

## Establishment of Integrated Accounting Information Systems in an Emerging Market-Problems and Barriers

Reyhaneh Haghighi<sup>1</sup>  
Mohammad Ali Bagherpour Velashani<sup>2</sup>  
Mohammad Javad Saei<sup>3</sup>

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### Abstract:

This research study is aimed to investigate barriers and problems of establishment process of integrated accounting information systems (IAIS) in the universities of an emerging market (Iran) in order to facilitate their establishment. The research population includes Iranian state universities' CFO and his/her deputy, as well as IT specialists involved in the process of establishment of IAIS in those universities in 2016 and 2017. The required data was collection using a questionnaire designed and developed by the researchers in accordance with the literature (there was no standard questionnaire). The collected data was analyzed at three levels "Total population (Population) ", "CFO or Deputy" (Managers) and "IT Specialists"(Specialists). The results at "Population " level show that the most important problem is related to" design and establishment of the IAIS" and problems related to "project analysis and risk" and "plan" are the least important. Other problems are "employees", "culture", "managers", "and level of information technology and information systems in the university".

From the Managers and Specialists' point of view problems related to "design and establishment of IAIS" have the most importance. This case study would be of value to regulators, senior managers, system analysts, university authorities especially CFOs and IT managers, and researcher especially in developing and emerging markets.

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<sup>1</sup> Ph.D Candidate, Ferdowsi University of Mashhad, re.haghighi@mail.um.ac.ir.

<sup>2</sup> Associate Professor of Accounting, Ferdowsi University of Mashhad, Corresponding Author: Bagherpour@um.ac.ir.

<sup>3</sup> Assistant Professor, Ferdowsi University of Mashhad, mj-saei@ um.ac.ir.

## 1. Introduction

The information age has forced organizations to apply various information and techniques to perform their managerial duties and use resources optimally. In this situation, having high quality information is more important and can improve decision making process (Cushing, 1982). Information systems play a significant role by storing and processing data as well as providing useful information (Olivé, 2007). Due to the change in organizations' focus (from activity based to process based), an integrated information system for organizations is vitally important. Systems' integration improve the qualitative characteristics of relevance and facilities decision making through the integration and classification of information (Hobday & Prencipe, 2005).

Information system (irrespective of the type of organization) has a life cycle consisting of six steps. These steps include: decision-making and acceptance, education, establishment, establishment and maintenance, gradual improvement, and disposal. The third stage of this cycle (establishment) is recognized as one of the most important and costly stages in the life cycle of the information system (Steves et al., 2001). The establishment of information systems is associated with many problems and, in most cases, has a high rate of failure (Heeks, 2002). According to Yongyi and Ying (2005) the failure or success of an information system is mainly related to the establishment step. Considering the importance of the accounting information system in the organization (including state universities) as well as the establishment phase, this study examines and identifies the barriers and problems of the establishment of IAIS in Iranian state universities and their importance. Contextual factors such as, culture, legal systems, economic development, and education levels affect the development of financial reporting in each country (e.g., Gray, 1988; Baker and Wallage, 2000; Askary, 2006) as well as the establishment of the related systems. Iran has its own unique contextual characteristics such as culture, political, economic, and organizational structure and culture (ArabSalehi and Bagherpour Velashani, 2009). This may result in establishment problems and barriers, which may be different from those in developed countries.

## 2. Failure factors of information systems

Failure is a complex word with different definitions. Unawareness of the nature of failure can be a reason for this variety (Wilson & Howcroft, 2002)<sup>1</sup>. High rate of failure in establishment of information systems were shown in different studies as well as different failure factors (e.g. Sterebel, 1996; The Standish Group, 2002). Some factors have Two-sided effect i.e., their existence results in success and their absence cause failure, but others have one-sided effect. That is, their existence can cause success/ failure but their absence does

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<sup>1</sup> See Heeks (2003), Alter & Ginzberg (1987), Lucas (1975, 1978), Flowers (1997), Bailey & Pearson (1983) and Markus (1983).

not necessarily lead to success/ failure (Seddon et al., 1999). In the literature, different classifications are presented for grouping failure factors (e.g., Lyytinen, & Hirschheim, 1987; Yeo, 2002). By considering them, the researchers provide a new classification including organizational structure, process factors, and environmental factors. They are presented in more detailed as follows.

### **2.1. Organizational structure**

The business dictionary defines organization structure as “The typically hierarchical arrangement of lines of authority, communications, rights and duties of an organization. Organizational structure determines how the roles, power and responsibilities are assigned, controlled, and coordinated, and how information flows between the different levels of management”. Applying information technology can change organizational structures. If information systems are not suitable for organizational structures, they will fail (Winklhofer, 2001). Some of the factors that can be considered in this classification include organizational culture, organizational levels, and technology (the maturity level of technology), which are explained below.

#### **• Organizational culture**

Culture is defined as a set of values that is related mutually with human factors, organizational structure, and control system, which determines behavioral norms in the organizations (Ravasi & Schultz, 2006). It can also affect the acceptance of change and development. For example, an organization may not develop a suitable culture for applying modern technology and have an interest to do all works manually (Flowers, 1997).

#### **• Organizational levels**

Organizational levels refer to the users of information systems whose knowledge, expertise, and their attitude affect the success or failure of such systems. They are divided into two groups including management (middle and senior) and employees (other users). This separation is in accordance with prior research as well as the importance of management in the success and failure of the system's establishment. :

**• Management:** The managers' philosophy and attitude towards the information systems and their doubt about the establishment strategy can affect the acceptance and rejection of the information systems (Galliers et al. 1994; Gottschalk, 1999; Earl, 1993). These systems may be disposed because of short-term managerial attitudes and their expectations to achieve short term returns (Gunawardhana and Perera, 2015). In some cases, managers have non-financial education and so, they are not familiar with the benefits and facilities of these systems (Sajadi and Tabatabaee Nejad, 2003). Other factors, such as the lack of managers' support and their beliefs and commitments to the current and new systems, are also indicated as barriers in some studies (such as Ketchell, 2003).

• **Employees:** Employees are another users of the information systems. Their resistance to establishment is studied by many researchers (Lyytinen and Hirschheim, 1987; Earl, 1993). Fear of losing position, previous expectations, the extent of change, requirement to gain more expertise or less attention to human resource due to the extent of the change or automation (Keen, 1981), personality factors (age and gender), beliefs (Shakes et al., 1993). The fear of losing social position and employees' power would be a barrier for adopting a well-designed system (Kendall, 1997; Keen, 1981) and examples of the factors creating resistance.

## **2.2. Process factors**

Process improvement and better organization of working groups can result in problem solving and failure prevention (Sterebel, 1996). Process factors include current system (technology) in the organization and problems related to planning and project methodology that are explained below.

### **2.2.1. Current system in the organization (the maturity level of the current information system)**

The existence of old, manual and inflexible systems, incomplete and inaccurate information in the databases, and lack of proper documentation are some of the problems that can affect establishment and establishment of a new information system in organizations (Oprea, and Mesnita, 2006). Lack of proper communication and reporting lines between different parts of the organization make it difficult to create an information system (Ghazizadeh and Jalali Kutanai, 2006). Regarding these it can be said that the maturity level of the current systems has an important effect on the establishment of the new ones.

### **2.2.2. Problems related to planning and project methodology**

The existence of a strategic IT plan is an important factor for the information technology projects' success. It has a long-term horizon and includes a set of organization perspective, mission and structural strategies, as well as required resources. The strategic alignment of these projects with the plan, as well as the alignment of the plan with the organization goals and missions result in profitability and competitive advantage for organizations (Gottschalk, 1999). Some factors that imbed in this category are as follows:

#### **1. Unclear definition of project objectives:**

The establishment of an information system should have clear objectives communicated effectively to all the people in the organization. Unclear project's objectives can cause individuals' confusion leading to the failure of the project (Ewusi-Mensah, 1997).

#### **2. Lack or unavailability of needed resources:**

An efficient mechanism for maintaining quality of the establishment is equipping resources (Premkumar & Kling, 1994). Different financial and human resources are needed for establishing and implementing an information system.

Unavailability of them (including communication resources) can diminish the possibility of the success as it is represented in researches such as Galliers et al. (1994) and Earl (1993).

**3. *Lack of proper and sufficient training:***

The establishment process of the information systems needs different knowledge and expertise. For increasing the useful participation of the related persons in the process, training in different fields such as Accounting, budget, computer is important (Ellis, 1994). Prior research (Hovenga & Mantas, 2004) show that lack of proper and sufficient training can lead to the failure of the systems.

**4. *Problems related to projects design:***

Proper designing of information systems is one of the main factors affecting their success. If it is complicated or costly, the human and social issues as well as users' needs are not considered (Lyytinen, & Hirschheim, 1987), there is no alignment between organization's structure, culture and goals, all of these will result in system's failure. In addition, qualitative characteristics (e.g., relevance and reliability) of the information provided by the system is affected mainly by the system design (Sajadi and Tabatabaee Nejad, 2003) and difficulty in this regard will result in failure and disposal of the system.

**5. *Human resources combination problems:***

Individuals involved in the establishment process of information systems should have proper level of knowledge and expertise in the related field. In another word, there should be a good combination of the required expertise. However, in reality there were some cases in which involved persons do not have the required qualification (Gunawardhana and Perera, 2015) resulting in the failure of the project.

**6. *Violation of budget:***

Preparing a budget (time and financial) and doing cost-benefit analysis are necessary before the establishment of any project (Galliers et al., 1994).

**7. *The project risk:***

Every information system project, based on its nature, has its own risks, which should be identified and managed, otherwise, they may cause the failure (Poullymenakou, and Serafeimidis, 1997). In relation to the identification of the risk levels, Laudon & Laudon (1995) considered three dimensions including project size, project structure, and technical experience level of the information system team and personnel. In this regard, some researchers study the relationship between success of information system projects and their size. They show that unsuccessful projects are often large. The reason is that managing large projects, as well as evaluating and analyzing their progress is harder than smaller ones (Lauden & Laudon, 2007).

### 2.3.Environmental factors

Environmental factors are also considered as factors influencing the success and failure of the information systems projects. The environment is divided into internal and external groups.

- **Internal environment:** there may be policies within the organization that are in conflict with the information system establishment (Poullymenakou, and Serafeimidis, 1997). Also, there may be no regulatory requirement for establishment of the system within an organization. Sometimes, there are manuals in organization, but they are defective and are not completely followed (Moafi et al., 2009).

- **External environment:** According to Moafi et al. (2009), there are some external environmental factors such as non-approval and existence of proper laws and regulations align with the advancement of information technology, social and political conditions in the country that can affect the establishment of the projects.

### 3. Population and sample size

Regarding the main purpose of the research that is to identify the establishment's problems and barriers of integrated accounting information systems in state universities, the research population includes CFO of universities and their deputies as well as computer engineers (IT specialists) participated in the establishment process of information systems of state university (under the supervision of Ministry of Science, Research and Technology and Ministry of Health and Medical Education) during 2015 to 2016. The minimum sample size (99) was determined applying PASS software with considering the minimum power of 80% as well as the significance level of 5%. More questionnaires (200) were distributed between sample respondents due to the limitations of survey studies and the possibility of not receiving the required number of questionnaires. Finally, 104 proper questionnaires were collected and used.

### 4. Research Methodology

In terms of the purpose, this research is Survey-based empirical studies and in terms of the nature of the data qualitative and descriptive in terms of the methodology. Data collection was done in two steps. Firstly, in order to identify the possible problems of establishment, we used library resources such as books and articles. Then, a questionnaire was designed and developed in accordance with the nature and subject of the research and based on the literature (there was no standard questionnaire) to be completed by the research population.

In order to evaluate the validity of this research, the views and suggestions of universities' academic staff, professionals and IT specialists in the field of information systems was collected and corrective measures were taken. The

collected data was analyzed at three levels including "Total population (Population) ", "CFO or Deputy"(Managers) and "IT Specialists"(Specialists). To investigate the reliability, "Cronbach's alpha" (Table 1), as well as the methods of "confirmatory and exploratory factor analysis" (Table 2) and the "average variance extracted method (AVE)" were used.

In this study, according to Cerny and Kaiser (1977) factors that have a KMO higher than 0.6 are considered desirable (optimal), higher than 0.5 acceptable and higher than 0.4 good. The optimal value for construct reliability (CR) and average variance extracted method (AVE)" is greater than 0.6 and close to 0.5, respectively, which are acceptable domain in this study (Table 3).

**Table1- The reliability of the research components**

Levels	Culture	Management	Employee	Current System in the Organization in the University	Plan-Related Problems (Establishment-Sources	Problems Related to the Design and Establishment of Information Systems	Analysis and Risk Analysis Problems
Population	0.706	0.756	0.871	0.768	0.552	0.855	0.697
Managers	0.823	0.858	0.892	0.794	0.746	0.822	0.670
Specialists	0.489	0.690	0.835	0.807	0.428	0.919	0.808

**Table2-KMO Test**

Test	Culture	Management	Employee	The Existed Level of Information Technology and Information Systems in The University	Plan-Related Problems (Establishment-Sources	Problems Related to The Design and Establishment of Information Systems	Analysis and Risk Analysis Problems
<b>A. At the Population level</b>							
KMO	0.748	0.674	0.842	0.667	0.500	0.852	0.652
Bartlett's test of sphericity	Chi-square	63.725	56.282	327.992	61.211	12.012	39.974
	df	10	3	66	3	1	36
	P-value	0.000	0.000	0.000	0.000	0.000	0.000
<b>B. CFO or Deputy</b>							
KMO	0.770	0.794	0.821	0.679	0.500	0.824	0.500
Bartlett's test of sphericity	Chi-square	130.498	141.214	374.161	74.234	34.967	189.838
	df	10	6	66	3	1	36
	P-value	0.000	0.000	0.000	0.000	0.000	0.000
<b>C. IT Specialists</b>							
KMO	0.648	0.647	0.706	0.626	0.510	0.824	0.705
Bartlett's test of sphericity	Chi-square	8.472	26.182	118.723	30.113	3.678	144.811
	df	3	15	36	6	3	36
	P-value	0.037	0.036	0.000	0.000	0.298	0.000

**Table3- CR and AVE Indexes**

<b>Models</b>	<b>CR</b>	<b>AVE</b>
The conceptual model at the population level	0.872	0.461
The conceptual model at the managers level	0.871	0.497
The conceptual model at the Specialists level	0.806	0.548

### 5. Descriptive Statistics

According to the collected data final sample includes men (84.6%), women (15.4%), CFO (57%), CFO Deputies (22%), and IT specialists (21%), so the results are expected to be more influenced by men and CFOs' attitudes. In regard to the academic degree, the highest percentages relates to Master of Arts (49%) and Bachelor (47.1%). Regarding this, it is expected that they have the most effect on the results.

The responders field of study includes accounting (50.5%), management, economics and other related fields (28.1%), and others (21.4%). Given the fact that the majority of them studied accounting and management, economics and other related fields, they should have a high level of knowledge about the information systems, which can increase the validity of the research findings.

### 6. Findings

In this section the barriers and problems of establishment are identified by applying structural equivalent method. The fitted model measurement for each of the Latent variables and indicators of fitted model were investigated. If the model indicators were inappropriate, the hidden relationships would be identified. The results of running the final model are presented below. As shown in Table 4, the most important factor at population and managers levels is related to the design and establishment of the information system (at 0.824 and 0.832, respectively), but this factor is ranked in the second level (1.145) at the specialist level. The culture factor is in the third place at the population level (0.747) and is in second place at the level of managers (0.813) and in the specialists' point of view it is not a barrier. Employees' factor is placed in the second rank (0.810) at the population level, and in terms of managers and specialists' point of view, is placed at third (0.801) and fourth (0.430) level respectively. The management factor, at the managers and population level, was ranked in the fourth place (0.750 and 0.670, respectively) and in the first place in terms of specialists (0.670). Managers believe that technology level of information and information systems in the university is placed at fifth (similar to the population level), however, IT specialists consider the least importance for it. Problems related to Plan (establishment-resource), and project analysis and risk problems have the least important at the population and managers levels. They are not considered as a problem by specialists. Prior research show the culture as a barrier for establishment (Flowers, 1997; Yeo, 2002; Poulymenakou and Serafeimidis,



1997). Louden & Louden (2007) and Ewusi-Mensah (1997) has shown the management as a problem factor in their research. As stated, another barrier identified in this research is employees, similar to Gunawardhana and Perera's findings (2015). Plan- related Problems (establishment-resource) is also identified as a barrier in Yeo's study (2002) and the project analysis and risk problems by research of Poulymenakou and Serafeimidis (1997).

**Table 4. Standardized coefficients conceptual model-population, managers and specialists**

Affecting Variables	Affected Variables	Estimate-(Load Factor) Population	Estimate-(Load Factor) Managers	Estimate--(Load Factor) Specialists
University Structure (Internal Factors)	Employees	0.810	0.801	0.430
University Structure (Internal Factors)	Culture	0.747	0.813	-
University Structure (Internal Factors)	Management	0.670	0.750	1.154
Process Factors	Current System In The Organization (The Maturity Level Of The Current Information System) in the University	0.548	0.565	0.305
Process Factors	Plan-Related Problems (Establishment-Sources)	0.522	0.564	-
Process Factors	Problems Related to the Design and Establishment of Information Systems	0.824	0.832	1.145
Process Factors	Analysis and Risk of Project Problems	0.524	0.525	0.489

The fitness indicators of the models were also investigated and their appropriateness confirmed.

## 7. Conclusions and Recommendations

The main objective of this research was to explore the barriers and problems of IAIS establishment process in an emerging market, i.e Iran. It was argued that the establishment barriers and problems in Iran may be different than those in developed countries because of the different contextual factors. The most important problem as stated above, at the population and CFO level, was the "problems related to the design and establishment of information systems", while the IT specialists considered "management" as the most important problem and, then addressed "problems related to the design and establishment of information

systems". The project analysis and risk, plan-related problems (establishment-resources) were the least important at the two levels (population and CFO), while "employees" and "the existed level of information technology and information systems in the university" were the least importance at the level of specialists. Also, the importance of each question in the classes was calculated for each of these three levels (at the population and management at the culture facture inadequate innovation and the low level of competitive space among employees are the most important factor. At the university level low-level awareness of senior managements about the capabilities of the new information systems and insufficient motivation among financial personnel in accepting the new information system are important in terms of population and management level. At process level the important question(in terms of population level) are: the impossibility of providing infrastructure Hardware to implement new information systems, disregard the needs of the CFO in the design of new information systems and timeliness violation of the project. Overall, comparing the results with prior research(Moohebat et al,2010; Holland and Light,1999; Nah and Lau ,2002; Jafari et al ,2007) support the argument that the barriers and problems of IAIS establishment process in Iran is different than other countries. It is recommended to universities' authorities that for complete establishment of the IAIS the mentioned barriers and problems should be considered and deal with thoughtfully.

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## استقرار سیستم‌های اطلاعاتی یکپارچه حسابداری در دانشگاه‌ها - موانع و مشکلات

### چکیده

هدف این تحقیق بررسی موانع و مشکلات فرایند استقرار سیستم‌های اطلاعاتی یکپارچه حسابداری در دانشگاه‌های یک بازار نوظهور (ایران) به منظور تسهیل استقرار آنها می‌باشد. جامعه مورد مطالعه این تحقیق مدیران مالی، معاونان مدیران مالی دانشگاه‌ها و همچنین متخصصین تکنولوژی اطلاعات (IT) درگیر در فرایند استقرار و یکارگیری سیستم‌های اطلاعاتی مذکور در دانشگاه‌های دولتی در سال‌های 1394 و 1395 می‌باشد. داده‌های مورد نیاز با استفاده از پرسشنامه خود ساخته توسط محققین مطابق با مبانی نظری جمع آوری و داده‌های گردآوری شده در سه سطح "کل جامعه"، و نیز سطوح "مدیران یا معاونان مالی" و "متخصصین کامپیوتر" بررسی و تحلیل گردید. نتایج حاصل از تحقیق نشان می‌دهد که مهمترین مشکل در سطح کل "مشکلات مربوط به طراحی و استقرار سیستم اطلاعاتی" می‌باشد و "تحلیل و ریسک پروژه"، و مشکلات مربوط به "برنامه" از کمترین اهمیت برخوردار می‌باشند. سایر مشکلات عبارتند از: "کارکنان"، "فرهنگ"، "مدیریت"، "سطح فناوری اطلاعات و سیستم‌های اطلاعاتی موجود در دانشگاه" از دیدگاه مدیران و متخصصین کامپیوتر "مشکلات مربوط به طراحی و استقرار سیستم اطلاعاتی" دارای بیشترین اهمیت می‌باشد. این مطالعه برای قانونگذاران، مدیران ارشد، تحلیل‌گران سیستم‌ها، مقامات (مسئولین) دانشگاه‌ها بویژه مدیران مالی و تکنولوژی اطلاعات و محققین بویژه در بازارهای نوظهور و در حال توسعه ارزشمند (مفید) است.