACC	DECENT	.139	.040	3.488	***
IMPACC	FINPRE	.057	.043	1.325	.185
IMPACC	COMPOS	.245	.068	3.627	***

Of course it is vital to mention that this model does not fit the data as well as the previous; hence the indices of fit are deteriorating for this model. Nevertheless, it might be possible to interpret this difference by suggesting that "decentralization", as a contingent variable, may affect the general aspects of universities' accounting system, whereas "competitive position" could encourage universities to improve the technical aspects of their accounting systems. Examples of general aspects are "demand for different accounting reports", "speed of preparing accounting reports", and "use of independent auditing", whilst "use of non-financial information", "use of new techniques of management accounting", and "computerising accounting practices" are instances of technical features in an accounting system. So, in terms of technical improvement in accounting systems **just one part of the first hypothesis, part b, is supported**.

7-5-2. Test Results of Hypothesis Two

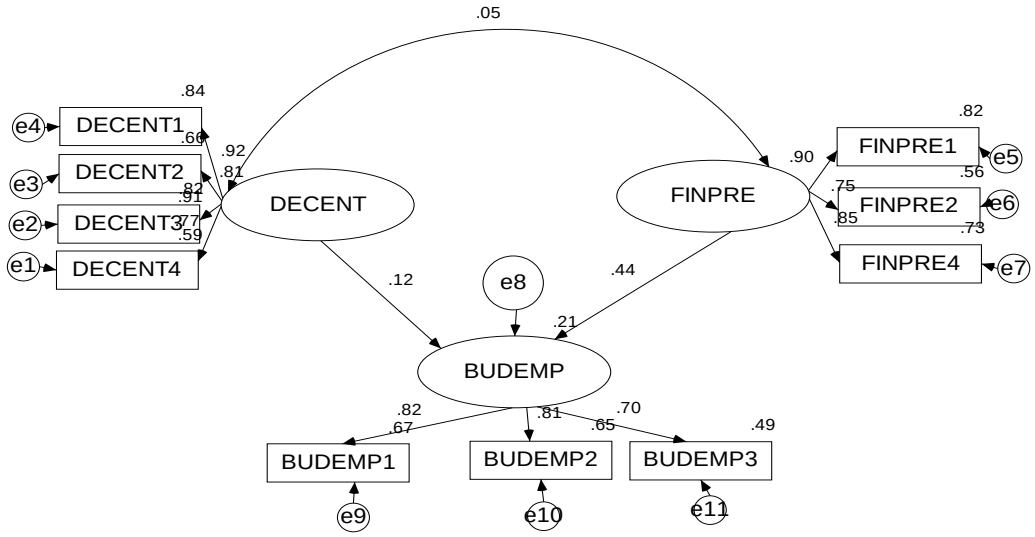
In the second hypothesis it is suggested that the extent of "budget emphasis" in Iranian universities is associated with "decentralization" and "financial pressure. The precise form of that hypothesis is as follows:

H2. Iranian Universities which are (a) more "decentralized" and (b) facing "higher financial pressure" put more "emphasis on budget control".

The model and variables regarding this hypothesis exclusively are shown in Figure 7-14. The estimations reported in the diagram are in standardized form and show that 21

per cent of variances regarding the "budget emphasis" are explained by "decentralization" and "financial pressure" as two related contingent variables. The standardized regression weights are 0.12 and 0.44 respectively.

Figure 7-14) Exclusive structural model for hypothesis two (n=246)



The indices of fit for this model are, as expected, better than the related total model. Table 7-37 illustrates the results of the statistical tests on this hypothesis and also compares the statistics of the total model in this matter. As can be seen from the Table, there are no meaningful differences among the estimates of the two models.

Table 7-37) Statistics regarding the test of hypothesis two (n=246)

Dependent variable	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimates	S.E.	C.R.	P
BUDEMP	DECENT	.115	.066	1.747	.081	.114	.066	1.721	.085
BUDEMP	FINPRE	.490	.081	6.061	***	.489	.080	6.094	***

Although **both parts of this hypothesis are supported by these results,** the relationship between "budget emphasis" and "decentralization" is not so strong (with just a 10 per cent level of significance), but that relationship is very significant for "financial pressure".

7-5-3. Test Results of Hypothesis Three

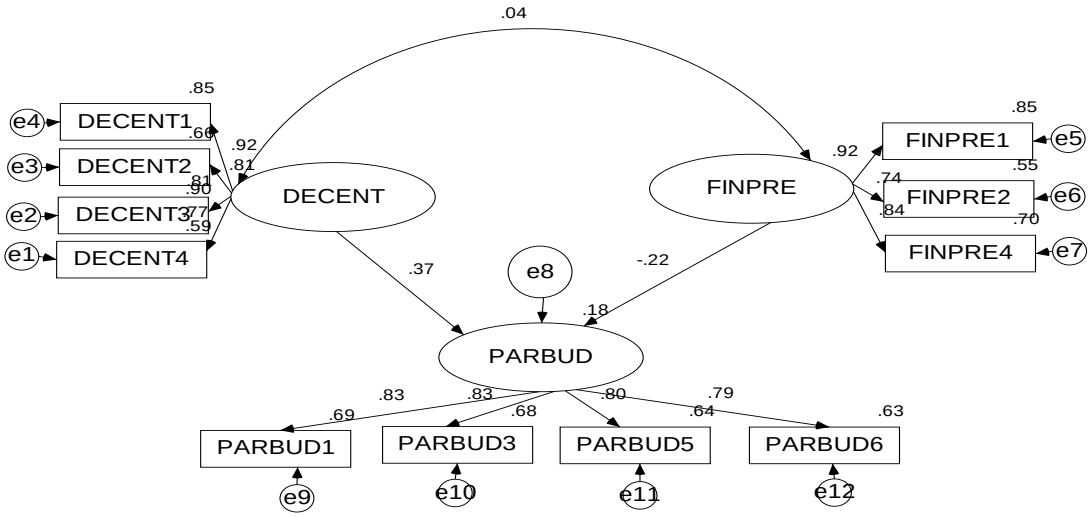
The third hypothesis claims a positive association between "decentralization" and "participative budgeting" on the one hand, and a negative relationship between

"financial pressure" and "participative budgeting" on the other hand. In other words hypothesis three suggests the following:

H3. "Participative budgeting" in Iran's universities is associated (a) positively with "decentralization", but (b) negatively with "financial pressure".

The diagram below (Figure 7-15) is the outcome of the test of this hypothesis with the collected data using SEM analysis by Amos. It is just a part of the proposed total model regarding the accounting aspects of Iranian universities. As this model is smaller and simpler than the total model, as expected the fit with the data is also better.

Figure 7-15) Exclusive structural model for hypothesis three (n=246)



The regression coefficients of latent variables can be seen in Table 7-38 according to two versions of the model: an exclusive model and part of a comprehensive model (total model). In spite of some slight differences between estimates in two cases, the final results are identical, **so the proposed hypothesis is confirmed at one per cent level of significance based on these tests and statistics**. However, this information indicates that the positive association of "participative budgeting" with "decentralization" is stronger and safer than its negative association with "financial pressure".

Table 7-38) Statistics regarding the test of hypothesis three (n=246)

Dependent variable	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
PARBUD	DECENT	.317	.058	5.460	***	.323	.059	5.464	***
PARBUD	FINPRE	-.209	.064	-3.274	.001	-.219	.066	-3.313	***

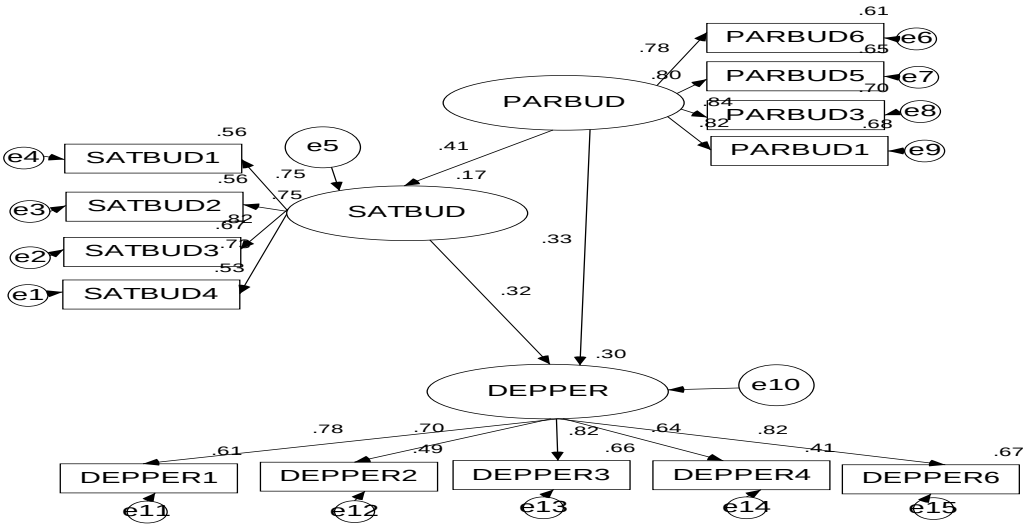
7-5-4. Test Results of Hypothesis Four

The fourth hypothesis is about direct and indirect (through creating "satisfaction with budgets" for the Departments) positive association between "participative budgeting" and "universities' departmental performance". The exact wording of this hypothesis is as follows:

H4. Iranian "Universities' departmental performance" is (a) positively related to "participative budgeting" and (b) mediated by "satisfaction with budgets".

The exclusive model for this hypothesis is as shown in Figure 7-16 which indicates the direct and indirect path of the effect of "participative budgeting" on "departmental performance". In fact, in this hypothesis the mediating effect of "satisfaction with budgets" on the relationship between "participative budgeting" and "departmental performance" is also tested. As was discussed in section 5-3-4 of chapter 5, the most popular procedure in mediation testing is the method proposed by Baron and Kenny (1986) which requires two simple regression analyses and one multiple regression analysis to be conducted. Some limitations to Baron and Kenny's (1986) method have been stated and several other methods have been proposed and compared in other studies (MacKinnon et al., 2002). An alternative test of mediation effect was proposed and developed by Sobel and Leinhardt (1982) for structural equation models. Their emphasis is on assessing the strength of indirect effect between independent and dependent variables.

Figure 7-16) Exclusive structural model for hypothesis four (partial mediation) (n=246)



SEM can increase the robustness of the mediation test in four ways: 1. path coefficients can be estimated in one run and simultaneously rather than using several regression analyses, should the researcher wish to use the method of Baron and Kenny (1986); 2. by deleting or adding some paths, test and comparison between competing models in terms of fitness to the related data can be conducted (MacKinnon et al., 2002); 3. when there is a more complex model or multiple mediations (Williams et al., 2009); and 4. by estimating a new standard error for indirect effect using bootstrapping technique, the risk of probable deviation from normality is eliminated (MacKinnon et al., 2002).

Based on the above explanations and statistics in Table 7-39, the mediating effect of "satisfaction with budgets" on relationships between "participative budgeting" and "departmental performance" is confirmed as it can meet two key conditions of mediation. Two main conditions for mediation are "significant association between predictor and mediator variables" on the one hand, and between "mediator and outcome variables" on the other hand (Kenny et al., 1998).

Table 7-39) Statistics regarding the test of hypothesis four (n=246)

Dependent variables	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
SATBUD	PARBUD	.409	.073	5.561	***	.412	.073	5.638	***
DEPPER	PARBUD	.271	.063	4.312	***	.270	.064	4.240	***
DEPPER	SATBUD	.267	.064	4.175	***	.259	.062	4.175	***

Unfortunately Amos does not provide the test of significance for indirect effects, although it does compute the value of indirect effects in both standardised and non-standardised forms. Therefore, to check the significance of indirect effect, the product of coefficients of indirect paths should be divided into a new standard error for indirect path. Standard error for indirect path can be calculated based on the proposed formula by Sobel (1982). That formula is as below:

$$\sqrt{b_1^2 s_2^2 + b_2^2 s_1^2 + s_1^2 s_2^2}$$

Where:

b_1 and s_1 are respectively association coefficients and standard error of "participative budgeting" and "satisfaction with budgets".

b_2 and s_2 are respectively association coefficients and standard error of "satisfaction with budgets" and "departmental performance".

In this case the product of indirect path coefficient is 0.109 (0.409* 0.267), which has also been computed by Amos. The value of standard error for indirect path according to the aforementioned formula would be computed as 0.035. By dividing the product of path coefficient (0.109) into the standard error, critical ratio would be calculated as 3.114, which is significant in terms of statistical test. Overall, the total effect of "participative budgeting" on "departmental performance" is 0.380 which consists of 0.271 direct effects and 0.109 indirect effects. As was mentioned earlier, both direct and indirect effects are confirmed at a 0.01 level of significance.

It is argued that computing standard error for indirect path using Sobel's (1982) formula is based on the assumption that the multivariate normality would remain unchanged in the new situation but this is not true in every case; so, to overcome this problem the bootstrapping technique in SEM could be helpful (Williams et al., 2009). By conducting a bootstrap for this model with 500 bootstrap samples and a 0.90 bias-corrected confidence interval, new standard errors are achieved, so a standard error for indirect path is computed without assumption of normal distribution. This new standard error is 0.043 which is slightly more than before one (0.035); nevertheless, the significance of indirect association is confirmed at the 0.05 level (0.109 / 0.043 = 2.535).

One of the advantages of SEM in assessment of mediation models was mentioned as its ability to test competing models such as complete mediation or full mediation. Kenny *et al*. (1998) believe that, in the social science area, the idea of a complete mediation model is not very realistic, so they proposed the existence of significant direct association between predictor and criterion variables as one condition for mediation. Therefore, in terms of SEM, full mediation exists where the mediation model with defined direct path has less fit with the data than the model without direct path (Frazier et al., 2004, Xanthopoulou et al., 2007). To test these two models, the

direct path from "participative budgeting" toward "departmental performance" was removed and the programme was performed. The new model looks like Figure 7-17.

The comparison of fit indices (Table 7-40) shows that the model with partial mediation has a better fit with the data than the proposed model with full mediation and is consistent with the claim of Kenny *et al.* (1998).

Figure 7-17) Exclusive structural model for hypothesis four (full mediation) (n=246)

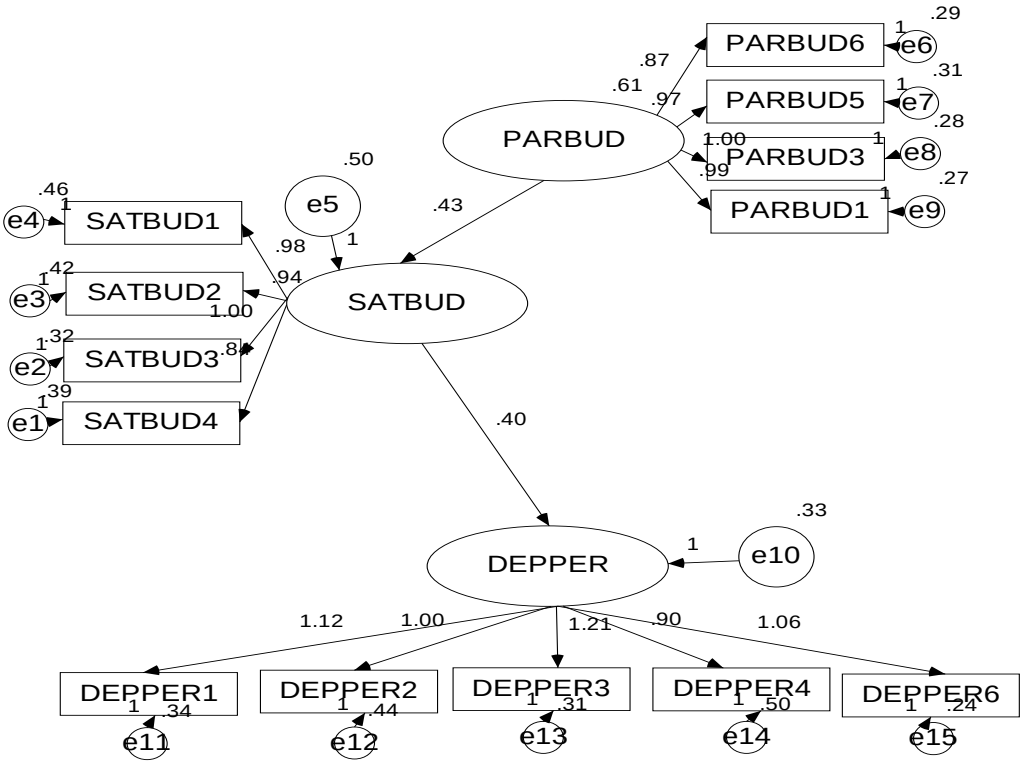


Table 7-40) Comparison between indices of fit for partial and full mediation regarding hypothesis four (n=246)

Model / Index	**CMIN**	**DF**	**CMIN/DF**	**CFI**	**NFI**	**RMSEA**
Partial mediation	82.4	62	1.33	.987	.950	.037
Full mediation	102.2	63	1.62	.975	.938	.050
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05

To test the superiority of the model with partial mediation over the other one, the discrepancy between chi-squares and degrees of freedom can be computed and checked with the Chi-square Statistic Table. These differences are 19.8 and 1 respectively, which shows a significant difference between these two models (according to the Chi-square Table for 1 degree of freedom, values greater than 6.64 are significant at the level of 0.01). Therefore, in this case, only partial mediation (not full mediation) is confirmed. As a result of the above-mentioned tests and explanations it can be claimed that **the fourth suggested hypothesis is confirmed in both parts, part a, and part b**. Of course the mediation suggested between "participative budgeting" and "departmental performance" proposed in part b should be considered partial mediation, to use a precise and technical word.

7-5-5. Test Results of Hypothesis Five

The fifth hypothesis suggests a positive association between "improved accounting system" and "departmental performance" both directly and indirectly by creating "competitive advantage" for the departments. The exact wording of the proposed hypothesis in this regard is as below:

H5. Iranian "Universities' departmental performance" is (a) positively related to "Improved accounting system" and (b) mediated by "competitive advantage".

Indices of fit regarding the model related just to this hypothesis (except for NFI which is due to the model size) are surprisingly worse than the total model's indices (Table 7-41). This may imply that the estimates of this model cannot be preferred to the total model's estimates, but the comparison still seems interesting. The schematic presentation of this model is shown as Figure 7-18.

Table 7-41) Comparison between indices of fit for small and total model regarding hypothesis five (n=246)

Model / Index	CMIN	DF	CMIN/DF	CFI	NFI	RMSEA
Small model	86.9	62	1.40	.970	.957	.041
Total model	624	510	1.22	.975	.881	.030
Acceptable values	N/A	N/A	Less than 3	More than .9	More than .9	Less than .05

Table 7-42 shows the estimate of regression weights concerning the latent variables of this model and hypothesis as a comparison between two models. It should be mentioned that these estimates result from a bootstrapped analysis of two models because the observed variables related to this part of the model have the largest deviation from normal distribution.

Figure 7-18) Exclusive structural model for hypothesis five (n=246)

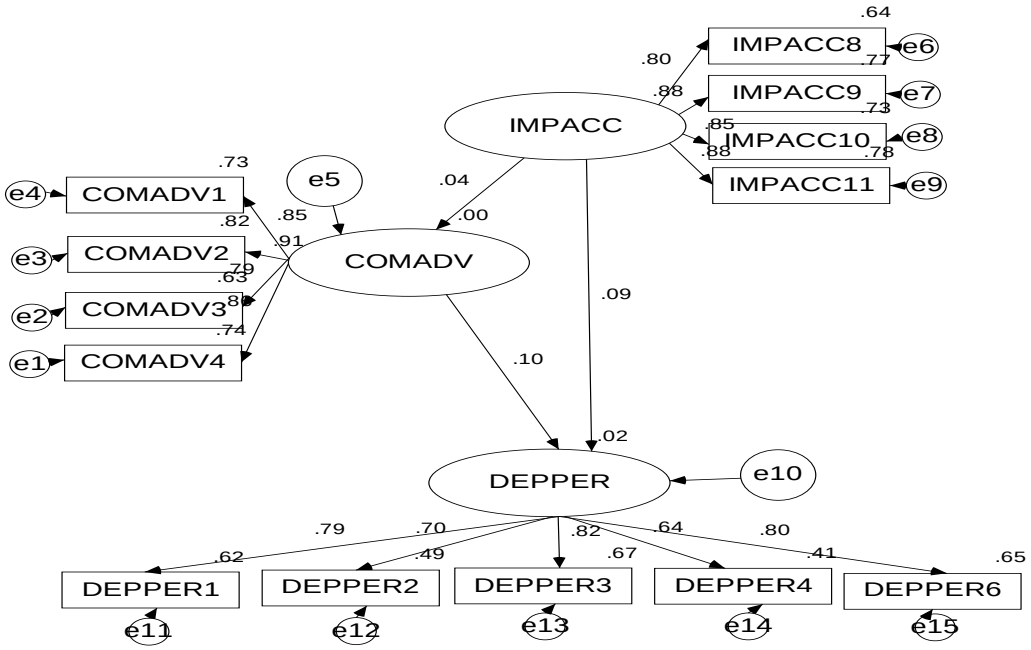


Table 7-42) Statistics regarding the test of hypothesis five (n=246)

Dependent variables	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
COMADV	IMPACC	.030	.046	.652	.529	.033	.051	.647	.536
DEPPER	IMPACC	.063	.054	1.166	.220	.079	.044	1.795	.061
DEPPER	COMADV	.091	.072	1.264	.202	.052	.050	1.040	.335

As can be seen from the above statistics, there is no significant association among variables; however, based on the total model's outcomes, the **association between "improved accounting system" and "departmental performance" is significant at the level of 0.10 which also might not be considered very strong.** Nevertheless, if it can be said that estimates of the total model, which result from a more holistic or system approach, are closer to the real-world situation (Chenhall, 2003, Van de Ven and

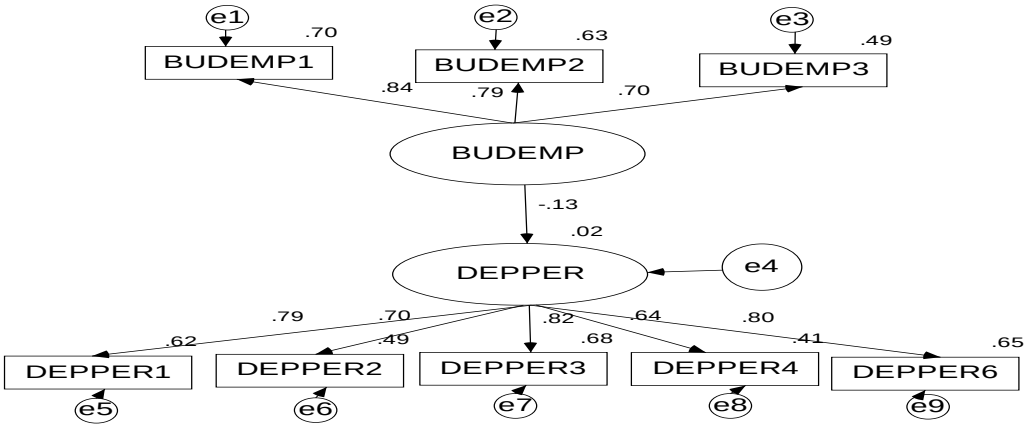
Drazin, 1985), it could be claimed that there is a significant positive association between "improved accounting system" and "performance". In any circumstances, if it can be claimed that there is a positive and direct association between "improved accounting system" and "departmental performance" to some extent, no sign of an indirect relationship through the creation of "competitive advantage" can be found according to these data and this analysis. It would be interesting to look at the distribution of effects for this hypothesis. Standardized total effect between "improved accounting system" and "departmental performance" is 0.094 which is made up of 0.090 direct effects and only 0.004 indirect effects. Although neither direct nor indirect effects are significant, the share of each one implies that the mediation role of "competitive advantage" in the relationship between "improved accounting system" and "departmental performance" in Iranian universities should be rejected. Thus, **part (a) of Hypothesis Five is weakly confirmed, but its part (b) clearly should be declined**.

7-5-6. Test Results of Hypothesis Six

As the content of the sentence below indicates, in the sixth hypothesis the negative effect of "more budget emphasis" on "universities' departmental performance" has been proposed:

H6. Iranian "Universities' departmental performance" is negatively associated with "more emphasis on budget controls".

Figure 7-19) Exclusive structural model for hypothesis six (n=246)



The diagram Figure 7-19 shows the SEM model related just to this hypothesis. This model also has a better fit with the data than the total model in all aspects, as was expected. For this hypothesis, too, there is a difference between estimates in exclusive

and total models to some extent. This difference can be found in Table 7-43. Although, according to both results, the negative direction for this proposed association has been confirmed, the significance cannot be confirmed in the total model (which can be considered more reliable in terms of being analogous to the real world). The results of the exclusive model do not show a strong relationship between them, however. Thus, **the sixth hypothesis cannot be confirmed, although the direction of the relationship is as expected**.

Table 7-43) Statistics regarding the test of hypothesis six (n=246)

Dependent variables	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
DEPPER	BUDEMP	-.131	.077	-1.072	.089	-.047	.048	-.984	.325

Table 7-44 summarises the outcome of the test of the hypotheses proposed in the Accounting System Model. This Table indicates that 3 out of 6 hypotheses (H2, H3, and H4) are fully supported whereas just one (H6) hypothesis is rejected. Two of them (H1 and H5) are supported in some parts and rejected in the others.

Table 7-44) Summary of hypotheses test results regarding the "Accounting System Model"

H no.	Content of hypothesis	Result of test
H1	Association between "improved accounting system" and: a. "decentralization" b. "competitive position" c. "financial pressure"	 rejected confirmed*** rejected
H2	Association between "emphasis on budget control" and: a. "decentralization" b. "financial pressure"	 confirmed*** confirmed***
H3	Association between "participative budgeting" and: a. "decentralization" (positively) b. "financial pressure" (negatively)	 confirmed* confirmed***
H4	Association between "departmental performance" and: a. "participative budgeting", directly b. "participative budgeting" via "satisfaction with budgets"	 confirmed*** confirmed***
H5	Association between "departmental performance" and: a. "improved accounting system", directly b. "improved accounting system" via "competitive advantage"	 Confirmed* rejected
H6	Association between "departmental performance" and "emphasis on budget controls"	rejected

*** 1%, ** 5%, *10% level of significance

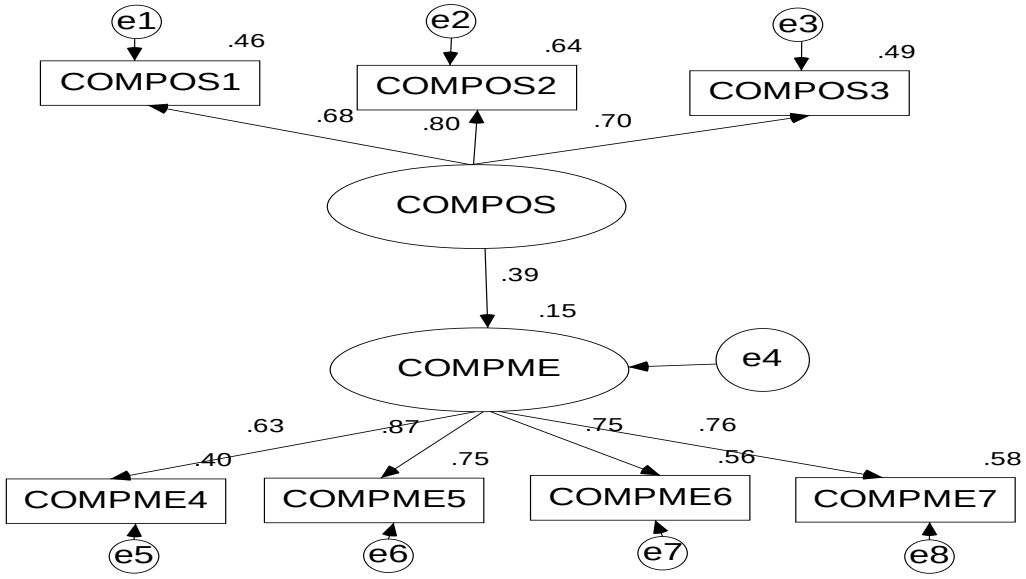
7-5-7. Test Results of Hypothesis Seven

In the seventh hypothesis it has been suggested that "competitive position" increased the importance of employing some other performance measures instead of just relying on traditional quantitative performance measures for employees' performance evaluation. The concise wording of this hypothesis is as follows:

H7. Use of "comprehensive performance measures" is considered more important for those Iranian universities that are facing more intense "competition".

The exclusive model for this hypothesis looks like Figure 7-20, which has been obtained from SEM analysis by Amos. As can be seen in the Figure, standardised association between these two latent variables is 0.39 and "competitive position" explains 0.15 of variances regarding the "comprehensive performance measures".

Figure 7-20) Exclusive structural model for hypothesis seven (n=246)



The regression weight between these two variables is presented in Table 7-45, based on different analyses in both exclusive model and total model. Although there is a minor discrepancy between estimates in the two models, it does not change the significance of association among them. Thus, **it can be concluded that the seventh proposition is supported by the data**.

Table 7-45 Statistics regarding the test of hypothesis seven (n=246)

Dependent variables	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
COMPME	COMPOS	.626	.131	4.758	***	.572	.121	4.733	***

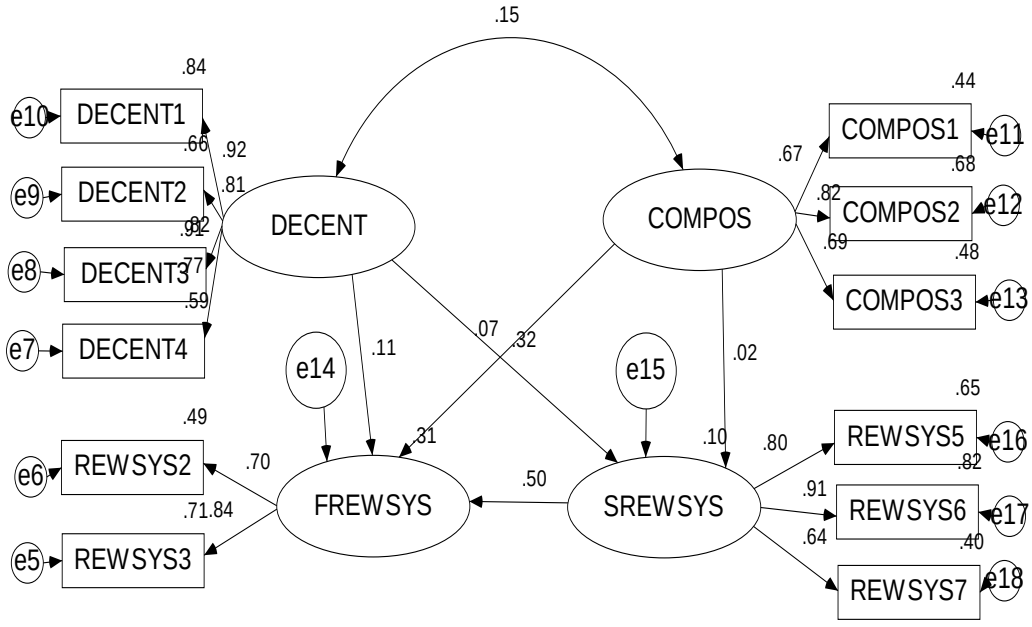
7-5-8. Test Results of Hypothesis Eight

The claim of the eighth hypothesis is that "competitive position" and "decentralization", as two contingent variables, could improve the universities' "reward system" to establish a better linkage with employees' performance. In other words, hypothesis 8 proposes the following:

H8. The "improvement of Iranian universities' reward system" is associated with (a) their level of "decentralization" and (b) intensity of "competition".

It might be useful to recall that, after exploratory factor analysis followed by confirmatory factor analysis and the building of the related measurement model, it seemed essential to distinguish between the two elements of universities' reward system (faculty members' reward system and other staff's reward system) and treat them as two distinct variables. Therefore the model related just to this hypothesis is something similar to the diagram below (Figure 7-21).

Figure 7-21) Exclusive structural model for hypothesis eight (n=246)



Regression weights regarding these variables can be found in Table 7-46. Hence, there was some difference between the results from normal SEM analysis and bootstrapped analysis in connection with these variables; the estimates below are based on bootstrapped results to provide an assurance that the probable bias of non-normality has been removed. According to these statistics it is evident that "staff's reward system" is significantly associated with "decentralization (β=0.322 or 0.321 and p=0.000); however, the association with "faculty members' reward system" is not as significant (β= 0.113 and p= 0.099). Nevertheless, there is no evidence to confirm any significant association between "competitive position" and either part of the universities' "reward system". Therefore it can be concluded that, in connection with this hypothesis, **just part (a) indicating a positive relationship between "decentralization" and "reward system", is confirmed with different strengths for two components of reward system, but part (b) claiming an association between "competitive position" and "reward system" should be rejected.**

Table 7-46) Statistics regarding the test of hypothesis eight (n=246)

Dependent variables	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
FREWSYS	DECENT	.113	.072	1.569	.099	.113	.072	1.569	.099
SREWSYS	DECENT	.322	.071	4.535	***	.321	.071	4.421	***
FREWSYS	COMPOS	.108	.143	.755	.439	.121	.144	.840	.436
SREWSYS	COMPOS	.030	.118	.254	.751	.032	.118	.271	.756

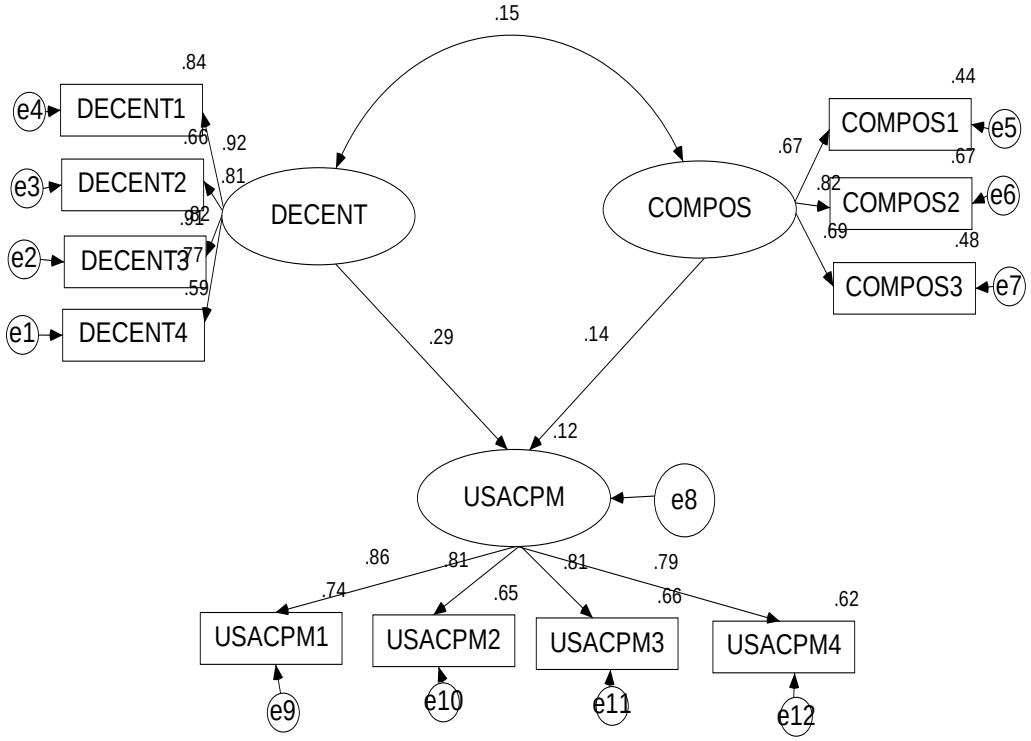
7-5-9. Test Results of Hypothesis Nine

The ninth hypothesis claims that "decentralisation" and "competitive position" would encourage the universities' managers to increase their usage of accounting information in various aspects of performance management. The exact wording of this hypothesis is as below:

H9. The extent of "usage of accounting information in performance management" by Iranian universities is related to (a) their level of "decentralization" and (b) intensity of "competition".

That part of the total model which is just about this hypothesis as a distinctive model designed and executed by Amos to give a kind of cross-check result is shown as Figure 7-22. As the diagram below illustrates, standardised associations between "competitive positions" (COMPOS) and "decentralization" (DECENT) with "use of accounting information in PM" (USACPM) are 0.14 and 0.29 respectively.

Figure 7-22) Exclusive structural model for hypothesis nine (n=246)



Unstandardised regression weights between these variables along with the results of a significance statistical test are presented in Table 7-47. To be sure of avoiding bias due to any non-normality the bootstrap analysis was performed for this model as well (requesting 500 samples and a 0.90 bias-corrected confidence interval). Therefore, the information below is based on the corrected results of bootstrapped analysis for this hypothesis.

Table 7-47) Statistics regarding the test of hypothesis nine (n=246)

Dependent variable	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
USACPM	DECENT	.282	.069	4.087	.006	.283	.070	4.043	.006
USACPM	COMPOS	.204	.094	2.170	.042	.206	.095	2.168	.045

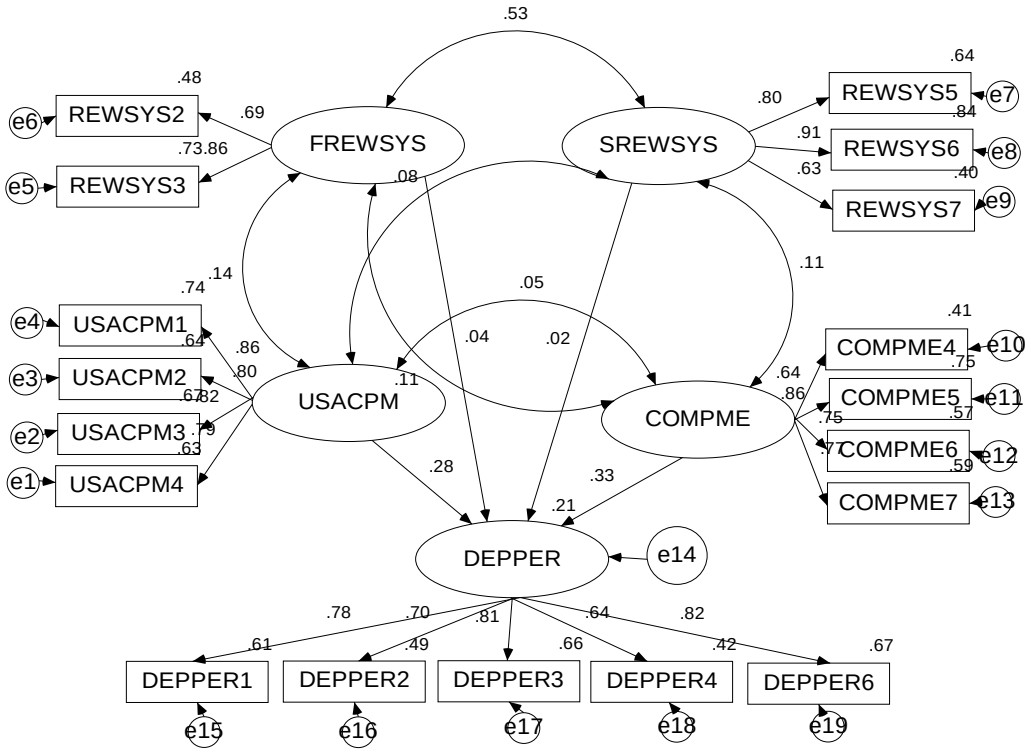
According to this information the effect of "decentralisation" on "use of accounting information in PM" with $\beta = 0.282$ and p= 0.006 is revealed as significant at the 0.01 level. Likewise, the extent of "use of accounting information in PM" is related to "competitive position" with $\beta = 0.204$ and p= 0.045 at the 0.05 level of significance. Thus **hypothesis nine is supported by the data in both its parts, although the association of dependent variable with "decentralization" is stronger than "competitive position"**.

7-5-10. Test Results of Hypothesis Ten

In the tenth hypothesis, it is suggested that "improvement in reward system", "use of comprehensive performance measures", and "use of accounting information in PM" are positively associated with "departmental performance". In other words:

H10. Iranian Universities' departmental performance is positively related to (a) "improved reward system", (b) importance of "comprehensive performance measures" and (c) "use of accounting information in performance management".

Figure 7-23) Exclusive structural model for hypothesis ten (n=246)



The latent variables concerning this hypothesis were employed to build the exclusive model conveying just these relationships and the result of running it by Amos is shown in Figure 7-23. As can be seen in this Figure, standardised associations between two parts of "reward system" and "performance" are about .04 and .02, but for other two factors they are .28 (use of accounting information in PM) and .33 (comprehensive performance measures). The diagram also indicates that, together, these variables have explained 21% variances of "departmental performance".

Table 7-48) Statistics regarding the test of hypothesis ten (n=246)

Dependent variable	Independent variables	Exclusive model				Total model			
		Estimate	S.E.	C.R.	P	Estimate	S.E.	C.R.	P
DEPPER	SREWSYS	.018	.061	.297	.767	.016	.055	.290	.772
DEPPER	FREWSYS	.032	.065	.498	.618	.035	.064	.542	.588
DEPPER	USACPM	.212	.053	3.987	***	.210	.053	3.974	***
DEPPER	COMPME	.237	.052	4.531	***	.240	.053	4.553	***

Table 7-48 illustrates regression weights between independent and dependent variables of this hypothesis in two forms of the model including exclusive and related total models. As is evident from the Table above, there is no meaningful difference among the results of these two models and, based on both of them, no association among "reward system" (neither related to faculty members nor for other staff) because β values are .018 and .032, and p values are .767 and 0.618. Conversely, use of "comprehensive performance measures" and "accounting information in PM" are significantly related to "departmental performance" (with β = 0.24 and p = 0.000, and β = 0.21 and p = 0.000 respectively). It might be useful to mention that there is no such difference between these outcomes and bootstrapped results of the analyses in connection with this hypothesis. Therefore, **it can be claimed that two parts of this hypothesis (sections b and c) are supported, but the other part (section a) is rejected according to these data and their analysis.**

Table 7-49 illustrates a summary of hypothesis-testing results regarding the Performance Management Model. It indicates that 2 out of 4 hypotheses are confirmed in all parts (H7 and H9), but the other two (H8 and H10) are supported only in parts.

Table 7-49) Summary of hypotheses test results regarding the "Performance Management Model"

H no.	Content of hypothesis	Result of test
H7	Association between importance of "comprehensive performance measures" and " competitive position"	confirmed***
H8	Association between "improvement in reward system" and: a. "decentralization" b. "competitive position"	 confirmed***[81] rejected
H9	Association between "usage of accounting reports in PM" and: a. "decentralization" b. "competitive position"	 confirmed*** confirmed**
H10	Association between "departmental performance" and: a. "improved reward system" b. "comprehensive performance measures" c. "usage of accounting reports in PM"	 rejected confirmed*** confirmed***

*** 1%, ** 5%, *10% level of significance

7-5-11. Test Results of Hypothesis Eleven

As was discussed in the section 4-5-3 of the Methodology chapter, several discrepancies are expected regarding some of the associations between proposed variables in the two main models of this study. According to this expectation, two models were rerun after dividing all cases into three groups based on their departments, and the outcomes were assessed in section 4-3 of this chapter. This eleventh hypothesis and four other hypotheses are about these suggested differences. The precise wording of the eleventh hypothesis is as below:

H11. The positive relationship of "participative budgeting - satisfaction with budgets - performance" in Research and Education Departments is stronger than in Financial Departments.

To test this hypothesis, two steps can be executed by SEM analysis. The first phase assesses whether there are any differences between various departments' reactions to the proposed relationship in this hypothesis; in the second phase the power of

[81] Association with "faculty members' reward system is very weak (10% level of significance), however.

association in each department is analysed. To perform the first phase, the Accounting System model which was formed for three subsamples is rerun by constraining the association of direct and indirect paths between "participative budgeting", "satisfaction with budgets" and "performance" to be equal for all groups. If the fit indices for the new version of the model are statistically worse than for the previous one (the model without constraints), it can be deduced that the groups differ in regard to these relationships; otherwise, the reaction of all departments should be assumed the same (Byrne, 2001). Table 7-50 illustrates the comparison results of two forms of the above-mentioned model: versions with and without limitations of associations.

Table 7-50) Comparison between indices of fit for free and constrained models regarding hypothesis eleven (n=246)

Model / Index	CMIN	DF	CMIN/DF	CFI	NFI	RMSEA
Free model	1910	1530	1.25	.921	.707	.032
Constrained model	2088	1539	1.36	.886	.680	.038
Differences	178	9	0.16	-.035	-.027	.006

As can be seen from the Table above, all indices have become worse after the programme was asked to suppose that the relationships between proposed variables are identical for all of the Departments. To assess whether this worsened state is statistically significant, the computed difference of Chi-square should be compared with the significant amount of Chi-square at 9 degrees of freedom. Significant amounts of Chi-square with 9 degrees of freedom at the 0.05 and 0.01 levels are 16.92 and 21.67 respectively. Therefore, the difference between groups in this regard is supported. To accomplish the second phase, it might be sufficient to compare the standardised coefficients between variables in each group. These statistics which are indicated in Table 7-31 show that direct effect of "participative budgeting" on "performance" in Education Departments (0.385) and Research Departments (0.256) is larger than in Financial Departments (.161).

Table 7-51) Statistics regarding the test of hypothesis eleven (n=246)

Type of effects	Education Dep. (n=82)	Research Dep. (n=81)	Financial Dep. (n=83)
Direct effects	.385***	.256**	.161
Indirect effects	.022	.251**	.222**
Total effects	.407***	.507***	.383***

*** 1%, ** 5%, *10% level of significance

Although the hypothesis could not be supported in terms of indirect effect (indirect effect in Education departments is less (0.022) than in Financial Departments (0.222)), **the comparison of total effects also confirms the proposed hypothesis.**

7-5-12. Test Results of Hypothesis Twelve

The twelfth hypothesis claims that Education and Research Departments are expected to suffer more than Financial Departments in the event of "more budgets emphasis". In other words, this proposition says:

H12. The negative relationship of "more budget emphasis - performance" in Research and Education Departments is stronger than in Financial Departments.

Similarly, to the previous hypothesis, two steps of testing are performed with this hypothesis. In the first phase, the associations between "budget emphasis" and "performance" are set as equal for all groups of Departments, and the model is executed again. The comparative results concerning the fit indices in two forms of the model are presented in Table 7-52 and confirm that the constrained model is much worse than the original one, as the difference of Chi-square in two models for 3 degrees of freedom would exceed the related values in the Chi-square Table (7.81 and 11.34 at 0.05 and 0.01 levels of significance, respectively). The significance of the differences between groups in this matter is revealed.

Table 7-52) Comparison between indices of fit for free and constrained models regarding hypothesis twelve (n=246)

Model / Index	CMIN	DF	CMIN/DF	CFI	NFI	RMSEA
Free model	1910	1530	1.25	.921	.707	.032
Constrained model	2042	1533	1.33	.895	.687	.037
Differences	132	3	0.08	-.026	-.020	.005

As a second check, the standardized regression weight between "budget emphasis" and "performance" is compared for all groups. These statistics are presented in Table 7-53. Even if the association between these two variables is not statistically significant, these statistics do not confirm the proposed hypothesis. It seems necessary to mention that running the analysis by requesting 500 samples bootstrapping did not cause any significant differences in the results. Anyway, the outcome of this hypothesis might be considered as confirmatory evidence that, in the event of financial pressure followed by more emphasis on budgets, priority for budget distribution is given to Education and Research Departments rather than Financial Departments. **Therefore, and contrary to expectations about this hypothesis, the results suggest that, in the situation of financial pressures followed by more "emphasis on budget controls", Financial Departments are suffering more than other Departments.** This is might be due to this point the activities of Education and Research Departments are considered the main objective of the universities and, so the priority of budget distribution is always given to them. **Therefore, Hypothesis 12 should be declined.**

Table 7-53) Statistics regarding the test of hypothesis twelve (n=246)

Dependent variable	Independent variable	Education Dep.)	Research Dep.	Financial Dep.
DEPPER	BUDEMP	-.092	-.052	-.120

7-5-13. Test Results of Hypothesis Thirteen

In the thirteenth hypothesis it has been suggested that Financial Managers would assess a stronger association between "improved accounting system" and "performance" both directly and indirectly by creating a "competitive advantage" compared to the other two groups of managers. The exact wording of this hypothesis is as below:

H13. The positive relationship of "improved accounting system - competitive advantage - performance" in Research and Education Departments is weaker than in Financial Departments.

To test whether there are any differences between the three groups of Departments in connection with above-mentioned relationship, the Amos programme was asked to assume that those associations are equal for all groups in the Divisional Accounting System model presented in the 4-3-1 subsection of this chapter. The comparison outcomes regarding the fit indices of two competing models, illustrated in Table 7-54, confirm that these models are undoubtedly different. The magnitude of difference between Chi-squares of two models (385 at 9 degrees of freedom) is very much larger than the least vital values at the 0.05 and 0.01 levels of significance (16.92 and 21.67 respectively). It could be statistically interpreted that the proposed associations in the thirteenth hypothesis have various degrees of strength depending on the groups.

Table 7-54) Comparison between indices of fit for free and constrained models regarding hypothesis thirteen (n=246)

Model / Index	CMIN	DF	CMIN/DF	CFI	NFI	RMSEA
Free model	1910	1530	1.25	.921	.707	.032
Constrained model	2295	1539	1.49	.844	.648	.045
Differences	385	9	0.24	-.077	-.059	.013

After verifying the existence of difference between the groups in this regard, it is necessary to assess in which groups these associations are stronger and in which they are weaker. The standardised values of different types of effects for all three groups of Departments (Table 7-55) show that direct and total effects of "improved accounting system" on "performance" in Financial Departments are very much stronger than in the other two Departments.

Table 7-55) Statistics regarding the test of hypothesis thirteen (n=246)

Type of effects	Education Dep.	Research Dep.	Financial Dep.
Direct effects	.020	.053	.319***
Indirect effects	.007	.017	.003
Total effects	.027	.070	.322***

*** 1%, ** 5%, *10% level of significance

However, the mediation effects of "competitive advantage" on the relationship between "improved accounting system" and "performance" could not be confirmed

even for Financial Departments. Conversely, the indirect effect of "improved accounting system" or mediating effect of "competitive advantage" seems to be stronger in Research Departments, even though that association itself is very much immaterial. To sum up, it can be said that **this hypothesis is just partly confirmed or should be restated as below:**

The positive relationship between "improved accounting systems" and "performance" in Research and Education Departments is weaker than in Financial Departments.

7-5-14. Test Results of Hypothesis Fourteen

The nature and essence of the fourteenth hypothesis is quite similar to the previous hypothesis (thirteenth hypothesis); however there are some differences between these two hypotheses in terms of their area of influence and bases of measurement, as discussed in the methodology chapter. This hypothesis claims that Financial Departments' "use of accounting information in PM" is much more effective than that of the other two types of Departments, Education and Research. The precise wording of the fourteenth hypothesis is as below:

H14. The positive relationship of "usage of accounting information in PM - performance" in Research and Education Departments is weaker than in Financial Departments.

Consistent with the approach employed to test all the hypotheses from number eleven onwards, for this hypothesis this two-step method is used. In the first step, the path from "USACPM" variable (usage of accounting information in PM) to "DEPPER" variable (departmental performance) in the Divisional Performance Management model (presented in subsection 4-3-2 of this chapter) is constrained as equal for all three groups and the model is rerun. Table 7-56 indicates the comparison results of this model and the previous one in terms of fit indices.

Table 7-56) Comparison between indices of fit for free and constrained models regarding hypothesis fourteen (n=246)

Model / Index	CMIN	DF	CMIN/DF	CFI	NFI	RMSEA
Free model	1033	786	1.31	.923	.749	.036
Constrained model	1131	789	1.43	.894	.726	.042
Differences	98	3	0.12	-.029	-.023	.006

It is evident from Table 7-56 that the new model is in a worse situation compared to the original model which was free to compute different regression weights for the paths designated by this hypothesis. Comparing the difference in Chi-squares of two forms of the model (98 with 3 degrees of freedom) with the significant amount in the Table of Chi-squares (7.81 and 11.34 at 0.05 and 0.01 levels of significance, respectively) confirms that these two competing models are significantly different.

Table 7-57) Statistics regarding the test of hypothesis fourteen (n=246)

Dependent variable	Independent variable	Education Dep.)	Research Dep.	Financial Dep.
DEPPER	USACPM	.193*	.109	.550***

In step two, the standardized values of regression coefficients between two proposed variables (indicated in Table 7-57) for three kinds of Departments are compared. As can be seen from the above Table, this coefficient is 0.550 (quite significant) for Financial Departments, but for the other two departments it is either non-significant (Research Departments, 0.109) or just significant at the level of 0.10 (Education Departments, 0.193). **Therefore, according to this data and analyses the fourteenth hypothesis is supported.**

7-5-15. Test Results of Hypothesis Fifteen

The final hypothesis of this study suggests that the use of "comprehensive performance measures" in opposition to "usage of accounting information in PM" (previous hypothesis) for Education and Research Departments is more important than for Financial Departments. In other words, the fifteenth hypothesis claims that:

H15. The positive relationship of "comprehensive performance measures and performance" in Research and Education Departments is stronger than in Financial Departments.

Similarly to the 4 previous hypotheses, to test this hypothesis the existence of discrepancy between groups of Departments concerning the proposed relationship was first assessed, using the technique of competing models in SEM. To do so, the Amos programme was asked to assume that the association coefficient between "COMPME" (comprehensive performance measures) and "DEPPER" (departmental

performance) is identical for all three groups. After executing the model with this imposed constraint, the resulting indices of fit were compared to the fit indices of that model without any constraint of estimation. The comparison of results can be seen in Table 7-58.

Table 7-58) Comparison between indices of fit for free and constrained models regarding hypothesis fifteen (n=246)

Model / Index	CMIN	DF	CMIN/DF	CFI	NFI	RMSEA
Free model	1033	786	1.31	.923	.749	.036
Constrained model	1152	789	1.46	.887	.721	.044
Differences	119	3	0.15	-.036	-.028	.008

As expected, the new form of the model is not as fit as the free model (the model without constraint) as all indices of fit are worse off (Table 7-58). By comparing the differential of Chi-squares of two models with the values of the Chi-square Table, the significance of the difference between these models is revealed. Making sure that the difference is significant for this hypothesis seems more important compared to previous hypotheses because, in this situation, "COMPME" and "DEPPER" are positively related at a 0.01 level of significance in all groups of Departments (Table 7-59). Nevertheless, standardized values relating to these regression weights in Table 7-59 show that this association for Financial Departments is slightly less than for Research Departments, although the association of Research Departments and Education Departments is also different. **In any case, there is no evidence to suggest that the proposed hypothesis in this matter be rejected, so the hypothesis is supported.**

Table 7-59) Statistics regarding the test of hypothesis fifteen (n=246)

Dependent variable	Independent variable	Education Dep.)	Research Dep.	Financial Dep.
DEPPER	COMPME	.360***	.345***	.328***

*** 1%, ** 5%, *10% level of significance

Table 7-60 summarises the test results of proposed hypotheses relating to Differences between Departments. It shows that 4 out of 5 hypotheses (H11, H13, H14, and H15) in this matter are supported, but one of them is declined (H12).

Table 7-60) Summary of hypotheses test results regarding the "Differentials between Departments Model"

H no.	Content of the hypothesis	Result of test
H11	Positive association of "participative budgeting - satisfaction with budgets - performance" at Research and Education Departments is stronger than Financial Departments	confirmed**
H12	Negative association of "more budget emphasis - performance" at Research and Education Departments is stronger than Financial Department	rejected
H13	Positive association of "improved accounting system - competitive advantage - performance" at Research and Education Departments is weaker than Financial Departments	confirmed**
H14	Positive association of "usage of accounting information in PM - performance" at Research and Education Departments is weaker than Financial Departments	confirmed***
H15	Positive association of "comprehensive performance measures and performance" at Research and Education Departments is stronger than Financial Departments	confirmed**

*** 1%, ** 5%, *10% level of significance

7-6. Summary and Conclusion

This chapter has endeavoured to present the results of the data analysis process and perform the hypothesis-testing. To do so, first the different approaches to building an SEM model, including one-step, two-step and four-step methods, were introduced. Next, the design of measurement models underlying all latent variables was explained. In the fourth section of this chapter, total SEM models for the Accounting System, Performance Management, and Differentials between Departments were designed, tested, and their indices of fit and other estimations analysed. In that section, the outcomes of performing bootstrapped analyses for both models, as a way of decreasing the risk of non-normality bias, were presented. In the final section, an exclusive structural model[82] concerning each proposition was designed, assessed, analysed and compared with the results of the related total models to gain more reliable statistics to be employed for judging whether to confirm or reject the hypotheses.

[82] As was explained in section 7-5-1, exclusive model refers to the model encompasses just the variables regarding an individual hypothesis rather than whole model (Echambadi et al., 2006).

The summary tables indicating the outcomes of hypotheses-testing show that 9 out of 15 hypotheses are supported according to the collected data from Iranian governmental universities, although 2 of them should be rejected. Nevertheless, the 4 remaining hypotheses could be confirmed in parts but should be declined in other parts due to lack of supporting evidence. In the next chapter, the researcher will attempt to discuss the implications and consequences of the findings resulting from this study, as well as its contributions and limitations, and some suggestions for future studies.

Chapter Eight
Discussion and Conclusion

8-1. Introduction

The previous chapters have attempted to set out the main parts of this study. The first chapter introduced the motivations, key questions and objectives of the study. The second chapter addressed the characters, situations and influential factors regarding the context of the study from a general perspective (the whole country) and in a particular area (the Higher Education sector) as context and background of this research project. Previous studies and literature related to this study were reviewed in the third chapter in two distinct groups including Contingency-Based accounting studies and studies on Performance Management. The review began with studies regarding the wider area of private organizations, narrowing down to the public sector and finally arriving at the Higher Education sector.

The fourth chapter, the Methodology chapter, conveyed the hypothesis development and theoretical models that resulted from the literature review and extended the research questions. The research philosophy, strategy and paradigm of the study were also introduced in this chapter. An explanation of the sample population, data collection method, and measurement of variables as well as the data analysis techniques also appear in that chapter. In chapter five, the data analysis techniques that have been used in contingency-based studies were briefly reviewed; then the bases and behaviours of SEM as the main data analysis technique of this study were explored. Chapters six and seven presented the collected data descriptively and analytically, and then the results of the hypothesis-testing were stated.

This chapter, as the final chapter of the study, will discuss the findings of this research and its implications. It will continue by highlighting the contributions of this study to methodological and theoretical aspects of the literature as well as its implications for policy-makers. Stating the limitations of the study and addressing some avenues for future studies in this regard will form the final parts of this chapter.

8-2. Summary of the Study

This study attempts to discover the reality of some perceived factors influencing Iranian Governmental universities' accounting system, performance management, and performance. The most important contingent factors that this group of universities has been facing for the last six years are deemed to be "decentralization", "competitive position" and "financial pressure". From another angle, the performance of Iranian universities is not assessed to be at a satisfactory level and there has been a common expectation that their performance needs to be improved, especially in terms of research activities. It cannot be denied that improvement in the governmental universities' performance depends on a combination of causes and variables such as staff, management, budgets, regulations, control systems, programmes and policies, culture, and political views.

Taking into account all the variables affecting the performance of Iran's governmental universities (for example governmental policies, infrastructures, and strategy) in one single study seems to be impossible or at least very problematical (Langfield-Smith, 1997); nevertheless, this does not mean that adopting and investigating some of those factors cannot shed any light on the case. Therefore, it was decided to discover the effect of those contingent variables on different aspects of accounting system and performance management of the universities in the hope of exploring some explanations of their level of performance. A review of the related literature led the researcher to undertake the study in the framework of Contingency Theory; hence, there are enormous amounts of understanding and many propositions that can explain and predict similar situations.

Of course, some problems prevent the researcher from taking advantage of those insights in a straightforward manner. Firstly, most of the studies have been conducted in the context of private companies, so prescription of their findings for the public sector needs considerable care and caution. Secondly, there are some equivocal and even contradictory results in that area, the employment of which could cause some confusion. Thirdly, although there may be a sufficient number of contingency-based studies on accounting systems, the scarcity of those kinds of studies in the area of performance management is quite understandable. Finally, an insufficient number of

contingency-based studies have investigated "financial pressure" in terms of budget constraint in a public organization as a contingent variable, although many studies have looked at "decentralization" and "competitive position" in this framework.

To answer the questions of this study, three aspects of accounting system (improvement in the systems, participation in allocating the budgets, and emphasis on budget controls) and two aspects of performance management at staff level (use of comprehensive measures for evaluating employees' performance and improvement in reward system) alongside "interaction between accounting information and performance management" were chosen. Drawing on related literature several hypotheses (section 4-5), in two models, were developed to assess the association between the proposed contingent variables, the mentioned dimensions of accounting system and performance management, and universities' departmental performance. In addition, two intervening variables including "satisfaction with budgets" and "competitive advantages" were added to the first model. It should be mentioned that five hypothesis were also proposed to assess the discrepancies in the reactions of different groups of departments' performance to changes in accounting system and performance management.

Data were collected during the latter part of 2009 (September to December) via postal questionnaire from all governmental universities in Iran. The number of usable responses, after removing responses with missing values and outliers and influential cases, is 246 so the response rate is 65.1 per cent. Data were analysed using SPSS 17 (at screening and descriptive analysis phase) and Amos 17, a programme of SEM (at advanced analysis and hypotheses-testing phase). A summary of results of the hypotheses-testing, which can be found in Tables 7-44, 7-49, and 7-60 in the previous chapter, indicates that 9 out of 15 hypotheses are supported while 2 should be rejected. The 4 remaining hypotheses could be confirmed in some sections, but should be rejected in other parts. In the next section, these results will be discussed and some implications will be stated.

8-3. Discussions around the Findings

The outcomes of data analyses showed that most of the proposed hypotheses of this research are supported, and this is consistent with overall findings in contingency-based literature. However, some of the propositions have to be rejected, in contrast with mainstream results of contingency-based studies of private companies, so it seems that they need to be explained and discussed as a kind of justification for those discrepancies. As was mentioned in previous chapters, the hypotheses of this study were classified into three groups around Accounting System, Performance Management, and differentials between categories of Department. Therefore, in this section, this classification is continued and implications of the results will be discussed based on that taxonomy.

8-3-1. Accounting System

The results of this study regarding the universities' accounting system can be grouped into two classes as many contingency-based studies have focused just on one part, although several of them have looked at both parts. The first part could be entitled "the effects of contingent variables on different aspects of accounting system" while the second part could be considered as "the consequences of those changes in accounting system aspects for universities' performance".

8-3-1-1. Contingent Factors and Accounting System

8-3-1-1-1. Improved Accounting Systems (H1)

Many contingent constructs have been investigated as factors that could influence different dimensions of organizational control systems including their accounting system and management accounting systems (Chenhall, 2003, Chapman, 1997). In the case of this study it seemed that just three of those constructs might be influential and meaningful, namely "decentralization", "competitive position" and "financial pressure"; however the latter variable is not as prevalent in those kinds of studies. According to the outcomes of hypotheses-testing for this study, those universities which are feeling intense competition from their rivals have tried to improve their accounting systems. This is consistent with most of the studies in this regard (see for example: Khandwalla, 1972, Simons, 1990, Bromwich, 1990, Mia and Clarke, 1999, Ax et al., 2008) although the context is the public sector. This may support the belief

that competition provides certain incentives to increase efficiency (Nickell, 1996). It might also propose the idea that the nature of competition, regardless of its context, needs much more updated information which should be accessible on time as the study by Cavalluzzo *et al*. (1998) confirmed this fact for the case of the Federal Reserve System in the USA. It is also argued that information could create many competitive advantages for all organizations (Porter and Millar, 1999). However, the results of this hypothesis-testing contradict the findings of a recent study showing that intensity of competition is negatively associated with changes in management accounting system, and are even the converse of the original hypothesis in this regard (Ruhana, 2007). Although Ruhana has tried to justify the results by proposing cultural difference and level of a country's development, inconsistency with the mainstream of previous studies in that regard still seems to be problematic. The result of this study somehow negates Ruhana's justification at least in terms of development level of countries, though the extent of development in Iran and Malaysia may be different.

It was mentioned in the previous chapter that the proxies for improved accounting system are mostly about technical aspects of accounting practices such as "employing advanced management accounting techniques" and "automatic reporting", so this result is quite compatible with the findings of Baines and Langfield-Smith (2003). Surprisingly, and inconsistent with the outcomes of a recent study in this area and context (Budding, 2008), no significant association could be found between decentralization and "improved accounting system" in technical aspects. However, decentralization is significantly related to general improvement in accounting system such as "increase in demand for different accounting reports", "speed of preparing accounting reports" and "use of independent auditors". This appears to be quite consistent with the result of Abdel-Kader and Luther's study (2008) which confirms the association between decentralization and sophistication in management accounting system, because they define sophistication of management accounting system as its ability to supply a broad range of information relevant to management needs. This seems quite reasonable and compatible with the definition of decentralization as delegation of more authority for decision-making (the definition adopted by this study) because the more the universities are decentralized, the more they are asked to report on their activities (Sepehri et al., 2004).

In connection with the association between "financial pressure" and "improved accounting system", the result of this study (no significant relationship could be found) supports the findings of Mail *et al.* (2007) claiming that financial pressure in a particular case of the Malaysian public sector could not cause technical and conceptual changes in its management accounting practices. However, it contradicts other previous limited contingency studies (Reid and Smith, 2000). This might be mostly because of differences between the dimensions of accounting system in this research and in those studies, as in three of those studies the emphasis is on cost accounting or management accounting (Orloff et al., 1992, Reid and Smith, 2000, Cavalluzzo et al., 1998), but in this study management accounting technique has been employed just as an indicator among others. In addition, in two of the above-mentioned studies, financial pressure is defined as cash flow crisis and deficit of revenue which is somehow different from governmental budget constraint which is meant by this study as financial pressure. It is interesting to note that in just one group of UK universities – the former Polytechnics – a relationship between financial pressure and accounting system evolution emerged (Broad, 2001). Necessary costs and expenses for developing accounting systems might be able to explain this result for Iranian universities because, in "financial pressure" situations, they do not embark on improving their systems as this could impose extra burdens and pressure on their budgets.

To sum up, it can be stated that improvement in Iranian accounting systems (both of general and technical aspects) is associated with "competitive positions" which they are facing, but "financial pressure" and "decentralization" could not improve their accounting systems; however, the association between "decentralization" and "improvement in general aspect of their accounting systems" is positively significant. In other words, "decentralization" as a contingent variable may affect the general aspects of universities' accounting system, whereas "competitive position" could encourage universities to improve their accounting systems in technical aspects.

8-3-1-1-2. More Budget Emphasis (H2)

It should be borne in mind that 'budget' here means governmental funds that are paid as annual budgets to the universities, so it is different from the budgeting part of cost accounting in private companies. As expected, the analyses confirmed that "financial

pressures" might increase the emphasis put on budget controls. However, this result is consistent with the findings of previous researchers such as Otley (1978) and Imoisili (1989), implying that environmental hostility which resulted from resource limitation and competition would force the managers to perform much more within budget boundaries. It also confirms the argument of Geiger and Ittner (1996) who claim that when public organizations are required to earn parts of their budgets, they will try to implement a more elaborate accounting system and put more emphasis on budget figures and more control on expenses.

Compatible with prevalent literature (for example: Burns and Waterhouse, 1975, Miah and Mia, 1996), the association between "decentralization" and "more emphasis on budgets" is positive and significant at a 0.10 level, although it is not so strong. It seems that the association "financial pressure" with "budget emphasis" is different from the relationship with "decentralization", as Kempkes and Pohl (2008) claim that, according to research, giving more autonomy to the universities will increase their efficiency in budget consumption. Therefore it might be concluded that the effect of each variable on "budget emphasis" could be considered different, as "financial pressure" may create some tensions and conflicts, but "decentralization" could boost the efficiency and productivity (Kempkes and Pohl, 2008). Therefore, the positive association of "financial pressure" and "decentralization" on "more budget emphasis" can be justified, although the nature and extent of each effect may be dissimilar.

8-3-1-1-3. Participative budgeting (H3)

The results of this study show that "participative budgeting" may be encouraged by "decentralization", but can be hampered by "financial pressure". The first part is quite consistent with most contingency-based studies; however, there is nothing directly about the latter part in the literature. As was mentioned in the section 4-5-1-6 of the methodology chapter, many variables and factors such as environmental uncertainty, task interdependence, task uncertainty, superior-subordinate information asymmetry (Shields and Shields, 1998, Kren and Maiga, 2007, Maiga, 2005), and decentralization (Merchant, 1981, Gul et al., 1995b) are considered some of the drivers of participative budgeting in organizations. It is argued that decentralization is also one of the causes of increased information asymmetry (Modell et al., 2000). It should be recalled that most of the studies in this area have been conducted in the context of private

companies; nevertheless, there are some studies that support the priority of participative budgeting over other types of budgeting practices, regardless of the context of implementation. For example, Awio and Northcott (2001) found that, in the Healthcare sector of Uganda, decentralization as the delegation of authority for decision-making could enhance the practice of participative budgeting.

As was mentioned before, nothing could be found in the literature on the direct effect of "financial pressure" on "participative budgeting". However, it was supposed that, from the negative effect of "financial pressure" and "budget emphasis" on "budgetary slack" (Merchant, 1985a, Dunk, 1993a) on the one hand, and the positive association between "participative budgeting" and "budgetary slack" (Young, 1985, Awasthi, 1988, Dunk, 1993a, Van der Stede, 2000, Davila and Wouters, 2005, Kren and Maiga, 2007) on the other hand, it can be concluded that "financial pressure" might negatively impact the "participative budgeting" approach. Interestingly enough, the testing of that hypothesis confirms this proposition, so it can be claimed that "financial pressures", at least in the public sector, might increase the probability of budgeting managers trying to set organizations' budgets in an autocratic manner without seeking other departments' participation and involvement.

To sum up, it seems that the existence of two contradictory variables affecting the Iranian universities' budgeting system simultaneously explains their present situation concerning participative budgeting, which is not at a high level (the statistics in Chapter Six show that computed mean for "participative budgeting" is 3.2, which is less than theoretical mean, 3.5).

8-3-1-2. Accounting System and Performance (H4, H5, and H6)

Propositions 4 to 6 tried to hypothesize the positive association of "improved accounting system" and "participative budgeting", and the negative relationship of "budget emphasis" with the universities' performance. The results of hypotheses-testing revealed that "participative budgeting" (H4), as the most important aspect of accounting system, is related to the universities' performance, both directly and indirectly by creating satisfaction with budgets for the Departments; however, the associations of "improved accounting system" (H5) and "budget emphasis" (H6) with universities' performance are not so remarkable. This is quite consistent with those

findings that claim that budgeting practices are still preferred to other accounting practices in public organizations (Goddard, 2005, Ramadhan, 2009). This discussion is followed by further explanatory details of these hypotheses' results.

As was mentioned before, the fourth hypothesis was confirmed in both parts of direct effect and indirect effect on "Departmental performance", whilst the results of previous studies in this regard are not so consistent and there are some contradictory findings. Many previous studies have found a positive relationship between participative budgeting and performance (for example: Brownell, 1982a, Kenis, 1979, Aranya, 1990, Lau and Tan, 1998, King et al., 2010), although others could not confirm such a relationship (Milani, 1975). Confirmation of this hypothesis not only supports the previous findings in this matter, but could also be considered as one of the limited evidence that the proposition might stretch to the public organizations. It might also be seen as an supportive evidence for the studies which claim that participative budgeting is preferred by different cultures (Frucot and Shearon, 1991) since its context is a developing, Eastern country. In addition, the significance of its indirect effect via "satisfaction with budgets" is consistent with many preceding studies (for example: Brownell, 1981, Mia, 1987, Kren, 1992, Haka and Krishnan, 2005) which showed that some mediating variables could better explain the nature of the relationship between "participative budgeting" and "performance".

The fifth hypothesis' test results indicate that there is no indirect association between "improved accounting system" and "performance" of Iranian universities via "competitive advantage"; however, the direct association is significant although it is not particularly strong (the significance level is 0.10). Positive association between "improved accounting system" and "performance" is consistent with previous studies in the private sector (Ismail, 2007, Bromwich, 1990, Mia and Clarke, 1999, Seaman and Williams, 2006) as well as public organizations (Miah and Mia, 1996, Abernethy and Stoelwinder, 1991). Of course, finding such a modest association may support the idea that, although many accounting techniques are employed in the public sector, only a selected number of key performance indicators are used by most of those organisations (Jackson and Lapsley, 2003).

Nevertheless, in contrast to many previous studies (Bromwich, 1990, Simons, 1990, Hoque et al., 2001), this study could not confirm that "improved accounting system" is able to create "competitive advantages" for this kind of organization. This fact seems to be related to the differences between nature of performance of private and public sector organizations in this regard as, according to Hopwood (2001), accounting in public organizations can potentially help them by examining their past performance. Since there are many different perspectives (politics, administration, law and economics) building diverse concepts (ownership, control, rights, taxation and accountability) in public organizations, it is not surprising to find some disagreements in behaviour between private and public organizations (Jones and Pendlebury, 2000). It is also important to note that the nature of the competition which Iranian universities are facing at the moment is not particularly financial but mostly about quality of research and education programmes (Farid and Nejati, 2008). Therefore, it seems rational to assume that improvement in accounting system may not be able to create for them that kind of competitive advantage that is related to financial issues.

A comparison between the results of hypotheses 4 and 5 indicates that budgetary aspects of accounting system are more important than improvement in accounting systems for Iranian governmental universities. Accounting system is perceived as a formal control system and the supposed usefulness of any formal budgeting and accounting practices depends on the context of business (King et al., 2010). For an environment where the main role players have a very high professional background and orientation the effect of a very formal control system does not seem to be positive, as these kinds of individuals (professionals) would not tolerate the imposing targets (Sutton and Brown, 2008). Although professional control is also considered an external form of control because it is somehow based on outside of the institute, it is categorized as a self-control process (Abernethy and Stoelwinder, 1995). Universities and hospitals are good examples of organizations dominated by professional employees (Derber and Schwartz, 1991) so it is not surprising that participative budgeting is revealed to have a more significant association (than accounting system) with universities' performance.

The sixth hypothesis could not be supported by the data, meaning that there is no significant negative association between "budget emphasis" and "universities'

performance"; however, the negative direction was confirmed. There are several contradictory findings in the literature regarding the effect of "budget emphasis" on "organizational performance". Hopwood (1972) found that strict budget emphasis could ultimately damage the performance of companies, while Otley (1978) claimed that more emphasis on budget controls will improve their outputs. A positive effect of budget emphasis on firms' performance was also confirmed in the financial services sector (Lau and Tan, 1998). Therefore, many other variables were proposed to explain and reconcile the contradictory findings, including the nature of the company's task, field of activity, and task uncertainty (see for example: Hirst, 1981). Studies in the area of Finance Theory suggest that greater budget control could increase the productivity of organizations, although it may negatively affect their employment, pay rise, and sustainability in the market (Bertero and Rondi, 2000, Nickell and Nicolitsas, 1999, Musso and Schiavo, 2008). On the other hand, it was suggested earlier that, in organizations dominated by professionals, severe stress on budget controls could be considered an obstacle to performance improvement, while another study showed that more budget control in US hospitals is adversely related to the quality of their performance (Shen, 2003).

By looking at the totality of the above-mentioned findings, it may be possible to explain the outcome of the testing of the sixth hypothesis in at least three different directions. First, the respondents to these questionnaires belong to three different departments of the universities (Education, Research, and Financial Departments) with different tasks and task uncertainty. Second, in universities, as in any other organizations, budget emphasis could increase their productivity to some extent. Finally, professionals in the universities are the main role players and would not be satisfied with formal types of controls including more emphasis on budget control; however, they do not constitute all of the employees in the universities. Therefore it seems that the overall result of those oppositional directions could have been revealed as the outcome of this hypothesis which shows neither a significant positive nor a significant negative relationship between "budget emphasis" and "performance". This result also suggests that, to discover the precise effect of budget emphasis on each direction, either some related intervening variables should be inserted into the model (for example professionals' motivation) or different proxies should be defined for measuring the performance.

8-3-2. Performance Management (H7 to H10)

As was mentioned in the Methodology Chapter (section 4-5-2), just two aspects of performance management including performance measures (Hypothesis 7) and reward systems (Hypothesis 8) were chosen to be investigated in the new situation of Iranian universities. These two aspects are considered the key parts of any performance management system (Otley, 1999). Besides, the researcher attempted to determine whether performance management system benefits from accounting information and to ascertain the effect of competitive position and decentralization on the extent of this possible usage (Hypothesis 9). Finally, the influence of employing "comprehensive performance measures", "improvement in reward systems", and "use of accounting information in performance management" is investigated (Hypothesis 10).

There is much evidence to suggest that organizations tend to use a combination of financial and non-financial measures to evaluate their own as well as their employees' performance (Kaplan, 2001, Neely et al., 1995, Chenhall and Langfield Smith, 2003, Schulz et al., 2010, Lee and Yang, 2010). Employing a set of quantifiable and non-quantifiable performance measures (Hirst, 1983, Govindarajan, 1984) or financial and non-financial measures is referred to as comprehensive performance measures (Kaplan and Norton, 1996a, Lipe and Salterio, 2000, Lee and Yang, 2010); in fact, comprehensive performance measures are associated with ordinary and exclusive performance measures (Lipe and Salterio, 2000). The testing of the seventh hypothesis revealed that competitive position and importance of employing comprehensive performance measures are significantly associated. This result is quite compatible with the extant literature in this regard (Kaplan and Norton, 1996a, Chenhall, 1997, Perera et al., 1997, Schulz et al., 2010); however, it is inconsistent with Widener's findings (2004) , as the use of traditional or quantifiable measures for evaluating the performance of their employees is slightly preferable in Iranian universities.

Based on the test result of the eighth hypothesis (H8, section a), there is a positive association only between "decentralization" and "improvement in reward system", although this association is very weak concerning the faculty members' reward systems. The difference between the degree of effect of "decentralization" on faculty

members' and other staff's "reward system" could be explained by this idea that creating change in other staff's compensation system is easier and more straightforward than for faculty members due to the factors such as professionalism, greater power of faculty members (Broadbent, 2007), their managerial positions (Bikmoradi et al., 2009), and probably greater fiscal consequences. It is important to recall that, according to SEM analysis, the removal of the component of fixed salary from the measurement model of "reward system" was inevitable, so these results only refer to supplementary components of the universities' reward system including overtime, extra teaching, bonuses and annual promotions. Although there are no explicit contingency-based studies in this regard, as far as this researcher knows, the result is consistent with the findings of Thompson and Richter (1998) regarding the priority of local reward system design. There has always been great controversy about the lack of objective measures that can be used in the reward systems of public organizations (Modell et al., 2000). However, it is expected that, by delegating a greater degree of authority for decision-making from the government to the universities, they can change and improve their reward systems in terms of linking payments and promotions to the employees' performance (Shelley, 1999).

Nevertheless, no relationship could be discovered between "competitive position" and "improvement in reward system" (H8, section b) either on faculty members' part or the other staff's. This result is not consistent with previous studies in TQM literature and contingency-based research in that their contexts are mostly for-profit organizations and changes in their reward system tend mainly towards gain-sharing and other performance-related monetary incentives (Schulz et al., 2010). The nature of competition also seems to be slightly different for public organizations compared to private companies. In private companies competition is mostly market competition and it is based on prices and costs (Simons, 1990, Mia and Clarke, 1999, Ax et al., 2008), whilst in Iranian governmental universities, the context of this study, it is mainly about quality of education and research activities (Mehralizadeh, 2005, Farid and Nejati, 2008). In evidence, Turk and Roolaht (2007) found that private universities in Estonia, compared to public ones, are more reliant on market-based criteria in their appraisal and compensation system. Thus, it might be unsurprising if no significant positive association between "competitive position" and "improvement in reward systems" of Iranian universities could be found, because a reward system in

every organization is not a simple or single-aspect issue but a very complicated area which is affected by many factors including general governmental policies and even national cultures (Herkenhoff, 2009). It should be born in mind that "governmental policies" and "notional culture" are supposed to be broadly similar for all governmental universities in Iran.

According to the result of the ninth hypothesis (H9), both "decentralization" and "competitive position" are associated with greater "usage of accounting information in performance management", although the influence of "decentralization" has been perceived as larger than "competitive position". These results support the findings of Miah and Mia (1996) and Budding (2008) regarding the effect of decentralization on usage of accounting information in public organizations, as well as the works of Khandwalla (1972), Simons (1990), and Ballantine *et al.* (1998) in connection with the indirect effect of competition on greater employment of accounting reports and information. They are also consistent with the study of Abernethy and Vagnoni (2004), which shows that universities in decentralized and competitive situations use accounting information mostly for decision-making and control as well as rewarding the employees, rather than other aspects of performance management such as goal definition, objective-setting and performance measurement. The result of the ninth hypothesis confirms this proposition that, although the role of non-financial performance measures and qualitative information and factors in a balanced approach is prevalent in most aspects of performance management (Kaplan, 2001), accounting information is still being used, even by public organizations, at least for the control and reward aspects of performance management. This to some extent supports the argument proposed by Miah and Mia (1996) claiming that emphasis on cost control is more likely in public organizations than in private companies. It also indicates that, in decentralized situations where managers feel themselves more responsible for their area of activity, and in competitive positions where more information is needed in order to make more accurate and rational decisions, usage of accounting information increases.

The testing of hypothesis ten (H10) revealed that "use of comprehensive performance measures", and "usage of accounting information in PM" are positively related to the universities' performance; however, contrary to expectations, no significant

relationship could be confirmed between "improvement in reward system" and "departmental performance", either for faculty members or for other staff. This result regarding the effect of "comprehensive performance measures" and "use of accounting information in PM" on universities' performance is consistent with the mainstream of findings in accounting literature (for example see: Widener, 2006, Cadez and Guilding, 2008, Schulz et al., 2010). It also supports the idea that employing a combination of quantitative and qualitative or financial and non-financial performance measures could help both private and public organizations (Kaplan, 2001, Karathanos and Karathanos, 2005). Although the importance of accounting information for PM in public organizations might not be as great as for private companies, the result showed that accounting information and reports are still considered important for performance management in Iran's governmental universities, especially for expenditure control and employee reward dimensions.

Nevertheless, the failure to find a positive association between "improvement in reward system" and "universities' departmental performance" appears to be problematic as there is lots of evidence creating an expectation of finding such a positive relationship (for example: Gomez Mejia, 1992, Sim and Killough, 1998, Bonner and Sprinkle, 2002, Schulz et al., 2010). However, several explanations could be provided for this somewhat contradictory finding. First, most of the studies that have found a positive association between reward system and performance have been conducted in private organizations where there are more objective criteria of performance to be linked to employees' rewards (Modell et al., 2000). It is also consistent with the result of hypothesis 8, part b, indicating that there is no positive association between competitive environment and improved reward system of the universities. Second, it seems that there is not necessarily an appropriate linkage between individuals' performance evaluation and organizational performance evaluation, so improving the reward system by linking it more substantially to individuals' performance does not necessarily mean that it would improve organizational performance (Metawie and Gilman, 2005). Third, some studies suggest that connecting performance measures to the reward system could create some side effects such as gaming, task negligence, tunnel vision and short-termism (Ittner et al., 1997, Goddard et al., 2000, Ittner et al., 2003) which they may hamper the organizational performance. Fourth, it has been claimed that an incentive-based

reward system could boost quantitative performance, but not qualitative performance (Verbeeten, 2008), whereas in public organizations, especially in universities, quality of performance seems to be more important. Finally, many studies which have found a positive association between reward system and performance have inserted some kind of intervening variables such as efforts (Bonner and Sprinkle, 2002), and strategy diversification (Gomez Mejia, 1992); therefore, devising a mediating variable such as motivation or job satisfaction might have better explained the association between reward system and universities' performance.

8-3-3. Different Types of Departments (H11 to H15)

The third set of hypotheses of this study was proposed to assess the probable differences among different groups of departments in Iran's universities. As was mentioned in the Hypotheses Development section (4-5-3) of the Methodology chapter, the philosophy behind these expectations is due to the differences between environmental and task uncertainty, task complexity and diversity, degree of professionalism, and interest in innovation in different types of Departments. It is believed that Education and Research Departments, compared to Financial Departments, are facing higher task and environmental uncertainty, and have more diverse jobs (Silaen and Williams, 2009), more professionals, and more innovative orientation (Sutton and Brown, 2008).

Test of the hypotheses that were proposed in this regard, shows that the influence of participative budgeting on performance is greater for Education and Research Departments than for Financial Departments. This is consistent with both the expectations and the literature (H11) but, surprisingly, it could not be confirmed that Education and Research Departments would suffer more than Financial Departments where more emphasis to be placed on budget controls (H12). Regarding H11, it should of course be mentioned that the association between participative budgeting and performance is also significant for Financial Departments, although that relationship is stronger for Education and Research Departments. The test outcome of Hypothesis Eleven is consistent with the literature and to some extent confirms the work of Govindarajan (1986a) who found that budgetary participation improves managerial performance in higher environmental uncertainty. It is also consistent with the arguments regarding the type of controls which are and are not suitable for

professionals (Abernethy and Stoelwinder, 1995, Broadbent, 2007, Sutton and Brown, 2008). Nevertheless, rejection of Hypothesis Twelve does not seem to be compatible with the result of Hypothesis Eleven and the aforementioned literature.

The implication of this refutation is that Financial Departments suffer more than other Departments when more emphasis on budget controls is imposed. This outcome could be due to the key performance measures that have been used to assess the performance of Financial Departments. Key performance indicators such as "investments in construction or purchase of new buildings" or "new investments in teaching and research assets and facilities" could suffer more readily than Education or Research key performance indicators such as "rate of graduation" or "number of international publications". Moreover, as the main cause of budget emphasis is revealed as budget constraint, this result might be an indication of the fact that, in the situation of financial pressure, the priority for fund distribution will be given to the departments which are performing the main activities of the universities. The final reason may be concerned with the positive effect of "budget emphasis" on "productivity" (Bertero and Rondi, 2000), which means that Education and Research Departments have a greater chance of increasing their productivity in the event of greater budget emphasis than Financial Departments.

Hypotheses thirteen and fourteen were confirmed based on the collected data and analyses of this study. The implication of Hypothesis thirteen (H13) is that "improved accounting system" in terms of technical changes is not as important for the Education and Research Departments as it is for the Financial Departments, where it is perceived as crucial. It is consistent with this argument that those managers who are regularly concerned with accounting and financial issues are likely to have a better perception of accounting-based controls, which would lead them to accept these kinds of controls and apply them (Lau and Tan, 1998). Therefore, it is reasonable to expect to find an influential effect of improvement in accounting systems on their performance. This result does not mean that other Departments do not use accounting information, as the result of Hypothesis Fourteen (H14) confirms that they do, but it means that technical changes in accounting system are not as important for them as they are for Financial Departments. This outcome supports the study of Seaman and Williams (2006) which claims that the extent of perceived environmental uncertainty has a moderating effect

on the relationship between changes in components of management accounting system and organizational performance.

Although Hypotheses 13 and 14 may seem to be quite similar, the claim of Hypothesis 14 is that the effect of "usage of accounting information in PM" on the Financial Departments' performance is greater than for Education and Research Departments. The result of the test confirms this proposition, even though that relationship for Education Departments is also significant at the level of 0.10, but for Research Departments, it is not statistically remarkable. This implies that, although use of accounting information in PM is considered important in Iran' universities in general (result of hypothesis 10), the most preferred area for the use of this information is still the financial affairs and, to some extent, teaching activities. This is quite consistent with the outcome of the test for the final hypothesis of this study, Hypothesis Fifteen.

The final hypothesis suggested that the positive association between "use of comprehensive performance measures" and "departmental performance" is stronger for Education and Research Departments than for Financial Departments. This is consistent with the mainstream of findings in contingency-based literature and particularly supports the results of the work of Govindarajan (1984) indicating that organizations or departments that work under more environmental and task uncertainty are more reliant on subjective performance measures, but organizations with a low level of uncertainty mostly employ formula-based performance measures. It was argued that Research and Education Departments are facing more uncertainty compared with Financial Departments on the one hand, and comprehensive performance measures are a combination of objective and subjective or quantitative and qualitative performance measures on the other hand. Therefore, it does not seem surprising if use of comprehensive performance measures was perceived as more important and effective in Research and Education Departments in comparison with Financial Departments.

8-3-4. Summary of Discussion and some Conclusions

According to the discussions and explanations in the preceding subsections, several conclusions can be proposed regarding the accounting system, performance

management, and performance of Iran's governmental universities. First, competitive position might have been impacting universities' accounting systems and performance management as it is associated with technical improvement in their accounting system, use of comprehensive performance measures, and use of accounting information in their performance management. Second, decentralization might have been influencing the universities' accounting systems and performance management because it is found to be related to improvement in general aspects of their accounting system, budgetary participation, improvement in their reward systems, and increased usage of accounting information in performance management. Also, budget constraint has negatively been related to participative budgeting, but positively to emphasis on budget controls. Third, it was discovered that the participative budgeting aspect of accounting system compared to two other dimensions including budget emphasis and improvement in the system could exert greater influence and produce more improvement in the performance of universities. Fourth, it was discovered that employing comprehensive performance measures along with the use of accounting information in performance management could affect universities' performance, but such an effect could not be confirmed for improved reward systems. Finally, it can be claimed that improved accounting system and usage of accounting information in performance management is perceived as more important for Financial Departments; on the other hand, the effect of participative budgeting and use of comprehensive performance measures on the performance of Research and Education Departments is greater than that for Financial Departments. However, none of above conclusions imply concrete causation as data were collected through a survey-based method rather than an experimental process (Chenhall, 2003).

8-4. Contributions, Limitations, and Suggestions

This section attempts to explore possible contributions that have been made to the literature by this study; then, several limitations that have been confronted during the conducting of this research are explained, and finally some suggestions are proposed for future research opportunities in this area.

8-4-1. Research Contributions

The contributions made by a piece of research are very important and are perhaps the most crucial element of each study, as several writings and papers have tried to

articulate or even theorize this issue (for examples: Whetten, 1989, Sutton and Staw, 1995, Corley and Gioia, 2011). This study contributes to the literature in several ways which can be categorized in three groups including methodological, theoretical, and practical contributions. The contributions of this research based on the above classification are presented as follows.

8-4-1-1. Contributions in Methodology

At least three methodological contributions can be attributed to this study. Firstly, the results of EFA and CFA show that "improved accounting system", which was originally designed as one variable, could or, more accurately, should be separated into two variables that can be named: "general improvement in accounting system"; and "technical improvement in accounting system". Various instruments with quite a wide range of measures have thus far been employed for measuring different aspects of improvement in accounting systems such as sophistication in management accounting system (Khandwalla, 1972, Abdel-Kader and Luther, 2008), usefulness of accounting system (Chenhall and Morris, 1986), development in accounting system (Orloff et al., 1992, Reid and Smith, 2000), appropriateness of accounting system (Chia, 1995), advancement in management accounting system (Baines and Langfield-Smith, 2003), efficiency of accounting system (Cavalluzzo et al., 1998), and improved costing system (Hill, 2000). The aforementioned measures could either be categorized in one tier of proposed aspects of improvement in accounting system or consist of both aspects. It seems that the precise design of construct regarding the general or technical aspect of development in accounting system would result in better understanding of changes in accounting system, particularly for public organizations.

Secondly, there has been a call for empirical studies with a larger range of data to assess the effect of implementing and employing different performance management systems on performances of public organizations (Verbeeten, 2008), as most of these kinds of studies have been opting for case-study methods and qualitative approaches (Van Helden, 2005). This study contributes to the methodology of performance management studies in the public sector by undertaking a nationwide survey method and collecting data from all of the governmental universities in Iran, achieving a relatively high response rate (65 per cent).

Finally, use of SEM itself as the main technique of data analysis in this study could be seen as a methodological contribution in a number of ways. First, it is a kind of response to the call for greater use of SEM in management accounting studies, as many writers have advocated the use of SEM in this field (Shields and Shields, 1998, Smith and Langfield-Smith, 2004, Williams et al., 2009). In addition, SEM helped the researcher to build and finalize more reliable and valid measurement constructs through the fit indices and proposed the removal of some of the observed variables which were not compatible with other observed variables for that particular construct (Shook et al., 2004). In total, 16 out of 66 observed variables for all of the constructs were dropped from the analyses, based on the suggestions of SEM. However, it should be recalled (as was explained in sections 7-3-2 and 7-3-4) that deletion of these observed variables left the related factor a narrower concept in that regard. For example, deletion of three questions in conjunction with the "decentralization" factor implies that this factor relating to Iran's governmental universities does not encompass the recruiting process. Moreover, use of bootstrapping technique, which is embedded in the SEM, in this study could be very helpful in dealing with the probable slight deviation from normal distribution by some of the variables. In circumstances where there is no remedy for non-normality of the data, bootstrapping analysis could assist the researcher to correct and gauge the effect of non-normality on the outcomes of the analysis (Byrne, 2001). Finally, several advantages of SEM over other traditional techniques (such as Multiple Regression) were outlined and explained in the section 5-3-10 of the Chapter 5. The ability to take observed variables directly as inputs (Kline, 2005), solve and analyse complex models (Smith and Langfield-Smith, 2004), , solve and estimate several equations simultaneously for many dependent variables (Smith and Langfield-Smith, 2004), and employ a more robust method of judgement regarding the model fit (Smith and Langfield-Smith, 2004) are some of the important advantages of SEM. Therefore, it is perceived that these points have helped the researcher overcome the inherent shortcomings in other statistical procedures and achieve much precise and robust outcome.

8-4-1-2. Contributions in Theory

In terms of theoretical contribution, this study also contributes to the literature in several ways. First, it is believed that research in financial accounting areas in less-developed countries has been conducted sufficiently to some extent, but the

understanding about diffusion of knowledge concerning management accounting and performance management in those countries is very slight (Hopper et al., 2008). This study can be considered a kind of effort to cast some light on performance management and accounting system in a developing country, especially in its public sector.

In addition, the testing of some postulates of Contingency Theory in the public sector (Chenhall, 2003) as a major part of non-for-profit organizations of a developing country could expand the realm of activity and predictability of that theory . Miah and Mia (1996) provide three reasons why the findings of contingency-based research on private companies cannot be generalized to public organizations. Differences in their aims of benefit maximization, more rules and regulations in the public sector, and monopolistic or quasi-monopolistic area of activity are the headings under which these discrepancies are explained. Therefore, this study extends several of the basic propositions of contingency-based accounting studies in the Higher Education sector of Iran.

Moreover, several studies in various disciplines call for more investigation to discover the variables that may affect performance management systems and practices (Verbeeten, 2008, Chenhall, 2008, Lee and Yang, 2010); similarly, the interaction between management control system and performance management has not been subjected to sufficient consideration and investigation (Cuganesan and Donovan, 2011). This research can be seen as a kind of response to these calls by trying to assess the effect of two contingent variables - “competitive position” and “decentralization” - on two main aspects of performance management systems, namely “comprehensive performance measures” and “reward systems”. On the other hand, interaction between output of accounting system as one important component of management control systems with the above-mentioned contingent variables and performance management was investigated by this study, particularly in the Higher Education area.

Furthermore, there have been several persuasive calls in contingency-based accounting literature to boost an understanding of other factors and variables that could explain the adoption of different management accounting practices by different

organizations (Tillema, 2005, Gerdin, 2005, Chenhall and Moers, 2007, Abdel-Kader and Luther, 2008). Financial pressure in terms of budget constraint seems to be one of those variables, especially in public organizations, that are mostly reliant on public funds. In public organizations, as far as the researcher is aware, only Broad (2001) has implicitly looked at it as one contingent variable that could cause developments in management accounting systems of one group of UK universities. Financial pressure in terms of budget constraint does not make sense in private companies because in governmental organizations it is related to both of earning and cash, but for private companies it is mostly just about cash. However, in private companies just cash flow crises that is similar to financial pressure to some extent, have been investigated as one of the motivations for development of management accounting systems (Reid and Smith, 2000). The present study took financial pressure as an explicit contingent variable which could cause some improvement in accounting systems, more emphasis on budget controls, and the prevention of participative budgeting; however, its effect on improvement in accounting systems in Iran's governmental universities could not be confirmed.

Finally, thus far in contingency-oriented accounting studies four antecedents, namely environmental uncertainty, task uncertainty, job interdependence and information asymmetry have been proposed as main incentives for budgetary participation (Shields and Shields, 1998). Shields and Shields (1998) called for further research to discover other reasons for practice of participative budgeting. This research can be considered as one response to that call in that it shows that financial pressure is a threatening factor to participative budgeting; hence, it contributes to increasing the understanding of the incentives and disincentives for participative budgeting, at least in the public sector area where most budgets are provided by governments.

8-4-1-3. Practical Contributions

The practical contributions of this study are mostly about the investigation of the consequences of recent reform in Iran's Higher Education sector; there are some pointers for the Ministries supervising Iran's universities, some implications for the management of universities, and perhaps some benefits for similar governmental organizations such as the Ministry of General Education and Governmental

Healthcare Network. However, universities' Boards of Trustees and managers can benefit from other aspects of this study.

There has been little post hoc investigation of the consequences of the recent reform in Iran's Higher Education sector, which was supposed to delegate more authority to the universities' managers. Just one paper could be found by this researcher in relation to management issues following that reform and it was conducted very soon after the reform had been initiated (Mehralizadeh, 2005). This study can convey some feedback to the policy-makers in this regard to enable them to assess the extent of the success of that policy's implementation as well as some direct and indirect effects of that reform. This study gives a general understanding of the areas in which decentralization has been established and the degree of its implementation; however, consistent with the findings by Ahmady et al. (2007), this study shows that decentralization has not been implemented as it was expected. It also assessed the consequences of that policy in different aspects of accounting and performance management of universities in particular, as well as its indirect effect on universities' performance. One of the most ambitious aims of policy-makers in Iran's Higher Education sector is to improve the performance of universities, especially in the research area (Malekzadeh et al., 2001), so the results of this study may provide them with part of the solution.

There are some points in this study that could be of interest to two major ministries in Iran, the Ministry of Science, Research and Technology (MSRT) and the Ministry of Health and Medical Education (MHME), which are directly supervising governmental universities. One of the most challenging issues in Iran's Higher Education sector has always been to find the right approach and formula for estimating and finalizing the size of the budgets for each university (Gharun, 2007). It is obvious that many variables should be considered in this regard since relying on just one factor, such as the number of students, might not result in an appropriate budget for the universities (Ahmady et al., 2007). Seeking the participation of the universities in this matter alongside other considerations could be helpful. The importance of this issue increases with the knowledge that participative budgeting could create more a satisfactory budget for the universities followed by an improvement in their performances, as was confirmed by previous research (for example: Awio and

Northcott, 2001, King et al., 2010) as well as this study. According to this study, both "decentralization" and "competitive position" for the universities are related to positive consequences for their accounting system and performance management as well as their performances. Therefore, MSRT and MHME could use the results of this study to satisfy themselves that the already committed approach to giving more autonomy to the universities is perceived positively and to try to resolve any likely problems in this regard and remove any obstacles in the way. They could also note that creating a more competitive environment for the universities may develop their accounting system, performance management, and their performance. It seems that these points are to some extent true for other similar organizations such as General Education Organizations and Governmental Healthcare Network.

Universities' management may also gain some advantages as a result of this study. Firstly, knowing that participative budgeting is positively related to the satisfaction with budgets and universities' performance, they can design and implement budgetary participation at an internal level of their universities. Secondly, the results of this study - consistent with the previous studies (Kaplan, 2001, Verbeeten, 2008, Lee and Yang, 2010) - indicate that use of comprehensive performance measures is positively associated with the universities' performance. So, they are recommended to define and implement a wide variety of performance measures that are a combination of objective and subjective as well as quantitative and qualitative performance measures for evaluating the performance of their employees. Reliance on just some traditional quantitative measures, such as punctuality, hours of presence in workplace, or budget and cost measures, seems to be highly discouraging. Thirdly, in connection with the reward system in the universities, SEM's indication and insistence on the removal from the analyses of the component of fixed salary for both faculty members and other staff may mean that there is minimal linkage between this part of the reward system and the employees' performance. Perhaps this problem is one of the reasons why no association between "improved reward system" and "performance" could be found. Therefore, more studies, investigations, and corrections appear necessary in this regard, as one of the important parts of the reward system is the fixed salary component. Finally, according to the outcomes of this research, although the most important aspects of accounting system in universities are perceived to be budgeting dimension and, particularly, participative budgeting, greater consideration of

accounting information and reports in performance management might improve the universities' performance. Anyway, the results of this research could be employed after the probable correctional effect of the following limitations, which confronted this study, has been dealt with.

8-4-2. Research Limitations

It seems that certain limitations could constrain the findings of this study from being employed in a generalized approach. Therefore, before interpreting the outcomes of this research, it will be helpful, even vital, to pay attention to the following restrictions. Firstly, the proposed relationships in this study might be assumed to be causal relationships which need to be proved with the aid of experimental data and evidence (Shields et al., 2000); however, the data were collected through a cross-sectional survey, so this limitation should be borne in mind whenever the results are used (Chenhall, 2003). Thus, this study does not claim to have found any causal relationships amongst the proposed variables, but it can be said that, according to the data and analyses, some of the variables are related to one another and some are not.

Secondly, it is obvious that many factors and variables such as strategy, governmental policy, different infrastructure, and geographical location of universities play a role in universities and can consequently affect and influence accounting system, performance management and universities' performance. This study could not (for practical limitations, (Langfield-Smith, 1997)) and did not want (as explained in section 7-4-1-2) to take into account all variables and role players in the area of the universities' performance management. It is admitted that excluding some other probably related variables may have caused omitted variable bias[83] in this study; nevertheless estimation of the extent of that bias is not possible as data regarding those variables are not available (except for 'size' which was tested as a control variable, see section 7-4-1-2).

Thirdly, in SEM literature one of the most important concerns regarding the use of outcomes of SEM is the number of cases that are used (Bollen, 1989, Kline, 2005). In other words, the sufficiency of sample size for using SEM is crucial and a large

[83] Omitted variable bias may occur when a model does not include all relevant independent variables (Barreto and Howland, 2006).

sample is always preferred. Statistical analyses based on small sample size may contain more sampling error so the results of those analyses are considered less reliable and stable (Kline, 2005). Although Kline (2005) believes that, in general, samples with more than 200 cases can be considered large samples, the magnitude and complexity of the model is also influential in this matter. The largest model of this study has 85 free parameters to be estimated, so based on different numbers of participants - which have been offered as required cases for every free parameter varying from 15 to 5 (Kline, 2005) - the sample size should have been at least 425. This limitation is mostly due to the limited size of the population of this study, as the total number of governmental universities in Iran is 126; so, by multiplying it by 3 (the number of Departments in each university) the size of the population would be just 376. Nevertheless, there is no consensus about the required number of cases for each free parameter of estimations; thus, as a rule of thumb the results of studies with more than 200 cases can be considered reliable (Hoe, 2008).

Finally, besides the many benefits it brought to this study, SEM imposed one limitation on it as well. As was explained in the previous chapter, within the phase of confirmatory factor analysis or measurement model building, several observed variables that were not sufficiently compatible with the whole model have to be eliminated from the further analyses as SEM indices implied. Although the removal of these items increased the reliability, validity, and robustness of the measurement models (Shook et al., 2004), some parts of the collected data have to be ignored. For example, the components of fixed salary regarding the faculty members and other staff, which are the main components of the reward system in Iran's universities, have to be dropped from the related analyses since indices of fit for the measurement models did not allow these observed variables to be retained.

8-4-3. Suggestions for Future Studies

Undertaking and completing the present research has resulted in several suggestions for future investigations to be conducted in this particular area. Some of these ideas are explored here. It seems that the topic of this study, which is about the changes and improvements in accounting systems and performance management of governmental universities in Iran, could be investigated from other related points of view such as Institutional Theory and Agency Theory. The consequences of decentralization for

accounting system and performance management in the governmental universities can be investigated from the angle of Agency Theory to discover whether or not these results are compatible with the behaviour of principals (Ministries that are supervising the universities) and agents (the governmental universities) (Jensen, 1976). In addition, many insights could be gained into the changes in accounting system and performance management in public organizations by employing Institutional Theory frameworks. A comparison between the results of this study and other kinds of studies on this subject would be very interesting. This would also respond to the call by Chenhall (2003) regarding the idea of employing other theoretical insights to create advances in contingency frameworks.

Furthermore, adding some other variables that can affect the universities' performance management and consequently their performance, such as strategy, governmental policy, different infrastructure, and geographical location of universities, could be expected to explain much more of the variances of the universities' performance. As was explicated in the previous chapter (sections 7-4-1, and 7-4-2), the variables proposed in this study, altogether could explain just less than 40 per cent of the universities' performance variance, meaning that many other important variables could contribute to that explanation (see also explanations regarding omitted variable bias in previous section).

Moreover, undertaking a qualitative research study could increase the depth of understanding regarding the results of this study, especially in those areas where the outcomes are not so compatible with the results of previous studies. For example, the failure to find an association between "improvement in reward system" and "universities performance" needs much more investigation and explanation, which could not be provided by this study. As another example, according to the result of this study budget emphasis could negatively affect the performance of Financial Departments more than Education and Research Departments; this was not expected. A qualitative study might shed more light on the mechanism and reasons behind those unanticipated outcomes.

Finally, by inserting some other mediating or/and moderating variables, another study might be able to clarify some of the surprising results. For example, unexpected

results regarding the effect of budget emphasis on different types of Departments also seems to need more investigation. To discover the precise effect of budget emphasis on each Department, either some meaningful intervening variables (for example professionals' motivation) should be inserted into the model or different proxies for measuring the performance (such as some identical and quite subjective measures) should be defined.

8-5. Summary and Conclusion

In this chapter, the researcher has endeavoured to give an overview of the whole study, followed by some further explanations and discussions of the findings and results of the study. In the final section of this chapter some of the major contributions and implications of this research and its limitations, as well as several suggestions for future studies, were presented. This study has attempted to assess the new situations that Iran's governmental universities have been confronting since 2004. It also looked at the extent of the implementation of policy-makers' desire in Iran's Higher Education sector to decentralize the universities and give them more autonomy in decision-making. The main aim of the present research was to assess the consequences of those new conditions on accounting system, performance management, and performance of the universities. The results of this study, which are mostly consistent with the overall direction of the literature, support the positive effect of delegation of more authority of decision-making to the universities, highlight the role of budgeting practices, especially participative budgeting, and confirm the importance of employing comprehensive performance measures.

Further qualitative studies could shed more light on the interpretation of the results of this research, and undertaking more quantitative investigations would reveal the effect of other influential variables on accounting system, performance management and performance of the governmental universities in Iran.

Appendices

Appendix A: Summary of Hypotheses

Part one: Accounting System

H1. Iran's universities which are (a) more "decentralized" and (b) facing more intense "competition" and (c) higher "financial pressure" have more "improved accounting systems".

H2. Iran's universities which are (a) more "decentralized" and (b) facing higher "financial pressure" put more "emphasis on budget controls".

H3. "Participative budgeting" in Iran's universities are (a) positively associated with "decentralization", but (b) negatively with "financial pressure".

H4. Iranian "universities' departmental performance" is (a) positively related to "participative budgeting", (b) mediating by "satisfaction with budgets".

H5. Iranian "Universities' departmental performance" is (a) positively related to "improved accounting systems" (b) mediating by "competitive advantage".

H6. Iranian "Universities' departmental performance" is negatively associated with "more budget emphasis".

Part two: Performance Management System

H7. Use of "comprehensive performance measures" is considered more important for the Iranian universities which are facing more intense "competition".

H8. "Improvement in reward systems" of Iranian universities' is associated with (a) their level of "decentralization" and (b) intensity of "competition".

H9. The extent of "use of accounting information in performance management" by Iranian universities is related to (a) their level of "decentralization" and (b) intensity of "competition".

H10. Iranian universities' departmental performance is positively related to (a) "improvement in reward systems", (b) importance of "comprehensive performance measures" and (c) "use of accounting information in performance management".

Part three: Differences between Departments

H11. The positive relationship of "participative budgeting - satisfaction with budgets - performance" at Research and Education Departments is stronger than Financial Departments.

H12. The negative relationship of "more budget control - performance" at Research and Education Departments is stronger than Financial Departments.

H13. The positive relationship of "improved accounting system - competitive advantage - performance" at Research and Education Departments is weaker than Financial Departments.

H14. The positive relationship of "usage of accounting information in PM-performance" at Research and Education Departments is weaker than Financial Departments.

H15. The positive relationship of "comprehensive performance measures - performance" at Research and Education Departments is stronger than Financial Departments.

Appendix B: Questionnaires and covering letters

Covering letter - initial

Vice chancellor/Manager of Education/Research/Financial affaires
Dear Sir/Madam,

I would like to inform you that the enclosed questionnaire is about my research project in PhD programme.

The topic of above-mentioned thesis is "investigation of relationship between new situations for Iran's universities, their accounting systems, and performance management".

So many researches have been done to investigate and discover the effect of external factors and conditions on organizations' accounting systems and their direct and indirect effect on organizations' performance, but most of them have concentrated on private sector. Therefore, lack of study and insight in public sector and governmental organizations including universities is quite sensible.

Bearing in mind that the results of this study could be useful for universities and success of this research depends on completion of the questionnaire, I would like to request you humbly to complete it by devoting just 10 to 15 minutes of your valuable time.

You could be quite assured that the collected data will be treated completely confidential and will be analysed anonymously. Nevertheless it is totally up to you to answer to these questions or not, either totally or partially.

There is a pre-paid envelope in this package to be used for sending back the completed questionnaire.

Many thanks,
Abbas Alimoradi
PhD student in accounting

Covering letter - Follow up

Vice chancellor/Manager of Education/Research/Financial affaires
Dear Sir/Madam,

I would like to remind you that around more than two months ago I sent you the enclosed letter and questionnaire regarding my research project in PhD programme.

The topic of above-mentioned thesis is "investigation of relationship between new situations for Iran's universities, their accounting systems, and performance management".

As I said in previous letter, the findings of this research could be helpful for universities, thus I would like to request you humbly to complete this questionnaire by devoting just 10 to 15 minutes of your valuable time.

I have received many responses from your colleagues in other universities, but still need more responses to reach to a more reasonable quantity of data to make my analyses and results much more reliable.

You could be quite assured that the collected data will be treated completely confidential and will be analysed anonymously.

There is a pre-paid envelope in this package to be used for sending back the completed questionnaire.

Many thanks,
Abbas Alimoradi
PhD student in accounting

Questionnaire - Education Manager

1-How long have you been in your current job (at this university or other universities)?	Less than 5 years	5 to 10 years	11 to 15 years	16to 20 years	21 to 25 years	More than 25 years
	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐

2-What is the total number of students at this university?	Less than 3,000	3,000 to 5,999	6,000 to 8,999	9,000 to 11,999	12,000 to 14,999	15,000 or more
	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐

3 - In 5 past years it seems universities have been facing some of below positions which have influenced them from outside. Could you please rate the extent of below factors in this university, generally?

	Nothing 1	Very low 2	Low 3	Moderate 4	Significant 5	Very large 6
a. Change in law which resulted in more autonomy for universities	☐	☐	☐	☐	☐	☐
b. Competitive positions in education issues	☐	☐	☐	☐	☐	☐
c. Competitive positions in research issues	☐	☐	☐	☐	☐	☐
d. More student entrants	☐	☐	☐	☐	☐	☐
e. Financial pressure (budget constraint)	☐	☐	☐	☐	☐	☐
f. Impossibility to recruit qualified academic staff	☐	☐	☐	☐	☐	☐
g. Impossibility to recruit qualified non-academic staff	☐	☐	☐	☐	☐	☐
h. Other (specify and rate please) ……...	☐	☐	☐	☐	☐	☐

4 -How often you have to postpone or ignore some expenditures due to budget constraints?	Never 1	2	3	4	5	Very frequently 6
	☐	☐	☐	☐	☐	☐

5-What has been the trend of budget growth to cover inflation rate in 5 past years?	Significant increase 1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	Significant decrease 6 ☐
6-"Financial pressures on university have increased in recent years" to what extent do you agree?	Strongly disagree 1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	Strongly agree 6 ☐
7-"University's position now are more competitive than 5 years ago" to what extent do you agree?	☐	☐	☐	☐	☐	☐

8-Could you please rate the extent of change in university's authority during 5 past years for:	No change 1	Very low increase 2	Low increase 3	Moderate increase 4	Significant increase 5	Very large increase 6
a. Decision making in educational issues	☐	☐	☐	☐	☐	☐
b. Legislation in educational issues	☐	☐	☐	☐	☐	☐
c. Decision making in administrative issues	☐	☐	☐	☐	☐	☐
d. Legislation in administrative issues	☐	☐	☐	☐	☐	☐
e. Decision making in recruiting staff	☐	☐	☐	☐	☐	☐
f. Legislation in recruiting Staff	☐	☐	☐	☐	☐	☐

9-Could you please rate the extent of changes regarding accounting system at this university during 5 past years?	No change 1	Very low increase 2	Low increase 3	Moderate increase 4	Significant increase 5	Very large increase 6
a. Demand for different accounting reports	☐	☐	☐	☐	☐	☐
b. Frequency of accounting reports	☐	☐	☐	☐	☐	☐
c. Speed of preparing accounting reports	☐	☐	☐	☐	☐	☐
d. Use of internal auditing	☐	☐	☐	☐	☐	☐
e. Use of independent auditing	☐	☐	☐	☐	☐	☐
f. Accuracy of accounting reports	☐	☐	☐	☐	☐	☐
g. Qualification of accounting reports	☐	☐	☐	☐	☐	☐
h. Use of non-financial information in accounting reports	☐	☐	☐	☐	☐	☐
i. Use of new techniques of management accounting	☐	☐	☐	☐	☐	☐
j. Computerising accounting practices	☐	☐	☐	☐	☐	☐
k. Automatic reporting	☐	☐	☐	☐	☐	☐

10-To what extent emphasise on budget control has increased in past 5 years"?	☐	☐	☐	☐	☐	☐

11-To what extent are you directly allowed to transfer budget funds between headings (in percentage)?	More than 20 1	Less than 20 2	Less than 15 3	Less than 10 4	Less than 5 5	Nothing 6
	☐	☐	☐	☐	☐	☐

12-How much is the importance of compliance between your actual performance and budget figures?	Very low importance 1	2	3	4	5	Very high importance 6
	☐	☐	☐	☐	☐	☐

13-What is the extent of your department's involvement in finalising its budgets?

Very Low Involvement — Very high Involvement

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

14-To what extent reasoning by the budgeting manager for revising your budget is convincing?

Very Low extent — Very high extent

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

15-How often do you need to discuss with the chancellor or budgeting manager about your department's budget?

Never — Very frequently

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

16-How often does budgeting department seek your opinion or suggestion when setting budget?

☐ ☐ ☐ ☐ ☐ ☐

17-How much is your influence on the final figures of your department's budget?

Very Low Influence — Very high Influence

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

18-How much is the importance of your participation in budget to have a reasonable budget for your department?

Very Low Importance — Very high Importance

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

19-How satisfied are you with below aspects of budgets for your department?

Very dissatisfied — Very satisfied

	1	2	3	4	5	6
a. completeness of budgets	☐	☐	☐	☐	☐	☐
b. fairness of budgets	☐	☐	☐	☐	☐	☐
c. flexibility of budgets	☐	☐	☐	☐	☐	☐

20-In your opinion, how satisfied are staff with the budgetary system at this university in past 5 years compared to years before that?

☐ ☐ ☐ ☐ ☐ ☐

21-To what extent do you use of accounting information for practices below in your area of activity?	Nothing 1	2	3	4	5	Very large extent 6
a. For competitors' cost assessment	☐	☐	☐	☐	☐	☐
b. For competitors' position monitoring	☐	☐	☐	☐	☐	☐
c. For strategic costing	☐	☐	☐	☐	☐	☐
d. For offering competitive price in proposals	☐	☐	☐	☐	☐	☐

22-Would you please rate the importance of below criteria for evaluation of your subordinates' performance?	Very low importance 1	2	3	4	5	Very high importance 6
a. The extent of effort put into their jobs	☐	☐	☐	☐	☐	☐
b. Their concern with quality	☐	☐	☐	☐	☐	☐
c. The extent of students' satisfaction with them	☐	☐	☐	☐	☐	☐
d. Their attitudes to their works and university	☐	☐	☐	☐	☐	☐
e. The punctuality and length of their presence at their workplace	☐	☐	☐	☐	☐	☐
f. Their task accomplishment on time	☐	☐	☐	☐	☐	☐
g. Their concern with costs and Budgets	☐	☐	☐	☐	☐	☐

23-To what extent do you agree with the below phrases about faculty members?	Strongly disagree 1	2	3	4	5	Strongly agree 6
a. Salaries are appropriately related to job performance	☐	☐	☐	☐	☐	☐
b. Other earnings are appropriately related to job performance	☐	☐	☐	☐	☐	☐
c. Annual promotion are appropriately related to job performance	☐	☐	☐	☐	☐	☐

24-To what extent do you agree with the below phrases about non-academic staff?	Strongly disagree 1	2	3	4	5	Strongly agree 6
a. Salaries are appropriately related to job performance	☐	☐	☐	☐	☐	☐
b. Overtimes are appropriately related to job performance	☐	☐	☐	☐	☐	☐
c. Other earnings are appropriately related to job performance	☐	☐	☐	☐	☐	☐
d. Annual promotions are appropriately related to job performance	☐	☐	☐	☐	☐	☐

25-What is the university's performance level in below aspects of educational area?	Very below average 1	2	3	4	5	Very above average 6
a. The rate of graduation during the planned period for each level.	☐	☐	☐	☐	☐	☐
b. Combination of faculty members (more lecturer=1, more full professor=6).	☐	☐	☐	☐	☐	☐
c. Graduates' success in passing Entrance Exam to study in upper levels	☐	☐	☐	☐	☐	☐
d. Quality of programmes and courses	☐	☐	☐	☐	☐	☐
- Is there any external measure for it? No ☐ yes ☐ please specify						
e. Graduates success in finding job	☐	☐	☐	☐	☐	☐

26-What is the level of this university's teaching performance compared to other governmental universities?	Very below average 1	2	3	4	5	Very above average 6
	☐	☐	☐	☐	☐	☐

27-To what extent do you take use from accounting reports and abilities for different aspects of performance management at this department?	Nothing 1	Very low extent 2	Low extent 3	Moderate extent 4	Large extent 5	Very large extent 6
a. Goal definition and standard setting	☐	☐	☐	☐	☐	☐
b. Performance measurement and comparing to targets	☐	☐	☐	☐	☐	☐
c. Controlling expenditure and decision-making	☐	☐	☐	☐	☐	☐
d. Rewarding to the employees	☐	☐	☐	☐	☐	☐

28-Do you have any performance management system?

Yes ☐ specify please

No ☐ please answer to the below question.

29-Do you have any plan to implement a performance management system in near future? Yes ☐ no ☐

30- Could you please briefly mention how do you measure the university's teaching position each year?

Questionnaire - Research Managers

1- How long have you been in your current job (at this university or other universities)?

Less than 5 years	5 to 10 years	11 to 15 years	16 to 20 years	21 to 25 years	More than 25 years
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

2- Missed number (for unity).

3- In 5 past years it seems universities have been facing some of below positions which have influenced them from outside. Could you please rate the extent of below factors in this university?

	Nothing	Very low	Low	Moderate	Significant	Very large
	1	2	3	4	5	6
a. Change in law which resulted more autonomy for universities	☐	☐	☐	☐	☐	☐
b. Competitive positions in education issues	☐	☐	☐	☐	☐	☐
c. Competitive positions in research issues	☐	☐	☐	☐	☐	☐
d. More student entrants	☐	☐	☐	☐	☐	☐
e. Financial pressure (budget constraint)	☐	☐	☐	☐	☐	☐
f. Impossibility to recruit qualified faculty members	☐	☐	☐	☐	☐	☐
g. Impossibility to recruit qualified other staff	☐	☐	☐	☐	☐	☐
h. Other (specify and rate please) ……	☐	☐	☐	☐	☐	☐

4- How often do you have to postpone or ignore some expenditures due to budget constraints?

Never					Very frequently
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

5- What has been the trend of budget growth to cover inflation rate, in 5 past years?

Significant increase					Significant decrease
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

6- "Financial pressures on university have increased in recent years" to what extent do you agree?	Strongly disagree 1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	Strongly agree 6 ☐
7 - "University's position now are more competitive than 5 years ago" to what extent do you agree?	☐	☐	☐	☐	☐	☐

8- Could you please rate the extent of change in university's authority during 5 past years for:	No change 1	Very low increase 2	Low increase 3	Moderate increase 4	Significant increase 5	Very large increase 6
a. decision making in research issues	☐	☐	☐	☐	☐	☐
b. legislation in research issues	☐	☐	☐	☐	☐	☐
c. decision making in administrative issues	☐	☐	☐	☐	☐	☐
d. legislation in administrative issues	☐	☐	☐	☐	☐	☐
e. Decision making in recruiting staff	☐	☐	☐	☐	☐	☐
f. legislation in recruiting staff	☐	☐	☐	☐	☐	☐

9- Could you please rate the extent of changes regarding accounting system during 5 past years?	No change 1	Very low increase 2	Low increase 3	Moderate increase 4	Significant increase 5	Very large increase 6
a. Demand for different accounting reports	☐	☐	☐	☐	☐	☐
b. Frequency of accounting reports	☐	☐	☐	☐	☐	☐
c. Speed of preparing accounting reports	☐	☐	☐	☐	☐	☐
d. Use of internal auditing	☐	☐	☐	☐	☐	☐
e. Use of independent Auditing	☐	☐	☐	☐	☐	☐

f. Accuracy of accounting reports ☐ ☐ ☐ ☐ ☐ ☐

g. Qualification of accounting reports ☐ ☐ ☐ ☐ ☐ ☐

h. Use of non-financial information in accounting reports ☐ ☐ ☐ ☐ ☐ ☐

i. Use of new techniques of management accounting ☐ ☐ ☐ ☐ ☐ ☐

j. Computerising accounting practices ☐ ☐ ☐ ☐ ☐ ☐

k. Automatic reporting ☐ ☐ ☐ ☐ ☐ ☐

10- To what extent emphasise on budget figures has increased at this university in past 5 years"? ☐ ☐ ☐ ☐ ☐ ☐

11- To what extent are you directly allowed to transfer budget funds between headings (in percentage)?

More than 20	Less than 20	Less than 15	Less than 10	Less than 5	Nothing
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

12- How much is the importance of compliance between your actual performance and budget figures?

Very low importance					Very high importance
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

13- What is the extent of your department's involvement in finalising its budgets?

Very Low Involvement					Very high Involvement
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

14-To what extent reasoning by the financial manager for revising your budget is convincing?

Very Low Extent					Very high extent
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

15-How often do you need to discuss with the chancellor or financial manager about your department's budget?	Never 1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	Very frequently 6 ☐
16-How often does financial department seek your opinion or suggestion when setting budget?	☐	☐	☐	☐	☐	☐
17-How much is your influence on the final figures of your department's budget?	Very Low Influence 1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	Very high Influence 6 ☐
18-How much is the importance of your participation in budget to have a reasonable budget for your department?	Very Low Importance 1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	Very high Importance 6 ☐
19-How satisfied are you with below aspects of budget figures for your department?	Very dissatisfied 1	2	3	4	5	Very satisfied 6
a. completeness of budgets	☐	☐	☐	☐	☐	☐
b. fairness of budget figures	☐	☐	☐	☐	☐	☐
c. flexibility of budgets	☐	☐	☐	☐	☐	☐
20-In your opinion, how Satisfied are staff with the budgeting system at this university in past 5 years compared to the years before that?	☐	☐	☐	☐	☐	☐

21-To what extent do you use of accounting information for practices below in your area of activity?	Nothing 1	2	3	4	5	Very large extent 6
a. For competitors' cost assessment	☐	☐	☐	☐	☐	☐
b. For competitors' position monitoring	☐	☐	☐	☐	☐	☐
c. For strategic costing	☐	☐	☐	☐	☐	☐
d. For offering competitive price in proposals	☐	☐	☐	☐	☐	☐

22-Would you please rate the importance of below criteria for evaluation of your subordinates' performance?	Very low importance 1	2	3	4	5	Very high importance 6
a. the extent of effort put into their jobs	☐	☐	☐	☐	☐	☐
b. their concern with quality	☐	☐	☐	☐	☐	☐
c. the extent of students' satisfaction with them	☐	☐	☐	☐	☐	☐
d. their attitudes to their works and university	☐	☐	☐	☐	☐	☐
e. the punctuality and length of their presence at their workplace	☐	☐	☐	☐	☐	☐
f. their task accomplishment on time	☐	☐	☐	☐	☐	☐
g. their concern with costs and budgets	☐	☐	☐	☐	☐	☐

23- To what extent do you agree with the below phrases about faculty members?	Strongly disagree 1	2	3	4	5	Strongly agree 6
a. Salaries are appropriately related to job performance	☐	☐	☐	☐	☐	☐
b. Other earnings are appropriately related to job performance	☐	☐	☐	☐	☐	☐
c. Annual promotion are appropriately related to job performance	☐	☐	☐	☐	☐	☐

24-To what extent do you agree with the below phrases about non-academic staff?						
a. Salaries are appropriately related to job performance	☐	☐	☐	☐	☐	☐
b. Overtimes are appropriately related to job performance	☐	☐	☐	☐	☐	☐
c. Other earnings are appropriately related to job performance	☐	☐	☐	☐	☐	☐
d. Annual promotions are appropriately related to job performance	☐	☐	☐	☐	☐	☐

25- What is the university's performance level in below aspects of research area?	Very below average 1	2	3	4	5	Very above average 6
a. Number of national publications	☐	☐	☐	☐	☐	☐
b. Number of international Publications	☐	☐	☐	☐	☐	☐
c. Number of applied research projects and contracts	☐	☐	☐	☐	☐	☐
d. Amount of research income	☐	☐	☐	☐	☐	☐
e. Number of patents and inventions	☐	☐	☐	☐	☐	☐

26-What is the overall level of university's research performance compared to other governmental universities?	Very below average 1	2	3	4	5	Very above average 6
	☐	☐	☐	☐	☐	☐

27-To what extent do you use from accounting reports and abilities for different aspects of performance management?	Nothing 1	Very low extent 2	Low extent 3	Moderate extent 4	Large extent 5	Very large extent 6
a. . Goal definition and standard setting	☐	☐	☐	☐	☐	☐
b. Performance measurement and comparing to targets	☐	☐	☐	☐	☐	☐
c. Controlling expenditure and decision-making	☐	☐	☐	☐	☐	☐
d. Rewarding to the employees	☐	☐	☐	☐	☐	☐

28-Do you have any performance management system?

Yes ☐ specify please

No ☐ please answer to the below question.

29-Do you have any plan to implement a performance management system in near future? Yes☐ no ☐

30-Could you please briefly mention how do you measure the university's research position each year?

Questionnaire - Financial Managers

1- How long have you been in your current job (at this university or other universities)?

Less than 5 years	5 to 10 years	11 to 15 years	16to 20 years	21 to 25 years	More than 25 years
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

2- What is the total number of staff at this university?

Less than 500	500 to 999	1000 to 1499	1500 to 1999	2000 to 2499	2500 or more
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

3- In 5 past years it seems universities have been facing some of below positions which have influenced them from outside. Could you please rate the extent of below factors in this university, generally?

	Nothing	Very low	Low	Moderate	Significant	Very large
	1	2	3	4	5	6
a. Change in law which resulted in more autonomy for universities	☐	☐	☐	☐	☐	☐
b. Competitive positions in education issues	☐	☐	☐	☐	☐	☐
c. Competitive positions in research issues	☐	☐	☐	☐	☐	☐
d. More student entrants	☐	☐	☐	☐	☐	☐
e. Financial pressure (budget constraint)	☐	☐	☐	☐	☐	☐
f. Impossibility to recruit qualified faculty members	☐	☐	☐	☐	☐	☐
g. Impossibility to recruit qualified other staff	☐	☐	☐	☐	☐	☐
h. Other (specify and rate please) ……	☐	☐	☐	☐	☐	☐

4- How often do you have to postpone or ignore some expenditures due to budget constraints?

Never					Very frequently
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

5- What has been the trend of budget growth to cover inflation rate in 5 past years?

Significant increase					Significant decrease
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

6- "Financial pressures on university have increased in recent years" to what extent do you agree?

Strongly disagree					Strongly agree
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

7 - "University's position now are more competitive than 5 years ago" to what extent do you agree?

Strongly disagree					Strongly agree
1	2	3	4	5	6
☐	☐	☐	☐	☐	☐

8- Could you please rate the extent of change in university's authority during 5 past years for:

	No change	Very low increase	Low increase	Moderate increase	Significant increase	Very large increase
	1	2	3	4	5	6
a. decision making in financial issues	☐	☐	☐	☐	☐	☐
b. legislation in financial issues	☐	☐	☐	☐	☐	☐
c. decision making in administrative issues	☐	☐	☐	☐	☐	☐
d. legislation in administrative issues	☐	☐	☐	☐	☐	☐
e. decision making in recruiting staff	☐	☐	☐	☐	☐	☐
f. legislation in recruiting staff	☐	☐	☐	☐	☐	☐

9- Could you please rate the extent of changes regarding accounting system during 5 past years?	Noting 1	Very low increase 2	Low increase 3	Moderate increase 4	Significant increase 5	Very large increase 6
a. Demand for different accounting reports	☐	☐	☐	☐	☐	☐
b. Frequency of accounting reports	☐	☐	☐	☐	☐	☐
c. Speed of preparing accounting reports	☐	☐	☐	☐	☐	☐
d. Use of internal auditing	☐	☐	☐	☐	☐	☐
e. Use of independent Auditing	☐	☐	☐	☐	☐	☐
f. Accuracy of accounting reports	☐	☐	☐	☐	☐	☐
g. Qualification of accounting reports	☐	☐	☐	☐	☐	☐
h. Use of non-financial information in accounting reports	☐	☐	☐	☐	☐	☐
i. Use of new techniques of management accounting	☐	☐	☐	☐	☐	☐
j. Computerising accounting practices	☐	☐	☐	☐	☐	☐
k. Automatic reporting	☐	☐	☐	☐	☐	☐
10- To what extent emphasise on budget figures has increased at this university in past 5 years"?	☐	☐	☐	☐	☐	☐

11- To what extent are you directly allowed to transfer budget funds between headings (in percentage)?	More than 20 1	Less than 20 2	Less than 15 3	Less than 10 4	Less than 5 5	Nothing 6
	☐	☐	☐	☐	☐	☐

12- How much is the importance of compliance between your actual performance and budget figures?	Very low importance 1	2	3	4	5	Very high importance 6
	☐	☐	☐	☐	☐	☐

13- What is the extent of your department's involvement in finalising its budgets?

Very Low Involvement — Very high Involvement

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

14 -To what extent reasoning by the budgeting manager for revising your budget is convincing?

Very Low extent — Very high extent

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

15-How often do you need to discuss with the chancellor or budgeting manager about your department's budget?

Never — Very frequently

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

16-How often does budgeting department seek your opinion or suggestion when setting budget?

☐ ☐ ☐ ☐ ☐ ☐

17-How much is your influence on the final figures of your department's budget?

Very Low Influence — Very high Influence

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

18- How much is the importance of your participation in budget to have a reasonable budget for your department?

Very Low Importance — Very high Importance

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐

19-How satisfied are you with below aspects of budget figures for your department?

Very dissatisfied — Very satisfied

	1	2	3	4	5	6
a. completeness of budgets	☐	☐	☐	☐	☐	☐
b. fairness of budget figures	☐	☐	☐	☐	☐	☐
c. flexibility of budgets	☐	☐	☐	☐	☐	☐

20-In your opinion, how satisfied are staffs with the budgetary system at this university in past 5 years compared to the years before that?

☐ ☐ ☐ ☐ ☐ ☐

21-To what extent do you use accounting information for practices below in your area of activity?	Nothing 1	2	3	4	5	Very large extent 6
a. For competitors' cost assessment	☐	☐	☐	☐	☐	☐
b. For competitors' position monitoring	☐	☐	☐	☐	☐	☐
c. For strategic costing	☐	☐	☐	☐	☐	☐
d. For offering competitive price in proposals	☐	☐	☐	☐	☐	☐

22-Would you please rate the importance of below criteria for evaluation of your subordinates' performance?	Very low importance 1	2	3	4	5	Very high importance 6
a. The extent of effort put into their jobs	☐	☐	☐	☐	☐	☐
b. Their concern with quality	☐	☐	☐	☐	☐	☐
c. The extent of students' satisfaction with them	☐	☐	☐	☐	☐	☐
d. Their attitudes to their works and university	☐	☐	☐	☐	☐	☐
e. The punctuality and length of their presence at their workplace	☐	☐	☐	☐	☐	☐
f. Their task accomplishment on time	☐	☐	☐	☐	☐	☐
g. Their concern with costs and budgets	☐	☐	☐	☐	☐	☐

23-To what extent do you agree with the below phrases about faculty members?	Strongly disagree					Strongly agree
a. Salaries are appropriately related to job performance	☐	☐	☐	☐	☐	☐
b. Other earnings are appropriately related to job performance	☐	☐	☐	☐	☐	☐
c. Annual promotion are appropriately related to job performance	☐	☐	☐	☐	☐	☐

24-To what extent do you agree with the below phrases about non-academic staff?	Strongly disagree 1	2	3	4	5	Strongly agree 6
a. Salaries are appropriately related to job performance	☐	☐	☐	☐	☐	☐
b. Overtimes are appropriately related to job performance	☐	☐	☐	☐	☐	☐
c. Other earnings are appropriately related to job performance	☐	☐	☐	☐	☐	☐
d. Annual promotions are appropriately related to job performance	☐	☐	☐	☐	☐	☐

25-What is the level of below aspects of financial performance at this university?	Very below average 1	2	3	4	5	Very above average 6
a. Ability to pay for expenses and liabilities on time	☐	☐	☐	☐	☐	☐
b. New investment in teaching, experimental, and research assets and facilities	☐	☐	☐	☐	☐	☐
c. New investment in constructing or purchasing new buildings	☐	☐	☐	☐	☐	☐
d. Growth in research income and other revenues besides governmental budget	☐	☐	☐	☐	☐	☐
e. The extent of your budget saving at the end of each year?	☐	☐	☐	☐	☐	☐

26-What is the overall level of university's financial performance compared to other governmental universities?	Very below average 1	2	3	4	5	Very above average 6
	☐	☐	☐	☐	☐	☐

27-To what extent do you use from accounting reports and abilities for different aspects of performance management?	Nothing 1	Very low extent 2	Low extent 3	Moderate extent 4	Large extent 5	Very large extent 6
a. Goal definition and standard setting	☐	☐	☐	☐	☐	☐
b. Performance measurement and comparing to targets	☐	☐	☐	☐	☐	☐
c. Controlling expenditure and decision-making	☐	☐	☐	☐	☐	☐
d. Rewarding to the employees	☐	☐	☐	☐	☐	☐

28-Do you have any performance management system?
Yes ☐ specify please
No ☐ please answer to the below question.

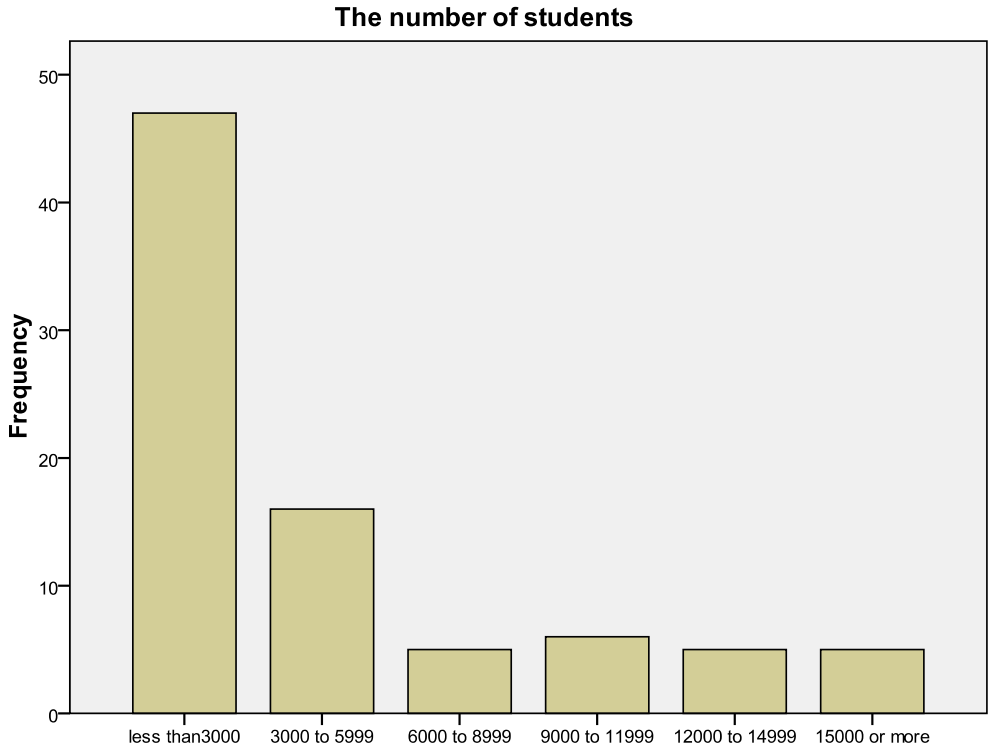
29-Do you have any plan to implement a performance management system in near future? Yes☐ no ☐

30-Could you please briefly mention how do you measure the university's teaching position each year?

Appendix C: Some Statistics about the Respondents

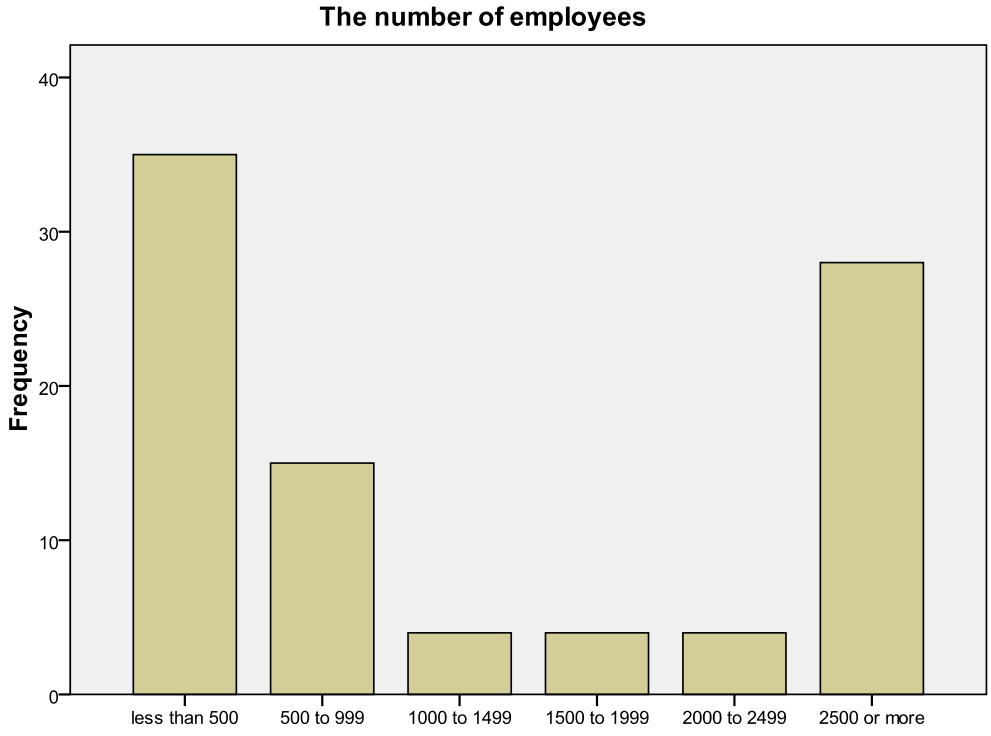
The number of students in each university

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than3000	47	43.1	56.0	56.0
	3000 to 5999	16	14.7	19.0	75.0
	6000 to 8999	5	4.6	6.0	81.0
	9000 to 11999	6	5.5	7.1	88.1
	12000 to 14999	5	4.6	6.0	94.0
	15000 or more	5	4.6	6.0	100.0
	Total	84	77.1	100.0	
Missing	System	25	22.9		
Total		109	100.0		



The number of employees in each university

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 500	35	32.1	38.9	38.9
	500 to 999	15	13.8	16.7	55.6
	1000 to 1499	4	3.7	4.4	60.0
	1500 to 1999	4	3.7	4.4	64.4
	2000 to 2499	4	3.7	4.4	68.9
	2500 or more	28	25.7	31.1	100.0
	Total	90	82.6	100.0	
Missing	System	19	17.4		
Total		109	100.0		



Work experience - Education Managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 5 years	47	43.1	52.8	52.8
	5 to 10 years	18	16.5	20.2	73.0
	11 to 15 years	15	13.8	16.9	89.9
	16 to 20 years	8	7.3	9.0	98.9
	21 to 25 years	1	.9	1.1	100.0
	Total	89	81.7	100.0	
Missing	System	20	18.3		
Total		109	100.0		

Work experience - Research Managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 5 years	63	57.8	67.0	67.0
	5 to 10 years	12	11.0	12.8	79.8
	11 to 15 years	12	11.0	12.8	92.6
	16 to 20 years	7	6.4	7.4	100.0
	Total	94	86.2	100.0	
Missing	System	15	13.8		
Total		109	100.0		

Work experience - Financial Managers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 5 years	42	38.5	45.7	45.7
	5 to 10 years	21	19.3	22.8	68.5
	11 to 15 years	9	8.3	9.8	78.3
	16 to 20 years	7	6.4	7.6	85.9
	21 to 25 years	3	2.8	3.3	89.1
	more than 25 years	10	9.2	10.9	100.0
	Total	92	84.4	100.0	
Missing	System	17	15.6		
Total		109	100.0		


work exprience education managers
Frequency
50
40
30
20
10
0
less than 5 years
5 to 10 years
11 to 15 yeard
16 to 20 years
21 to 25 years
work exprience education managers


work exprience Research managers
Frequency
60
40
20
0
less than 5 years
5 to 10 years
11 to 15 yeard
16 to 20 years
work exprience Research managers


work experience financial managers
Frequency
50
40
30
20
10
0
less than 5 years
5 to 10 years
11 to 15 yeard
16 to 20 years
21 to 25 years
more than 25 years
work experience financial managers

Appendix D: Frequency of Observed Variables (Questions)

Competitive Position

Q3-b) Extent of "competitive position" in education issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low	9	3.7	3.7	3.7
	low	55	22.4	22.4	26.0
	moderate	91	37.0	37.0	63.0
	significant	83	33.7	33.7	96.7
	very large	8	3.3	3.3	100.0
	Total	246	100.0	100.0	

Q3-c) Extent of "competitive position" in research issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low	14	5.7	5.7	5.7
	low	61	24.8	24.8	30.5
	moderate	76	30.9	30.9	61.4
	significant	74	30.1	30.1	91.5
	very large	21	8.5	8.5	100.0
	Total	246	100.0	100.0	

Q7) Existence of "competitive position" in whole

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	3	1.2	1.2	1.2
	slightly disagree	46	18.7	18.7	19.9
	slightly agree	108	43.9	43.9	63.8
	agree	81	32.9	32.9	96.7
	strongly disagree	8	3.3	3.3	100.0
	Total	246	100.0	100.0	

Financial Pressure

Q3-e) Extent of Financial pressure on university's activity, at overall

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nothing	1	.4	.4	.4
	very low	9	3.7	3.7	4.1
	low	47	19.1	19.1	23.2
	moderate	113	45.9	45.9	69.1
	significant	68	27.6	27.6	96.7
	very large	8	3.3	3.3	100.0
	Total	246	100.0	100.0	

Q4) How often they have to postpone or ignore some expenditures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	3	1.2	1.2	1.2
	rarely	8	3.3	3.3	4.5
	sometimes	42	17.1	17.1	21.5
	often	119	48.4	48.4	69.9
	frequently	68	27.6	27.6	97.6
	very frequently	6	2.4	2.4	100.0
	Total	246	100.0	100.0	

Q5) Trend of budget increase to cover inflation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	moderate increase	7	2.8	2.8	2.8
	low increase	35	14.2	14.2	17.1
	low decrease	99	40.2	40.2	57.3
	moderate decrease	93	37.8	37.8	95.1
	significant decrease	12	4.9	4.9	100.0
	Total	246	100.0	100.0	

Q6) Existence of financial pressure in universities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	6	2.4	2.4	2.4
	slightly disagree	48	19.5	19.5	22.0
	slightly agree	110	44.7	44.7	66.7
	agree	74	30.1	30.1	96.7
	strongly disagree	8	3.3	3.3	100.0
	Total	246	100.0	100.0	

Decentralization

Q3-a) Change in law to give more autonomy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nothing	7	2.8	2.8	2.8
	very low	56	22.8	22.8	25.6
	low	79	32.1	32.1	57.7
	moderate	84	34.1	34.1	91.9
	significant	20	8.1	8.1	100.0
	Total	246	100.0	100.0	

Q8-a) Authority for decision making in your special area of activity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	5	2.0	2.0	2.0
	very low increase	54	22.0	22.0	24.0
	low increase	79	32.1	32.1	56.1
	moderate increase	69	28.0	28.0	84.1
	significant increase	37	15.0	15.0	99.2
	very large increase	2	.8	.8	100.0
	Total	246	100.0	100.0	

Q8-b) Authority for legislation in your special area of activity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	6	2.4	2.4	2.4
	very low increase	57	23.2	23.2	25.6
	low increase	88	35.8	35.8	61.4
	moderate increase	82	33.3	33.3	94.7
	significant increase	13	5.3	5.3	100.0
	Total	246	100.0	100.0	

Q8-c) Authority for decision making in administrative issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	38	15.4	15.4	15.4
	low increase	87	35.4	35.4	50.8
	moderate increase	88	35.8	35.8	86.6
	significant increase	31	12.6	12.6	99.2
	very large increase	2	.8	.8	100.0
	Total	246	100.0	100.0	

Q8-d) Authority for legislation in administrative issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	3	1.2	1.2	1.2
	very low increase	62	25.2	25.2	26.4
	low increase	87	35.4	35.4	61.8
	moderate increase	73	29.7	29.7	91.5
	significant increase	21	8.5	8.5	100.0
	Total	246	100.0	100.0	

Q8-e) Authority for decision making in recruiting staff

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	4	1.6	1.6	1.6
	very low increase	77	31.3	31.3	32.9
	low increase	68	27.6	27.6	60.6
	moderate increase	74	30.1	30.1	90.7
	significant increase	23	9.3	9.3	100.0
	Total	246	100.0	100.0	

Q8-f) Authority for legislation in recruiting staff

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	31	12.6	12.6	12.6
	very low increase	68	27.6	27.6	40.2
	low increase	69	28.0	28.0	68.3
	moderate increase	63	25.6	25.6	93.9
	significant increase	15	6.1	6.1	100.0
	Total	246	100.0	100.0	

Participative Budgeting

Q13) Your involvement in finalising your budget

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low involvement	2	.8	.8	.8
	low involvement	46	18.7	18.7	19.5
	moderate involvement	101	41.1	41.1	60.6
	significant involvement	70	28.5	28.5	89.0
	high involvement	26	10.6	10.6	99.6
	very high involvement	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q14) How much convincing is budgeting manager's reasoning for revising your budget

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low extent	22	8.9	8.9	8.9
	low extent	69	28.0	28.0	37.0
	moderate extent	86	35.0	35.0	72.0
	significant extent	57	23.2	23.2	95.1
	high extent	9	3.7	3.7	98.8
	very high extent	3	1.2	1.2	100.0
	Total	246	100.0	100.0	

Q15) How often do you need to discuss about your budget

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	.4	.4	.4
	rarely	43	17.5	17.5	17.9
	sometimes	99	40.2	40.2	58.1
	often	71	28.9	28.9	87.0
	frequently	31	12.6	12.6	99.6
	very frequently	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q16) How often does budgeting department seek your suggestion regarding your budget

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	6	2.4	2.4	2.4
	rarely	63	25.6	25.6	28.0
	sometimes	100	40.7	40.7	68.7
	often	62	25.2	25.2	93.9
	frequently	12	4.9	4.9	98.8
	very frequently	3	1.2	1.2	100.0
	Total	246	100.0	100.0	

Q17) The extent of your influence in your final budget figures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low influence	3	1.2	1.2	1.2
	low influence	46	18.7	18.7	19.9
	moderate influence	97	39.4	39.4	59.3
	significant influence	74	30.1	30.1	89.4
	high influence	25	10.2	10.2	99.6
	very high influence	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q18) Importance of your participation in budget to have reasonable budget

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low importance	2	.8	.8	.8
	low importance	40	16.3	16.3	17.1
	moderate importance	106	43.1	43.1	60.2
	significant importance	79	32.1	32.1	92.3
	high importance	18	7.3	7.3	99.6
	very high importance	1	.4	.4	100.0
	Total	246	100.0	100.0	

Improved Accounting Systems

Q9-a) Demand for different accounting reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	3	1.2	1.2	1.2
	low increase	24	9.8	9.8	11.0
	moderate increase	97	39.4	39.4	50.4
	significant increase	101	41.1	41.1	91.5
	very large increase	21	8.5	8.5	100.0
	Total	246	100.0	100.0	

Q9-b) Frequency of accounting reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	9	3.7	3.7	3.7
	low increase	43	17.5	17.5	21.1
	moderate increase	70	28.5	28.5	49.6
	significant increase	90	36.6	36.6	86.2
	very large increase	34	13.8	13.8	100.0
	Total	246	100.0	100.0	

Q9-c) Speed of preparing accounting reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	6	2.4	2.4	2.4
	low increase	30	12.2	12.2	14.6
	moderate increase	85	34.6	34.6	49.2
	significant increase	98	39.8	39.8	89.0
	very large increase	27	11.0	11.0	100.0
	Total	246	100.0	100.0	

Q9-d) Use of internal auditing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	12	4.9	4.9	4.9
	very low increase	30	12.2	12.2	17.1
	low increase	58	23.6	23.6	40.7
	moderate increase	49	19.9	19.9	60.6
	significant increase	60	24.4	24.4	85.0
	very large increase	37	15.0	15.0	100.0
	Total	246	100.0	100.0	

Q9-e) Use of independent auditing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	5	2.0	2.0	2.0
	low increase	49	19.9	19.9	22.0
	moderate increase	77	31.3	31.3	53.3
	significant increase	91	37.0	37.0	90.2
	very large increase	24	9.8	9.8	100.0
	Total	246	100.0	100.0	

Q9-f) Accuracy of accounting reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	9	3.7	3.7	3.7
	low increase	26	10.6	10.6	14.2
	moderate increase	71	28.9	28.9	43.1
	significant increase	113	45.9	45.9	89.0
	very large increase	27	11.0	11.0	100.0
	Total	246	100.0	100.0	

Q9-g) Qualification of accounting reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	2	.8	.8	.8
	low increase	39	15.9	15.9	16.7
	moderate increase	88	35.8	35.8	52.4
	significant increase	86	35.0	35.0	87.4
	very large increase	31	12.6	12.6	100.0
	Total	246	100.0	100.0	

Q9-h) Use of non-financial information in accounting reports

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	8	3.3	3.3	3.3
	very low increase	28	11.4	11.4	14.6
	low increase	96	39.0	39.0	53.7
	moderate increase	61	24.8	24.8	78.5
	significant increase	48	19.5	19.5	98.0
	very large increase	5	2.0	2.0	100.0
	Total	246	100.0	100.0	

Q9-i) Use of new techniques of management accounting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	6	2.4	2.4	2.4
	very low increase	40	16.3	16.3	18.7
	low increase	48	19.5	19.5	38.2
	moderate increase	85	34.6	34.6	72.8
	significant increase	55	22.4	22.4	95.1
	very large increase	12	4.9	4.9	100.0
	Total	246	100.0	100.0	

Q9-j) Computerising accounting practices

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low increase	35	14.2	14.2	14.2
	low increase	48	19.5	19.5	33.7
	moderate increase	92	37.4	37.4	71.1
	significant increase	51	20.7	20.7	91.9
	very large increase	20	8.1	8.1	100.0
	Total	246	100.0	100.0	

Q9-k) Automatic reporting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	10	4.1	4.1	4.1
	very low increase	47	19.1	19.1	23.2
	low increase	64	26.0	26.0	49.2
	moderate increase	65	26.4	26.4	75.6
	significant increase	46	18.7	18.7	94.3
	very large increase	14	5.7	5.7	100.0
	Total	246	100.0	100.0	

More Budget Emphasis

Q10) Extent of budget emphasise

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nothing	3	1.2	1.2	1.2
	very small extent	8	3.3	3.3	4.5
	modest extent	42	17.1	17.1	21.5
	moderate extent	77	31.3	31.3	52.8
	significant extent	84	34.1	34.1	87.0
	very large extent	32	13.0	13.0	100.0
	Total	246	100.0	100.0	

Q11) Restriction for department managers to transfer budget funds

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	more than 20 percent	2	.8	.8	.8
	less than 20 percent	4	1.6	1.6	2.4
	less than 15 percent	40	16.3	16.3	18.7
	less than 10 percent	79	32.1	32.1	50.8
	less than 5 percent	95	38.6	38.6	89.4
	nothing	26	10.6	10.6	100.0
	Total	246	100.0	100.0	

Q12) Importance of compliance between actual and budgeted figures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low importance	7	2.8	2.8	2.8
	moderate importance	36	14.6	14.6	17.5
	significant importance	98	39.8	39.8	57.3
	high importance	87	35.4	35.4	92.7
	very high importance	18	7.3	7.3	100.0
	Total	246	100.0	100.0	

Satisfaction with Budgets

Q19-a) Satisfaction with completeness of budget figures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very dissatisfied	4	1.6	1.6	1.6
	dissatisfied	66	26.8	26.8	28.5
	slightly dissatisfied	76	30.9	30.9	59.3
	slightly satisfied	72	29.3	29.3	88.6
	satisfied	27	11.0	11.0	99.6
	very satisfied	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q19-b) Satisfaction with fairness of budget figures

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very dissatisfied	5	2.0	2.0	2.0
	dissatisfied	52	21.1	21.1	23.2
	slightly dissatisfied	87	35.4	35.4	58.5
	slightly satisfied	79	32.1	32.1	90.7
	satisfied	21	8.5	8.5	99.2
	very satisfied	2	.8	.8	100.0
	Total	246	100.0	100.0	

Q19-c) Satisfaction with flexibility of budgets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very dissatisfied	5	2.0	2.0	2.0
	dissatisfied	38	15.4	15.4	17.5
	slightly dissatisfied	95	38.6	38.6	56.1
	slightly satisfied	75	30.5	30.5	86.6
	satisfied	33	13.4	13.4	100.0
	Total	246	100.0	100.0	

Q20) Staff's satisfaction with budgets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very dissatisfied	1	.4	.4	.4
	dissatisfied	45	18.3	18.3	18.7
	slightly dissatisfied	99	40.2	40.2	58.9
	slightly satisfied	75	30.5	30.5	89.4
	satisfied	26	10.6	10.6	100.0
	Total	246	100.0	100.0	

Competitive Advantage

Q21-a) Use of accounting for competitors' cost assessment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low extent	84	34.1	34.1	34.1
	low extent	92	37.4	37.4	71.5
	moderate extent	34	13.8	13.8	85.4
	significant extent	32	13.0	13.0	98.4
	high extent	4	1.6	1.6	100.0
	Total	246	100.0	100.0	

Q21-b) Use of accounting for competitors' position monitoring

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low extent	62	25.2	25.2	25.2
	low extent	101	41.1	41.1	66.3
	moderate extent	59	24.0	24.0	90.2
	significant extent	18	7.3	7.3	97.6
	high extent	6	2.4	2.4	100.0
	Total	246	100.0	100.0	

Q21-c) Use of accounting for strategic costing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low extent	61	24.8	24.8	24.8
	low extent	100	40.7	40.7	65.4
	moderate extent	68	27.6	27.6	93.1
	significant extent	16	6.5	6.5	99.6
	high extent	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q21-d) Use of accounting for offering competitive price in proposals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low extent	57	23.2	23.2	23.2
	low extent	112	45.5	45.5	68.7
	moderate extent	44	17.9	17.9	86.6
	significant extent	31	12.6	12.6	99.2
	high extent	2	.8	.8	100.0
	Total	246	100.0	100.0	

Improvement in Reward Systems

Q23-a) Relation between faculty members salary and job performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	43	17.5	17.5	17.5
	disagree	80	32.5	32.5	50.0
	slightly disagree	52	21.1	21.1	71.1
	slightly agree	42	17.1	17.1	88.2
	agree	23	9.3	9.3	97.6
	strongly disagree	6	2.4	2.4	100.0
	Total	246	100.0	100.0	

Q23-b) Relation between faculty members other earnings and job performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	14	5.7	5.7	5.7
	disagree	66	26.8	26.8	32.5
	slightly disagree	62	25.2	25.2	57.7
	slightly agree	52	21.1	21.1	78.9
	agree	40	16.3	16.3	95.1
	strongly disagree	12	4.9	4.9	100.0
	Total	246	100.0	100.0	

Q23-c) Relation between faculty members annual promotion and job performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	18	7.3	7.3	7.3
	disagree	50	20.3	20.3	27.6
	slightly disagree	73	29.7	29.7	57.3
	slightly agree	57	23.2	23.2	80.5
	agree	35	14.2	14.2	94.7
	strongly disagree	13	5.3	5.3	100.0
	Total	246	100.0	100.0	

Q24-a) Relation between staff salary and job performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	39	15.9	15.9	15.9
	disagree	56	22.8	22.8	38.6
	slightly disagree	73	29.7	29.7	68.3
	slightly agree	49	19.9	19.9	88.2
	agree	20	8.1	8.1	96.3
	strongly disagree	9	3.7	3.7	100.0
	Total	246	100.0	100.0	

Q24-b) Relation between staff overtime payments and job performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	9	3.7	3.7	3.7
	disagree	60	24.4	24.4	28.0
	slightly disagree	85	34.6	34.6	62.6
	slightly agree	61	24.8	24.8	87.4
	agree	22	8.9	8.9	96.3
	strongly disagree	9	3.7	3.7	100.0
	Total	246	100.0	100.0	

Q24-c) Relation between staff other earnings and job performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	7	2.8	2.8	2.8
	disagree	53	21.5	21.5	24.4
	slightly disagree	75	30.5	30.5	54.9
	slightly agree	74	30.1	30.1	85.0
	agree	31	12.6	12.6	97.6
	strongly disagree	6	2.4	2.4	100.0
	Total	246	100.0	100.0	

Q24-d) Relation between staff annual promotion and job performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	14	5.7	5.7	5.7
	disagree	47	19.1	19.1	24.8
	slightly disagree	89	36.2	36.2	61.0
	slightly agree	63	25.6	25.6	86.6
	agree	22	8.9	8.9	95.5
	strongly disagree	11	4.5	4.5	100.0
	Total	246	100.0	100.0	

Comprehensive Performance Measures

Q22-a) Task accomplishment on time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low important	1	.4	.4	.4
	low important	15	6.1	6.1	6.5
	moderate important	28	11.4	11.4	17.9
	significant important	61	24.8	24.8	42.7
	high important	82	33.3	33.3	76.0
	very high important	59	24.0	24.0	100.0
	Total	246	100.0	100.0	

Q22-b) Extent of effort put into their jobs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low important	3	1.2	1.2	1.2
	low important	9	3.7	3.7	4.9
	moderate important	31	12.6	12.6	17.5
	significant important	74	30.1	30.1	47.6
	high important	81	32.9	32.9	80.5
	very high important	48	19.5	19.5	100.0
	Total	246	100.0	100.0	

Q22-c) Extent of students satisfaction with them

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low important	5	2.0	2.0	2.0
	low important	13	5.3	5.3	7.3
	moderate important	48	19.5	19.5	26.8
	significant important	91	37.0	37.0	63.8
	high important	62	25.2	25.2	89.0
	very high important	27	11.0	11.0	100.0
	Total	246	100.0	100.0	

Q22-d) Their attitudes to their work and university

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low important	3	1.2	1.2	1.2
	low important	9	3.7	3.7	4.9
	moderate important	61	24.8	24.8	29.7
	significant important	81	32.9	32.9	62.6
	high important	63	25.6	25.6	88.2
	very high important	29	11.8	11.8	100.0
	Total	246	100.0	100.0	

Q22-e) Their concern with costs and budgets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low important	10	4.1	4.1	4.1
	moderate important	26	10.6	10.6	14.6
	significant important	75	30.5	30.5	45.1
	high important	88	35.8	35.8	80.9
	very high important	47	19.1	19.1	100.0
	Total	246	100.0	100.0	

Q22-f) Punctuality and length of their presence in their workplace

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low important	1	.4	.4	.4
	low important	8	3.3	3.3	3.7
	moderate important	27	11.0	11.0	14.6
	significant important	58	23.6	23.6	38.2
	high important	88	35.8	35.8	74.0
	very high important	64	26.0	26.0	100.0
	Total	246	100.0	100.0	

Q22-g) Their concerns with quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low important	4	1.6	1.6	1.6
	low important	9	3.7	3.7	5.3
	moderate important	49	19.9	19.9	25.2
	significant important	62	25.2	25.2	50.4
	high important	74	30.1	30.1	80.5
	very high important	48	19.5	19.5	100.0
	Total	246	100.0	100.0	

Usage of Accounting Information in PM

Q27-a) Goal definition and standard setting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nothing	7	2.8	2.8	2.8
	very low extent	68	27.6	27.6	30.5
	low extent	93	37.8	37.8	68.3
	moderate extent	57	23.2	23.2	91.5
	large extent	20	8.1	8.1	99.6
	very large extent	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q27-b) Performance measurement and comparing to targets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nothing	1	.4	.4	.4
	very low extent	58	23.6	23.6	24.0
	low extent	113	45.9	45.9	69.9
	moderate extent	53	21.5	21.5	91.5
	large extent	20	8.1	8.1	99.6
	very large extent	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q27-c) Controlling expenditures and decision-making

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nothing	7	2.8	2.8	2.8
	very low extent	53	21.5	21.5	24.4
	low extent	82	33.3	33.3	57.7
	moderate extent	78	31.7	31.7	89.4
	large extent	19	7.7	7.7	97.2
	very large extent	7	2.8	2.8	100.0
	Total	246	100.0	100.0	

Q27-a) Rewarding to the employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	nothing	3	1.2	1.2	1.2
	very low extent	49	19.9	19.9	21.1
	low extent	88	35.8	35.8	56.9
	moderate extent	82	33.3	33.3	90.2
	large extent	18	7.3	7.3	97.6
	very large extent	6	2.4	2.4	100.0
	Total	246	100.0	100.0	

Universities departmental performance

Q25-a) First key performance indicator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very below average	3	1.2	1.2	1.2
	much below average	22	8.9	8.9	10.2
	slightly below average	81	32.9	32.9	43.1
	slightly above average	95	38.6	38.6	81.7
	much above average	43	17.5	17.5	99.2
	very above average	2	.8	.8	100.0
	Total	246	100.0	100.0	

Q25-b) Second key performance indicator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very below average	3	1.2	1.2	1.2
	much below average	28	11.4	11.4	12.6
	slightly below average	97	39.4	39.4	52.0
	slightly above average	85	34.6	34.6	86.6
	much above average	30	12.2	12.2	98.8
	very above average	3	1.2	1.2	100.0
	Total	246	100.0	100.0	

Q25-c) Third key performance indicator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very below average	1	.4	.4	.4
	much below average	22	8.9	8.9	9.3
	slightly below average	90	36.6	36.6	45.9
	slightly above average	89	36.2	36.2	82.1
	much above average	35	14.2	14.2	96.3
	very above average	9	3.7	3.7	100.0
	Total	246	100.0	100.0	

Q25-d) Fourth key performance indicator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very below average	1	.4	.4	.4
	much below average	35	14.2	14.2	14.6
	slightly below average	96	39.0	39.0	53.7
	slightly above average	80	32.5	32.5	86.2
	much above average	33	13.4	13.4	99.6
	very above average	1	.4	.4	100.0
	Total	246	100.0	100.0	

Q25-e) Fifth key performance indicator

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very below average	32	13.0	13.0	13.0
	much below average	81	32.9	32.9	45.9
	slightly below average	58	23.6	23.6	69.5
	slightly above average	42	17.1	17.1	86.6
	much above average	29	11.8	11.8	98.4
	very above average	4	1.6	1.6	100.0
	Total	246	100.0	100.0	

Q26) Overall level of departmental performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	much below average	11	4.5	4.5	4.5
	slightly below average	79	32.1	32.1	36.6
	slightly above average	99	40.2	40.2	76.8
	much above average	56	22.8	22.8	99.6
	very above average	1	.4	.4	100.0
	Total	246	100.0	100.0	

Appendix E: Evaluations and Estimations of Structural Models

Accounting System Model

Assessment of normality (Accounting System Model)

Variable	min	max	skew	c.r.	kurtosis	c.r.
DEPPER3	1.000	6.000	.265	1.698	-.107	-.343
PARBUD6	1.000	6.000	.122	.781	-.194	-.622
SATBUD2	1.000	6.000	.076	.486	-.388	-1.242
COMADV4	1.000	5.000	.589	3.769	-.358	-1.147
DECENT4	2.000	6.000	.105	.674	-.581	-1.859
DEPPER6	2.000	6.000	-.065	-.418	-.701	-2.243
DEPPER1	1.000	6.000	-.191	-1.222	-.211	-.675
IMPACC11	1.000	6.000	.033	.212	-.732	-2.343
SATBUD4	1.000	5.000	.134	.857	-.653	-2.091
BUDEMP1	1.000	6.000	-.449	-2.873	.008	.025
SATBUD1	1.000	6.000	.154	.983	-.793	-2.540
SATBUD3	1.000	5.000	-.058	-.374	-.492	-1.577
DEPPER4	1.000	6.000	.100	.642	-.554	-1.774
DEPPER2	1.000	6.000	.066	.421	-.086	-.274
COMADV3	1.000	5.000	.352	2.252	-.472	-1.511
COMADV1	1.000	5.000	.757	4.846	-.350	-1.120
COMADV2	1.000	5.000	.663	4.248	.107	.344
PARBUD1	1.000	6.000	.201	1.288	-.455	-1.455
PARBUD5	1.000	6.000	.119	.764	-.439	-1.406
PARBUD3	1.000	6.000	.202	1.296	-.590	-1.889
BUDEMP2	1.000	6.000	-.453	-2.903	.167	.536
BUDEMP3	2.000	6.000	-.256	-1.641	-.147	-.471
IMPACC10	2.000	6.000	-.035	-.225	-.659	-2.109
IMPACC9	1.000	6.000	-.220	-1.411	-.613	-1.964
IMPACC8	1.000	6.000	-.005	-.031	-.387	-1.241
COMPOS3	2.000	6.000	-.120	-.766	-.385	-1.233
COMPOS2	2.000	6.000	-.073	-.468	-.725	-2.320
COMPOS1	2.000	6.000	-.242	-1.550	-.527	-1.688
DECENT1	1.000	5.000	-.113	-.723	-.679	-2.175
DECENT2	1.000	6.000	.084	.537	-.739	-2.366
DECENT3	1.000	5.000	-.100	-.642	-.610	-1.954
FINPRE4	2.000	6.000	-.151	-.970	-.238	-.763
FINPRE2	1.000	6.000	-.597	-3.823	.959	3.071
FINPRE1	1.000	6.000	-.305	-1.953	.215	.687
Multivariate					1.414	.224

Model Fit Summary

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	85	624.340	510	.000	1.224
Saturated model	595	.000	0		
Independence model	34	5225.128	561	.000	9.314

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.053	.878	.858	.753
Saturated model	.000	1.000		
Independence model	.220	.357	.318	.336

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.881	.869	.976	.973	.975
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.909	.800	.887
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.030	.021	.038	1.000
Independence model	.184	.180	.189	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	794.340	822.673	1092.293	1177.293
Saturated model	1190.000	1388.333	3275.672	3870.672
Independence model	5293.128	5304.462	5412.310	5446.310

Variances of exogenous variables

Exogenous variables	Estimate	S.E.	C.R.	P
COMPOS (competitive position)	.380	.072	5.274	***
DECENT (decentralization)	.807	.088	9.180	***
FINPRE (financial pressure)	.642	.075	8.606	***
e21 (improved accounting sys.)	1.019	.124	8.189	***
e19 (participative budgeting)	.511	.067	7.574	***
e34 (competitive advantage)	.823	.101	8.120	***
e33 (satisfaction with budgets)	.519	.074	7.007	***
e20 (budget emphasis)	.619	.093	6.680	***
e35 (departmental performance)	.294	.051	5.793	***
e13	.135	.031	4.404	***
e14	.344	.037	9.279	***
e15	.202	.029	6.986	***
e10	.156	.022	6.950	***
e11	.384	.041	9.366	***
e12	.152	.024	6.259	***
e16	.446	.054	8.327	***
e17	.399	.073	5.507	***
e18	.332	.043	7.798	***
e22	.430	.046	9.316	***
e23	.327	.043	7.692	***
e24	.354	.042	8.406	***
e32	.419	.047	8.880	***
e31	.337	.052	6.489	***
e6	.324	.037	8.677	***
e7	.262	.034	7.793	***
e8	.278	.034	8.119	***
e26	.311	.037	8.406	***
e27	.171	.026	6.461	***
e28	.292	.031	9.396	***
e30	.377	.063	6.026	***
e25	.347	.047	7.414	***
e9	.351	.036	9.826	***
e29	.248	.030	8.262	***
e4	.464	.054	8.622	***
e1	.391	.044	8.955	***
e2	.310	.043	7.183	***
e3	.418	.049	8.573	***
e5	.290	.033	8.863	***
e38	.315	.039	8.106	***
e39	.501	.050	10.041	***
e37	.438	.046	9.610	***
e36	.340	.039	8.686	***

Performance Management Model

Assessment of normality (Performance Management System)

Variable	min	max	skew	c.r.	kurtosis	c.r.
USACPM2	1.000	6.000	.481	3.082	-.184	-.591
COMPME4	1.000	6.000	-.121	-.774	-.340	-1.088
DECENT4	2.000	6.000	.105	.674	-.581	-1.859
DEPPER6	2.000	6.000	-.065	-.418	-.701	-2.243
DEPPER1	1.000	6.000	-.191	-1.222	-.211	-.675
USACPM4	1.000	6.000	.278	1.780	-.049	-.157
USACPM1	1.000	6.000	.282	1.804	-.407	-1.303
USACPM3	1.000	6.000	.226	1.450	-.133	-.427
DEPPER4	1.000	6.000	.100	.642	-.554	-1.774
COMPME3	1.000	6.000	-.319	-2.042	-.015	-.047
COMPME1	1.000	6.000	-.599	-3.836	-.309	-.991
COMPME2	1.000	6.000	-.564	-3.615	.078	.251
DEPPER2	1.000	6.000	.066	.421	-.086	-.274
DEPPER3	1.000	6.000	.265	1.698	-.107	-.343
REWSYS3	1.000	6.000	.162	1.035	-.609	-1.949
REWSYS2	1.000	6.000	.242	1.548	-.815	-2.610
REWSYS7	1.000	6.000	.271	1.734	-.115	-.367
REWSYS6	1.000	6.000	.130	.831	-.498	-1.596
REWSYS5	1.000	6.000	.390	2.498	-.176	-.563
COMPOS3	2.000	6.000	-.120	-.766	-.385	-1.233
COMPOS2	2.000	6.000	-.073	-.468	-.725	-2.320
COMPOS1	2.000	6.000	-.242	-1.550	-.527	-1.688
DECENT1	1.000	5.000	-.113	-.723	-.679	-2.175
DECENT2	1.000	6.000	.084	.537	-.739	-2.366
DECENT3	1.000	5.000	-.100	-.642	-.610	-1.954
Multivariate					15.035	3.209

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	63	322.958	262	.006	1.233
Saturated model	325	.000	0		
Independence model	25	3332.638	300	.000	11.109

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.050	.907	.884	.731
Saturated model	.000	1.000		
Independence model	.259	.390	.340	.360

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.903	.889	.980	.977	.980
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.873	.789	.856
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.031	.017	.042	.999
Independence model	.203	.197	.209	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	448.958	463.917	669.794	732.794
Saturated model	650.000	727.169	1789.233	2114.233
Independence model	3382.638	3388.574	3470.271	3495.271

Variances of exogenous variables

Exogenous variables	Estimate	S.E.	C.R.	P
COMPOS (competitive position)	.374	.072	5.221	***
DECENT (decentralization)	.802	.088	9.131	***
e15 (other staff's reward system)	.739	.107	6.925	***
e24 (comprehensive performance measures)	.884	.112	7.862	***
e14 (faculty members' reward system)	.579	.119	4.869	***
e23 (use of accounting in PM)	.662	.090	7.335	***
e25 (departmental performance)	.336	.058	5.809	***
e8	.153	.022	6.861	***
e9	.384	.041	9.362	***
e10	.158	.025	6.434	***
e11	.453	.054	8.416	***
e12	.379	.073	5.159	***
e13	.339	.043	7.945	***
e16	.452	.063	7.142	***
e17	.217	.062	3.520	***
e18	.815	.082	9.924	***
e5	.480	.161	2.977	.003
e6	.870	.135	6.457	***
e28	.308	.039	7.935	***
e27	.447	.046	9.632	***
e19	.340	.052	6.506	***
e20	.148	.047	3.151	.002
e21	.813	.078	10.490	***
e26	.347	.040	8.705	***
e29	.492	.049	9.966	***
e7	.349	.036	9.811	***
e22	.840	.079	10.617	***
e4	.253	.035	7.159	***
e1	.371	.042	8.835	***
e2	.382	.045	8.397	***
e3	.283	.033	8.547	***
e30	.240	.030	8.010	***

Accounting System Model for Different Departments

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	255	1910.402	1530	.000	1.249
Saturated model	1785	.000	0		
Independence model	102	6519.949	1683	.000	3.874

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.084	.712	.664	.611
Saturated model	.000	1.000		
Independence model	.229	.326	.285	.307

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.707	.678	.924	.913	.921
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.909	.643	.838
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.032	.027	.037	1.000
Independence model	.109	.106	.112	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	2420.402	2808.569		
Saturated model	3570.000	6287.174		
Independence model	6723.949	6879.216		

Education Departments

Regression Weights: (Education managers- Divisional Acc. Sys. - Default model)

		Estimate	S.E.	C.R.	P	Label
IMPACC	<--- COMPOS	.611	.283	2.160	.031	
IMPACC	<--- DECENT	.060	.139	.432	.666	
PARBUD	<--- FINPRE	-.162	.138	-1.175	.240	
IMPACC	<--- FINPRE	.176	.212	.828	.408	
PARBUD	<--- DECENT	.365	.103	3.528	***	
SATBUD	<--- PARBUD	.081	.121	.668	.504	
COMADV	<--- IMPACC	.033	.096	.349	.727	
BUDEMP	<--- FINPRE	.453	.156	2.903	.004	
BUDEMP	<--- DECENT	.064	.105	.609	.542	
DEPPER	<--- COMADV	.105	.075	1.396	.163	
DEPPER	<--- SATBUD	.205	.087	2.358	.018	
DEPPER	<--- BUDEMP	-.068	.086	-.796	.426	
DEPPER	<--- PARBUD	.286	.089	3.195	.001	
DEPPER	<--- IMPACC	.011	.060	.188	.851	

Research Departments

Regression Weights: (Research managers- Divisional Acc. Sys. - Default model)

		Estimate	S.E.	C.R.	P	Label
IMPACC	<--- COMPOS	.733	.230	3.182	.001	
IMPACC	<--- DECENT	.160	.147	1.085	.278	
PARBUD	<--- FINPRE	.028	.183	.151	.880	
IMPACC	<--- FINPRE	-.177	.274	-.644	.520	
PARBUD	<--- DECENT	.345	.097	3.568	***	
SATBUD	<--- PARBUD	.489	.138	3.534	***	
COMADV	<--- IMPACC	.079	.091	.868	.385	
BUDEMP	<--- FINPRE	.723	.208	3.471	***	
BUDEMP	<--- DECENT	.168	.092	1.832	.067	
DEPPER	<--- COMADV	.129	.079	1.632	.103	
DEPPER	<--- SATBUD	.461	.130	3.547	***	
DEPPER	<--- BUDEMP	-.049	.097	-.499	.618	
DEPPER	<--- PARBUD	.230	.112	2.056	.040	
DEPPER	<--- IMPACC	.031	.058	.538	.591	

Financial Departments

Regression Weights: (Financial managers- Divisional Acc. Sys. - Default model)

	Estimate	S.E.	C.R.	P	Label
IMPACC <--- COMPOS	.745	.258	2.885	.004	
IMPACC <--- DECENT	.027	.142	.186	.852	
PARBUD <--- FINPRE	-.240	.089	-2.698	.007	
IMPACC <--- FINPRE	.109	.129	.842	.400	
PARBUD <--- DECENT	.150	.099	1.514	.130	
SATBUD <--- PARBUD	.574	.130	4.410	***	
COMADV <--- IMPACC	-.100	.110	-.915	.360	
BUDEMP <--- FINPRE	.372	.124	3.008	.003	
BUDEMP <--- DECENT	.157	.137	1.148	.251	
DEPPER <--- COMADV	-.020	.081	-.242	.809	
DEPPER <--- SATBUD	.397	.152	2.608	.009	
DEPPER <--- BUDEMP	-.088	.083	-1.069	.285	
DEPPER <--- PARBUD	.165	.147	1.123	.262	
DEPPER <--- IMPACC	.222	.080	2.793	.005	

Performance Management Model for Different Departments

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	189	1033.355	786	.000	1.315
Saturated model	975	.000	0		
Independence model	75	4122.206	900	.000	4.580

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.087	.766	.709	.617
Saturated model	.000	1.000		
Independence model	.278	.361	.308	.333

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.749	.713	.926	.912	.923
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.873	.654	.806
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.036	.030	.042	1.000
Independence model	.121	.118	.125	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	1411.355	1590.086		
Saturated model	1950.000	2872.027		
Independence model	4272.206	4343.131		

Education Departments

Regression Weights: (Education managers-Divisional PM System - Default model)

	Estimate	S.E.	C.R.	P	Label
SREWSYS <--- DECENT	.381	.159	2.394	.017	
SREWSYS <--- COMPOS	.260	.283	.918	.359	
COMPME <--- COMPOS	.870	.293	2.967	.003	
USACPM <--- DECENT	.227	.117	1.949	.051	
FREWSYS <--- DECENT	.099	.176	.564	.572	
FREWSYS <--- SREWSYS	.376	.145	2.602	.009	
USACPM <--- COMPOS	.245	.208	1.175	.240	
FREWSYS <--- COMPOS	.208	.302	.688	.491	
DEPPER <--- USACPM	.137	.081	1.685	.092	
DEPPER <--- SREWSYS	-.025	.065	-.386	.699	
DEPPER <--- FREWSYS	.091	.065	1.408	.159	
DEPPER <--- COMPME	.188	.062	3.006	.003	

Research Departments

Regression Weights: (Research managers-Divisional PM System - Default model)

	Estimate	S.E.	C.R.	P	Label
SREWSYS <--- DECENT	.356	.127	2.807	.005	
SREWSYS <--- COMPOS	-.144	.162	-.888	.375	
COMPME <--- COMPOS	.482	.163	2.958	.003	
USACPM <--- DECENT	.365	.149	2.444	.015	
FREWSYS <--- DECENT	.049	.091	.543	.587	
FREWSYS <--- SREWSYS	.554	.159	3.494	***	
USACPM <--- COMPOS	.295	.192	1.538	.124	
FREWSYS <--- COMPOS	.289	.128	2.253	.024	
DEPPER <--- USACPM	.076	.073	1.035	.301	
DEPPER <--- SREWSYS	.128	.150	.854	.393	
DEPPER <--- FREWSYS	-.068	.188	-.362	.718	
DEPPER <--- COMPME	.256	.090	2.838	.005	

Financial Departments

Regression Weights: (Financial managers-Divisional PM System - Default model)

	Estimate	S.E.	C.R.	P	Label
SREWSYS <--- DECENT	.336	.135	2.479	.013	
SREWSYS <--- COMPOS	-.048	.216	-.224	.823	
COMPME <--- COMPOS	.615	.222	2.770	.006	
USACPM <--- DECENT	.143	.092	1.553	.120	
FREWSYS <--- DECENT	.143	.104	1.376	.169	
FREWSYS <--- SREWSYS	.389	.129	3.003	.003	
USACPM <--- COMPOS	.131	.148	.882	.378	
FREWSYS <--- COMPOS	-.251	.165	-1.521	.128	
DEPPER <--- USACPM	.583	.151	3.854	***	
DEPPER <--- SREWSYS	.168	.113	1.481	.139	
DEPPER <--- FREWSYS	-.227	.171	-1.327	.184	
DEPPER <--- COMPME	.231	.082	2.806	.005	

Appendix F: Results of Bootstrapping Analysis

Accounting System Model

Bootstrapped standard errors of "Accounting System" structural model

Parameter			SE	SE-SE	Mean	Bias	SE-Bias
IMPACC	<--	COMPOS	.145	.005	.722	-.001	.006
IMPACC	<--	DECENT	.093	.003	.052	-.003	.004
IMPACC	<--	FINPRE	.092	.003	.113	-.003	.004
COMADV	<--	IMPACC	.051	.002	.033	.001	.002
PARBUD	<--	DECENT	.056	.002	.321	-.001	.002
PARBUD	<--	FINPRE	.070	.002	-.220	-.001	.003
SATBUD	<--	PARBUD	.078	.002	.412	.000	.003
BUDEMP	<--	DECENT	.068	.002	.113	-.001	.003
BUDEMP	<--	FINPRE	.099	.003	.484	-.005	.004
DEPPER	<--	IMPACC	.044	.001	.079	.001	.002
DEPPER	<--	COMADV	.050	.002	.052	.003	.002
DEPPER	<--	PARBUD	.076	.002	.253	-.006	.003
DEPPER	<--	SATBUD	.078	.002	.280	.010	.003
DEPPER	<--	BUDEMP	.053	.002	-.047	.000	.002

Bootstrapped confidence intervals of "Accounting System" structural model

Parameter			Estimate	Lower	Upper	P
IMPACC	<--	COMPOS	.723	.477	.958	.004
IMPACC	<--	DECENT	.055	-.086	.213	.478
IMPACC	<--	FINPRE	.116	-.037	.278	.212
COMADV	<--	IMPACC	.033	-.058	.118	.536
PARBUD	<--	FINPRE	-.219	-.339	-.120	.004
PARBUD	<--	DECENT	.323	.236	.416	.004
SATBUD	<--	PARBUD	.412	.284	.539	.005
BUDEMP	<--	DECENT	.114	.007	.224	.080
BUDEMP	<--	FINPRE	.489	.345	.683	.002
DEPPER	<--	IMPACC	.078	.013	.155	.061
DEPPER	<--	COMADV	.049	-.032	.125	.335
DEPPER	<--	SATBUD	.270	.148	.402	.006
DEPPER	<--	PARBUD	.259	.144	.397	.002
DEPPER	<--	BUDEMP	-.047	-.132	.038	.344

Performance Management Model

Bootstrapped standard errors of "Performance Management" structural model

Parameter			SE	SE-SE	Mean	Bias	SE-Bias
SREWSYS	<--	COMPOS	.118	.004	.032	.000	.005
FREWSYS	<--	COMPOS	.144	.005	.121	.009	.006
COMPME	<--	COMPOS	.131	.004	.621	.000	.006
USACPM	<--	COMPOS	.095	.003	.206	.005	.004
SREWSYS	<--	DECENT	.071	.002	.321	-.002	.003
FREWSYS	<--	DECENT	.072	.002	.113	-.001	.003
USACPM	<--	DECENT	.070	.002	.283	.004	.003
FREWSYS	<--	SREWSYS	.123	.004	.499	.000	.005
DEPPER	<--	SREWSYS	.070	.002	.034	.005	.003
DEPPER	<--	FREWSYS	.080	.003	.031	.001	.004
DEPPER	<--	COMPME	.045	.001	.201	-.002	.002
DEPPER	<--	USACPM	.055	.002	.197	-.003	.002

Bootstrapped confidence interval of "Performance Management" structural model

Parameter			Estimate	Lower	Upper	P
SREWSYS	<--	COMPOS	.032	-.147	.245	.756
FREWSYS	<--	COMPOS	.112	-.105	.351	.436
COMPME	<--	COMPOS	.621	.442	.909	.002
USACPM	<--	COMPOS	.200	.055	.362	.045
SREWSYS	<--	DECENT	.323	.211	.450	.003
FREWSYS	<--	DECENT	.114	.001	.236	.099
USACPM	<--	DECENT	.278	.163	.389	.006
FREWSYS	<--	SREWSYS	.499	.296	.721	.004
DEPPER	<--	SREWSYS	.029	-.086	.140	.711
DEPPER	<--	FREWSYS	.030	-.100	.168	.667
DEPPER	<--	COMPME	.204	.130	.281	.003
DEPPER	<--	USACPM	.200	.114	.303	.002

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