



## Reviewing the Implementation of Information Security Management System Requirements in Hospitals in Tabriz in East Azarbaijan

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### ABSTRACT

The purpose of this study was to investigate and analyze the assumptions and requirements for the implementation of Information Security Management System (ISMS). To check assumptions for security management system implementation, we studied the population of patients in hospitals in Tabriz. Reviewing the requirements and assumptions is based on the standard ISO / IEC 27001, ISO / IEC 27002 test target setting and ISO 27001 standard questionnaire containing 33 questions in 11 control samples. The data were analyzed using descriptive and inferential statistical method in which the factors of the implementation of information security management system were confirmed. As well as identification of factors contributing to the implementation of information security management system and factor analysis, structural equation model was used in PLS smart software based on its results in impact and indirect aspects of implementation effectiveness of the system. Finally suggestions based on research findings are presented.

### Keyword:

*Information Security Management System, ISO / IEC 27001, ISO / IEC 27002*

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## INTRODUCTION

Information is the main source for the implementation of Information Security Management. Information is data processing; in fact, this is the shortest definition. Data is the raw materials potentially to identify, to understand, the important information in order, for translating goods, and events nature which can be found in reality or in the imagination world, through research methods, cognitive tools, machine language, emotions, mind and brain and experiencing from the philosophic viewpoint, information has polymorphic and multi-semantic concepts and evidence in broadcast system for recognizing clear information of organization or hidden knowledge, information, in business sciences which are active in human and system but not in obvious transformation, document or set; therefore, using different tools in information technology is necessary for collecting this information and the same tools will cause coordination of information and science and business which are the basic and obvious requirements for management security information.

Hospitals are important centers for the people in terms of hygiene and treatment information. Beyond the design, electronic connects the hospitals, and this organized systems need information security standards as the foundation for the establishment of IT exploitation of great importance in the region.

In the field of information systems, healthcare organizations are manufacturers of health data. The work of system information is to preserve nature of the data in a secure environment in order to provide appropriate and high quality services for patients. Due to the importance of health data and the need of making it secure, many national and international organizations tried to develop standards such as: ISO27000, NAIC, AAMC CPRI, ASTM and HIPPA (Moqadasi, et al.2013).

Note that an information security management system preserves information resources persistency to protect the confidentiality, integrity and availability of organization's information. Regarded to these three concepts associated with informational security of the patient, we have the following: (Karami, et al.2013).

- Privacy: a process ensuring that information is accessible only for authorized persons. Confidentiality is achieved through encryption of the access control techniques.

- Correctness and accuracy: they ensure that information is accurate and allow you to access the data only when receiving exactly the right code when you write. These features influence the patient's safety.

- Availability of information: the possibility using on-demand information and availability of an organization or individual which is allowed. This feature is important in health care. The overall goal of this study is the analysis of requirements of the implementation of Information Security Management System for hospitals in Tabriz. To this end, assumptions and requirements for information security system are examined based on the COBIT model, which includes the criteria of organizing plans, acquisition and implementation, delivery and support, monitoring and assessment according to the standard ISO 27001 and ISO 27002 which are controlled in 11 studied areas including:

- 1-existential security policy
- 2-organizational information security
3. Asset Management
4. Human resources security
5. Physical and environmental security
6. Operations Management and communication
- 7-control access to information.
- 8.The development and maintenance of systems
- 9-managing incidents related to information security
- 10-business continuity management
- 11- accordance with the rules

### The main objectives:

The purpose of this study was to investigate and analyze the assumptions requirements of implementation Information Security Management System of Tabriz hospitals. For this purpose the requirements of information security management system based on the COBIT model, which includes organizing projection criteria, providing implementation, support and supervision are analyzed Survey placed.

### The importance and necessity of research:

Information is one of the most valuable and sensitive assets of the organization. Thus vital is to delivering timely and appropriate information. Requisite for business continuity, institution economic is protection and maintenance of information.

The use of computers has become a problem and the access of employees users to the internet or the other factors of organization is authorized; therefore, organizations and companies are looking intended to implement security elements. Security implementation is not only due to technical issues, but also it is because of the policy of rather control to create the proper procedures, and to enhance the percentage of information security, it causes the utilization of information security management systems. Presenting topics related to the information security is new, and attractive for all organizations and institutions. However countries use types of information security management system standards, unfortunately no effort has been accomplished for its adaptation, and implementation in the offices, and organizations in Iran. Nowadays, regional, international, political and economic conditions are extensively essential in researching to obtain global information; and losing opportunities causes the implementation of information systems to get slowly or inappropriate approach and this is a huge barrier form development of the usage of information technology. Fortunately, communication-based knowledge of society will form if, and definitely this is severely emerging. (Kazemi, 2014)

Hospitals are particularly important due to the specific types of clients, and sharing and transferring too much information. Accordingly, this special category has a specific type of database. In this study, we review the implementation of information security management system requirements in hospitals in Tabriz city in East Azarbaijan province.

**analytical model**

**Methodology**

The current study is a cross-sectional descriptive study (survey type).The results of the research can be used in hospitals intended to test the theoretical concepts and they will be discussed objectively and also will be applied.

**Data Collection:**

In terms of quantitative and qualitative features, every phenomenon that makes us aware of these features depends on the nature and how to achieve it. The aim of such descriptive or explanatory researches, is to access to information about the changes. The main ways to collect data include the following: the use of information and evidence, observation, interviews and questionnaires. (Arabi, et al, 2011)

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**Questionnaire**

The purpose of the questionnaire is to give us information about the specified studied group or community. One of the important reasons for the use of a questionnaire is to provides the possibility of studying large samples. Qualitative and applicable questionnaire help us obtain correct information which is very important (Arabi et al., 2011)

In this study, we have started to collect both primary and secondary data, secondary data is collected through library studies, reference books and journals, organization and using documents obtained from the Internet. Preliminary

data was, obtained through field studies and questionnaires. Questionnaire consisted of a cover letter to explain the purpose of the study and invited people to participate in the specialized research in addition to the two general questions as follows: first, the general questions turns back to the demographic characteristics of respondents such as education, sex, age, positions and years of service. The second specific questions category is to examine the requirements. In specific questions we examine the prerequisites and requirements for the implementation of Information Security Management System standard including 33 items.

**Validity**

The concept of validity or accreditation answers to the question that measures the extent of the attribute. No data validity can be measured accurately. Types of validity include content validity, criterion validity and construct validity. In the narrative structures relevant to the content, there is a credit to check the ingredients based on it. If the questions of the questionnaire especially examine attributes and skills that they have measured, the researchers plan to test the validity of the content. To ensure content validity, we must act as the tool so that the question is asked from the constituent instruments of the selected content. The validity was used in two forms CVR and CVI in the study.

A: index the content validity ratio (CVR): This index was designed by Lavshh ().each of the questions are asked according to the whole matter and classified in two-part Likert scale, "is it beneficial" and "not beneficial". Then, the content validity ratio is calculated based on the following formula:

$$CVR = \frac{\text{The number of experts who have chosen - benefit option}}{\text{The total number of specialists}}$$

Regarded to the number of experts who have evaluated the questions, minimum acceptable CVR should be based on the following table. CVR value lesser than the amount

calculated for the questions is asked regarding to the number of expert evaluators, and it should be excluded from the trial because according to content validity, it cannot agree.

CV minimum acceptable score based on the number of experts transition					
the amount of CVR	The number of specialists	the amount of CVR	The number of specialists	the amount of CVR	The number of specialists
0.37	25	0.59	11	0.99	5
0.33	30	0.56	12	0.99	6
0.31	35	0.54	13	0.99	7
0.29	40	0.51	14	0.75	8
		0.49	15	0.78	9
		0.42	20	0.62	10

According to the CVR data table and the number of experts selected for this study, 10 people, CVR should be Tasval top is 0.62, so were all the questions.

**B) Content validity index (CVD):** Waltz and Basel evaluated the content validity. That included specialists' "relevance", "clarity" and "simplicity" of each item on a 4-point Likert scale. Experts answered each item from 1 "not relevant", 2 "relatively relevant", 3 "relevant" to 4 "very

relevant" classifications. Simple items respectively from 1 "not easy", 2 "relatively easy", 3 "easy" to 4 " very easy"

and clear the items in the order of 1 "not clear", 2 "relatively clear ", 3" clear "to 4" very clear "to be determined.

The number of specialists who have items 3 and 4 score

$$CVI = \frac{\text{The number of specialists who have items 3 and 4 score}}{\text{The number of specialists}}$$

The minimum acceptable value for the index equal to 79/0 CVI and CVI If the item is less than 79/0 that the items must be removed.

The minimum acceptable value for the index equaled to 0.79 CVI; and any item which is lesser than 0.79 that item must be removed.

According to the findings of validity indicators of CVI and CVR it is concluded that this study has content validity. For the validity of structures, we used confirmatory factor analysis. Researchers are preparing a model which relatively assumes little empirical data based on several parameters, describing explanation or justification. This information is a pre-experimental model data structure that can be used in

the form of a theory or hypothesis, or a classification scheme in compliance form and content of objective, empirically determined conditions or knowledge gained from previous studies. Verifications procedures determine that the data is synchronized or is not a given factor structure. Confirmatory factor analysis uses PLS software for the structural prerequisites for the implementation of ISMS.

Table 6-3 Outer Loadings Load factor

	develope.c	k.access	legaly	m.business	m.daraei	m.event	m.operation	policy	s.human	s. hysical	sazmandehj
bc1_1				0.854160							
bc2_1				0.880386							
bc3_1				0.790180							
ca1_1		0.806628									
ca2_1		0.838499									
ca3_1		0.863215									
dms1_1	0.859943										
dms2_1	0.848968										
dms3_1	0.872959										
ll_1			0.814123								
l2_1			0.896947								
l3_1			0.841914								
ma1_1					0.797405						
ma2_1					0.815671						
ma3_1					0.774589						
mes1_1						0.806971					
mes2_1						0.836870					
mes3_1						0.803993					
moc1_1							0.838606				
moc2_1							0.845851				
moc3_1							0.869376				
os1_1											0.840833
os2_1											0.852303
os3_1											0.787408
p1_1								0.828107			
p2_1								0.843002			
p3_1								0.813563			
shs1_1									0.795717		
shs2_1									0.864975		
shs3_1									0.780566		
sph1_1										0.854389	
sph2_1										0.787176	
sph3_1										0.809724	

As the results of the outer loading table indicate, all factor loadings are larger than 0.3. So, all items have a positive impact on the implementation of information security management systems and are desirable; therefore, their validity in estimating the factors and requirements in their information security management system implementation. Reliability or credibility is the measurement tool of the technical reliability. This decision deals with the measurement tool concept mentioned that remains up to what extent the same conditions gives the same results. The reliability coefficient is confidence of zero (no relation) to +1 (a perfect relationship). Reliability coefficient indicates the extent measures stable characteristics or features of the variable subjects and its temporary measurements. For calculating the reliability of the instrument we measured it in various ways. (Bazargan, et al., 2008) There are two ways to reliability: Cronbach's alpha and composite reliability (reliability structure) The study measured the composite reliability.

Table 3-7 reliability research

	Composite Reliability		Composite Reliability
develope.c	0.895524	s.human	0.855165
isms	0.950966	s.physical	0.857969
k.access	0.874720	sazmandehi	0.866674
legaly	0.887780	tamin	0.848010
m.business	0.879789	tarahi	0.903945
m.daraei	0.838401	policy	0.867651
m.event	0.856727	poshtibani	0.904305
m.operation	0.887654	nezarat	0.881047

0.7 indicates high levels of internal consistency are reflective measurement models. 0.6 <CR> 0.7 is sufficient for exploratory research. 0.9> CR> 0.7 for the stage of maturity. According to the results table CR: Because the amount is more than 0.7, then the reliability of the questionnaire used in the study, is confirmed. In other words, the model has internal consistency.

#### Statistic, Society & Example

all individuals and objectives that have at least one common attribute. The number of population is restricted to say a limited population. Statistical society in this study, included all managers and information security and IT experts and users of hospitals in Tabriz and their information system, includes 101 individuals.

#### Conclusion:

in order to evaluate the questionnaire validity, and content validity, we used the form CVI, and CVR and narratives about the structure and reliability combined with optimum reliability.

In this study, society included all managers and information security and IT experts and users of information system of hospitals in Tabriz which may ultimately include 101 persons. Hence, the nature of this analytical study is from the survey applicable type. Based on field studies and analysis of questionnaire respondents, it included 56 males, and 45 female. 8 of the respondents were under 25 years old, 48 respondents were between 25-35 years old, 32 respondents were between 35-45 years old and 13 of them were older than 45 years old. Also, 3 of respondents have PhD degrees, 25 M.A, 57 B.A and 16 of them were with A.D. A Security of Manager project, 4 Director / Head of IT, IT expert 29, an information security management consular, 66 users hospital information system. 5 respondents less than 5 years, 32 between 5 - 10 years, 13 between 10 - 15 years and 21 for more than 15 years of service with 73 respondents lesser than 2 years, 23 patients between 2 - 5 years, 5 patients between 5 - 8 years project implementation experience with information security management system. 72 persons respondents in low volume projects, 26 medium-size projects, three people who attended in ISMS project were old.

Using the smart-PLS software and using structural equation modeling confirmatory factor analysis, we measured the results of test of convergent validity, divergent validity, reliability Security and reliability of observable variables and quality test and measurement model of 101 comments of experts, all about the prerequisites and requirements, including information security policy, the organization of information security, asset management, human resources in terms of security, physical and environmental security, communications and operations management, access control, use, development and maintenance, incident management information security, business continuity management and compliance with laws in secure level at %99 forecasted in hospitals in Tabriz are effective information security management system. According to prioritization of the factors affecting information security management system, operating (after) the most monitors and agents (after) the supply and implementation of information security management system at least affected hospitals in Tabriz.

#### Suggestions for Future Research

1. Given that in this study, only 8 hospitals were studied in Tabriz. Next, the researchers are recommended to perform such reviews in both public and private hospitals in order to compare the results of several researches in terms of reliability and confidence in using of the results achieved.
2. Comparative study of organizations, including hospitals that have attempted to establish information security management system and review results prior to the implementation of the deployment and provide suggestions to improve performance
3. According to the study, structural equation modeling and analysis of PLS is used for factors like the techniques presented by the other researchers such as AHP, TOPSIS and other software and structural equation such as LISREL, AMOS, etc.

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