The Effect of Applying the Information Technology Audit Standard # 21 on the Risk Related To ERP System in the Jordanian Companies

By Hamza Adel Mohammad Omosh, Audeh Ahmad Bani-Ahmad & Abed El- Rahman Kh. El- Dalabeeh

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Abstract- Because of the importance of institutions’ resources and their risks where changes related to Enterprise Resources Planning Systems as commercial operations are not easily to be implemented in terms of time and cost This paper came to identify the impact of applying standard 21which is one of the standards used in auditing information technology on reducing the risks of Enterprise resource planning (ERP) systems, A random sample consisted of 30 person who are specialized in information technology and auditing in the Jordanian industrial companies was selected, the result of the paper showes hatThere is an impact of applying standard 21 on reducing Enterprise resource planning (ERP) systems risks. Also showes that the auditors of information technology realize Enterprise resource planning (ERP) systems risks.

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Keywords: information technology, erp, standard 21.

I. Introduction

It is agreed upon in the field of information technology that information technology is the basic for Change. After the period of 1950s and 1960s had been characterized by efficiency, 1970s and 1980s by quality, and 19890s by flexibility, the second Millennium was characterized by the decade of innovation whether this was in the level of technology, operations, and the product or in the level of the organizational models (Mansor, 2008, p1).

Information technology and its audit are considered as one of the new subjects these days. Information Systems Audit and Control Association (ISACA) issued different standards to adjust the control and audit process, including standard 21 of reviewing Enterprise resource planning (ERP) systems where this standard reviews information technology and ensures the professionalism of the Enterprise resource planning (ERP) systems and evaluates the degree of complication of information technology in the institutions. On the other hand, the integration of the systems of information, internally and externally, led to establish a new kind of business organizations which is mainly called Extended Enterprise.

Concerning this issue, (ERP) is included within a set of information systems which works on achieving the integration of operations which is considered as the basic of the applications of E-business in one hand, and the basic of the traditional business on the other hand. ERP systems try to achieve this integration by providing a mechanism that helps in using the available data system (Shehab et al, 2004) - regardless the occupational field- and in saving timing and the accuracy which reflect on the over all performance of organization (Wieder, et.al. 2006)

a) Problem of the study

In the world of technology and accounting and with an increase in using Accounting Information Systems and the movement towards Enterprise resource planning (ERP) systems which are characterized by complexity and comprehensiveness, the interest of risks associated with information technology as Enterprise resource planning (ERP) systems have shown up. And because of these risks as security risks, there was a need to control and audit these systems to protect the researchers also recommended making ERP research in developing countries (Addo and Helo, 2011)

Based on this, the problem of the study is to identify the impact of applying standard 21 which is one of the standards used in auditing information technology on reducing the risks of Enterprise resource planning (ERP) systems, and more specifically the study tries to answer the following major question:

“What is the impact of applying standard 21 on reducing the risks of Enterprise Resources Planning Systems?”

Answering this question will be through the following sub questions:

- To what extent do the auditors of information technology realize the risks of Enterprise Resources Planning System?
- To what extent do the auditors of information technology commit to apply standard 21?
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- What is the importance of standard 21 as one of the standards of auditing information technology?
- What is the importance of auditing Enterprise Resources Planning System?

b) Importance of the study
The importance of this study is connected with importance of institutions’ resources and their risks where changes related to Enterprise Resources Planning Systems as commercial operations are not easily to be implemented in terms of time and cost which agree with the contest of (Esteves and Pastor, 1999) study of challenges facing the full spread and implementation of ERP package. And many institutions cannot implement Enterprise Resources Planning Systems for their huge size and the need for a high care in addition to that the institution will be affected by these changes. And the importance of this study emerged from the importance of standard 21, one of the standards of information technology audit, and its impact on reducing Enterprise Resources Planning Systems risks. And this study also focused on the companies which applied Enterprise Resources Planning Systems (ERP) in Jordan.

c) Hypotheses of the study
Based on the problem of the study, this study will examine the following hypotheses:
1. \( HO: \) there is no impact of applying standard 21 on reducing the risks of Enterprise resource planning (ERP) systems.
2. \( HO: \) the auditors of information technology do not realize the risks of Enterprise resource planning (ERP) systems.
3. \( HO: \) auditors of information technology do not commit to apply standard 21.
4. \( HO: \) there is no significance for the application of standard 21.
5. \( HO: \) there is no significance for auditing Enterprise resource planning (ERP) systems.

d) Methodology of the study
This study adopted the analytical descriptive approach where it depends on two sources for collecting data. First: books, studies, previous researches and internet. Second: a questionnaire which was arbitrated by the researcher of this study and other specialized in accounting information systems. This questionnaire consisted of 19 questions which were distributed as follows:
(1-4) Measures the impact of applying standard 21 on reducing ERP Risks.
(5-7) measure the extent of technology auditors’ realization of ERP Risks.
(8-13) measure the extent of technology auditors’ commitment to the application of standard 21.
(14-15) measure the importance of applying the standard 21.
(16-19) measure the importance of auditing in the ERP systems.

e) Population of the study and the sample
The population of the study consisted of specialized people in the field of information technology and information technology auditing in Jordan. A random sample consisted of 30 persons who are specialized in information technology and auditing in the Jordanian industrial companies was selected.

f) Statistical Analysis Method
Statistical Package for Social Science (SPSS), which was used to analyze the results of the study, includes the following:
- Dispersion Measures (means, standard deviations)
- Reliability measure (Cronbach alpha) audit equals 76.00%

g) Literature Review
i. Audit and Control on Information Technology
Information technology, nowadays, is considered as one of the basics of business management in the public and private institutions. Information technology, databases and communication nets have transferred the world from the industrial age to knowledge age and became a basic component in any sector.

As the importance of information increases, the interest of keeping the information away from risks increases as well and so the science of information security appeared. Information security is not considered as a pure technical operation done only by a specialized one in information technology but it is the fruit of corporation between all of the employees of one entity where roles and responsibilities are distributed to serve the entity’s work. And consequently, any plan is put by the entity regarding information security should contain elements and comprehensive items of all the operations and policies concerning the technology and human aspects. And because of the importance of information security a group of governmental and nongovernmental entities put forward standards of information security to have a specific level of information protection and to ensure that technology and computerized resources are used correctly and free of mistakes and to adopt best practices of information security. So many parties proposed standards and rules which monitor control and supervision of information resources systems of the institutions and the most well-known one of these is Information Systems Audit and Control Association (ISACA) which issued standards and different rules to monitor audit and control of information technology as standard 21(Guidance of audit and control of Enterprise resource planning (ERP) systems 21).
ii. Standards of Audit and Control Of Information Technology

Information Systems Audit and Control Association defined auditing standards as the compulsory requirements to audit information systems and issue financial reports concerning them. While the evidences are the information used by the auditor to estimate the information which will be audited is mentioned regarding the established standards.

h) Importance of Using the Standards Of Auditing

According to studies and researches, the most important reasons of using the standards in auditing are as follows:

- Knowledge Sharing: Information security standards follow a changeable sector so having a group of people who are interested in a specific standard provides more participatory in the information and grant fast access into the required information and provide the knowledge of future attitudes and the new technologies used in the field of information security. (www.isaca.org/socialmedia)

- Better Control: auditing standards of any entity help in control and monitor its activities and information security special tasks and they ensure its distinguished level as compared to other similar entities. (Kumar, 2000).

- Best practices: these standards include a big set of best practices existed in the field of information security and they cannot be compared to the effort and expertise of one entity but their combination with these practices will lead definitely to a better level in this field. (www.isaca.org/socialmedia)

- Structure clarity: standards audit provide a clear model of the organizational and administrative structure that can be followed by the entity. (www.isaca.org/socialmedia)

- Saving time: according to the importance of time in this competitive world, organizations are no more need to establish and develop a plan or a model for the project which may takes time while there is an international standard that was developed by the help of common expertise (www.isaca.org/socialmedia)

i) Information Systems Audit and Control Association

Information systems audit and control association (ISACA) is considered the responsible of audit and control of information security operations at international level. This association includes more than 95,000 members of different countries where this association provides a number of accredited certificates and programs in the field of auditing and information security as CISM, CRIS, CGEIT, CISA. ISACA updates the objectives of information control and technology which is associated with continuously so that it helps businessmen to carry out their responsibilities in the fields of information technology governance and supports the ideal value of their business (ISACA, 2011).

i. Standard (21) of Information Technology Audit

Standard 21 (auditing guidance) is guidance issued by Information Systems Audit and Control Association, where this standard ensured that the auditor has to commit to the application of the audit evidences to implement the standards efficiently and he has to clarify the reasons of not being committed to the evidences. And every one who is a Certified Information Systems Auditor has to commit to the standards of information systems auditing and to standard 6 concerning the performance audit where this performance of Enterprise resource planning (ERP) systems which is done by an information systems auditor has to be subjected to the supervision of another auditor. And the auditor has to commit to standard 2 concerning the independency of information systems' auditor and the importance of reviewing the guide of audit (N 26 of reengineering business process) and to the ensure the auditor's coverage, during the process of auditing Enterprise resource planning (ERP) systems, regarding the following areas which –from the authors perspective- result from the serious conditions of vendors (Dixit and Prakash, 2011):

- Process integration area: information systems auditor identifies the control's objectives of control operations, evaluates business risks and potential financial risks of the operations which should be implemented.

- Software (applications) security area: information systems auditor audits the documentation of the design regarding the extent of the security and control's appropriateness and the evaluation of the software security efficiency.

- Infrastructure Integration area: identifying the potential problems and the security risks, identifying structural issues of the internal control system that may cause problems in the operations' performance and reviewing the emergency plans continuously.

- Implementing integration area: taking into account the gradual transition of the new system of Enterprise Resources Planning syst-ems.

ii. Enterprise Resources planning systems

O’Leary (2000) defined Enterprise Resources Planning systems as a set of powerful software that enable business activities to have an integration of separated jobs while Sumner (2005) defined Enterprise Resources Planning systems as software tools used to manage the entity’s data. And these systems help the entities to deal with supply chain, receipt, inventory management, production planning, shipping, computer, human resources management, and other related functions with business. (Sumner, 2005).

The fundamental structure of Enterprise Resources Planning systems extended from 1950s...
and 1960s with the use of computers in business (Moller, 2005). And table (1) illustrates the historical development of entity’s systems.

In 1960s, Software Packages were represented by control’s systems of the inventory and the prediction of it. But in 1970s, material requirements planning appeared, where Master production Schedules and bills of materials files with a list of materials required to produce every material were used. Later, new methods were added to material requirements planning as sales planning, client’s needs’ processing, and Capacity Constraints. These methods provide inputs to Production Planning Tables known as Closed-Loop Planning. In 1980s, Manufacturing Resources Planning (MRP) included accounting systems, manufacturing system and materials management systems. And in 1990s, Enterprise Resources Planning systems provide an integration of all the functional operations in the entity (Sumners, 2005).

At the beginning of this century, a new generation of Enterprise Resources Planning systems which was called Extended Enterprise Resources Planning systems (eERP) appeared and its basic functions were as follows: e-commerce, Supply Chain Management, Client relationship management, business intelligence and other functions. And Enterprise Resources Planning systems is one of the basic component of the system of eERP and for the purposes of the functional cooperation, the system of eERP is opened for information flow.

### Table 1: Development of the entity’s systems (Moller, 2005)

<table>
<thead>
<tr>
<th>(new concept)</th>
<th>Kinds of systems</th>
<th>time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using computer to manage the programs (applications)</td>
<td>Control system of inventory and prediction of t.</td>
<td>1960</td>
</tr>
<tr>
<td>Integrated database, human resources management</td>
<td>ERP systems</td>
<td>1990</td>
</tr>
<tr>
<td>(Inter-organizational Collaboration)</td>
<td>Extended ERP(eERP)</td>
<td>2000</td>
</tr>
</tbody>
</table>

One of the challenged problems that faced Enterprise Resources Planning systems is that the software of this system imposed operations on the implemented companies of this system the issue of modifications or ignoring them is considered as a great challenge which every implemented company of this system face (Sumner, 2005) (Hawari and Heeks, 2010). Job of information system was represented by design, development, and software implementation but with Enterprise Resources Planning systems, the functions of design, development and implementation were prepared from another party. These systems have been adopted by many companies recently because of the expectations of low operations costs, shortest time of the operational sessions and satisfying the customers’ needs. And these systems include many software (applications) of business as: salaries, manufacturing, business intelligence, supply change management and general ledger. One of the most important suppliers of these systems is SAP, Oracle and PeopleSoft.

Implementing Enterprise Resources Planning systems is not an easy task and to achieve the desired efficiencies and to satisfy the customers’ needs, the companies should be subjected to an extensive rebuilding of business operations or they face customizing ERP package to achieve the functional operation (Scheer & Habermann, 2000).

### j) Types of Audit Risks

It is possible that the financial statements contain errors or hidden physical problems, or the auditor came up with unsatisfied results. And while a number of theoretical approaches pointed to ways that the auditor can follow when he deals with audit risks which are the systems and auditing based risks (Thneibat, 2006) but the modern studies regarding auditing enterprise resource planning systems ensured that the two ways became an old-fashioned when enterprise resource planning systems, which depend on integrated auditing, appeared in the world (Cooke, 2004) and since risks are considered a basic aspect in this study, the types of risks are:

- **Planned detection risks**: they are risks resulted from the possibility of the auditor’s incapability of detecting material misstatement using the tests and the analytical procedures (Thneibat, 2006).
- **Inherent risk**: it is a measure used by the auditor to evaluate the possibility of having material misstatement in the absence of internal control (Thneibat, 2006).
- **Control risks**: it is a measure used by the auditor to evaluate the possibility of having material misstatement that exceed amount of money could be tolerated as security risks of database (Hunton et al., 2004).
- **Acceptable Audit Risk**: it is a measure of the auditor’s desire of accepting financial statements that could be material misstatement after finishing the audit process and announced his decision as Unqualified.

### i. Model of Audit Risk

This model is considered as one of the best method used to deal with risk when planning a guide of auditing. And this model is used basically for planning
purposes in the report of the amount of proof that should be collected in every step of the process which is represented by courses of sales and collection, revenues and expenditures, salaries and individuals, inventory and the model is usually be according to the following formula:

Planned Detection Risk = Acceptable Audit Risk / Inherent Risk* Control Risk

PDR = AAR / IR * CR

ii. Security Risks of Enterprise Resource Planning Systems

Security in an integrated environment of Enterprise Resource Planning requires a new way of thinking and much more concern of business operations which are exposed to material misstatement that affect the entity’s financial results negatively. So the companies have to care of an integrated set of security and control functions which provide operations and they have to update its systems of business continuously at each level. The common regions which are exposed to security risks in an environment of Enterprise Resource Planning are as follows (Holsbeck and Johnson, 2007):

- **Net energy** (Holsbeck and Johnson, 2007): Enterprise Resource Planning systems will be provided into the system through Internet, Intranet or Extranet.

- **Relational Database**: Relational Database should store information in one place so there should be copies of the project database.

- **Operational systems**: they are software or a set of orders and instructions to control the physical part of the computer.

- **A computerized server**: it is the common shape for the computerization which is followed in an environment of enterprise resource planning systems.

k) **Software security risks**:

Having the legal and logical access varies from batch to another, in some cases, the rights of logical access is granted according to the operation symbol or its number. And when control of logical access is revised, it is important to make sure that the general control of the security program or the application are revised too and security program control includes the following: (the length of the user’s name or the user’s identification, the length of the password, changing the password from time to time, prohibit the user’s access into the system if he/she did many wrong attempts.

II. RESULTS OF THE STUDY

Mean and standard deviation were calculated to describe the responses of the sample of the study as follows:

<table>
<thead>
<tr>
<th>ST.d</th>
<th>Mean</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.59471</td>
<td>3.8889</td>
<td>1- Applying standard 21 is enough to reduce enterprise resources’ errors.</td>
</tr>
<tr>
<td>0.56761</td>
<td>4.0417</td>
<td>2- Applying standard 21 reduce risk of stopping work in enterprise resource planning (ERP) systems.</td>
</tr>
<tr>
<td>0.55665</td>
<td>4.0000</td>
<td>3- Applying standard 21 reduces security risks as risks of net security and database security in enterprise resource planning (ERP) systems.</td>
</tr>
<tr>
<td>0.85018</td>
<td>3.8472</td>
<td>4- Applying standard 21 on enterprise resource planning (ERP) systems leads to more accurate and reliable outputs and results than the traditional systems.</td>
</tr>
<tr>
<td>0.81793</td>
<td>3.9167</td>
<td>5- Information technology auditors have knowledge of enterprise resource planning (ERP) systems risks.</td>
</tr>
<tr>
<td>0.80491</td>
<td>3.8333</td>
<td>6- Risks related to enterprise resource planning (ERP) systems are important and need auditing.</td>
</tr>
<tr>
<td>0.88003</td>
<td>3.9861</td>
<td>7- there is a specialized auditor in information technology where you work.</td>
</tr>
<tr>
<td>0.94943</td>
<td>3.5000</td>
<td>8- standards and systems issued by Audit and control Association on information systems (ISACA) are put into practice at your work.</td>
</tr>
<tr>
<td>0.94932</td>
<td>3.5139</td>
<td>9- information technology auditors commit to apply standard 21 issued by ISACA.</td>
</tr>
<tr>
<td>1.34851</td>
<td>3.1111</td>
<td>10- the reason for information technology auditors’ non-compliance to the application of standard 21 is the weakness of standard’s content.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11- The reason for information technology auditors’ non-compliance to the application of standard 21 is their ignorance of the standard and its importance.</td>
</tr>
<tr>
<td>0.61983</td>
<td>3.6944</td>
<td>12- standard 21 is their ignorance of the standard and its importance.</td>
</tr>
<tr>
<td>0.70489</td>
<td>3.6944</td>
<td>13- There are legislations oblige carrying out audit on enterprise resources.</td>
</tr>
<tr>
<td>0.85580</td>
<td>3.8333</td>
<td>14- Applying standard 21 protect enterprise resources from manipulation and theft.</td>
</tr>
<tr>
<td>0.70322</td>
<td>4.1111</td>
<td>14- Applying standard 21 protect enterprise resources from manipulation and theft.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Result of null hypothesis</th>
<th>SIG T</th>
<th>Tabulated T</th>
<th>Calculated T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection</td>
<td>0.000</td>
<td>1.9939</td>
<td>15.959</td>
</tr>
</tbody>
</table>

Hypothesis (1):
Ho: there is no impact of applying standard 21 on reducing the risks of Enterprise resource planning (ERP) systems.
Ha: there is an impact of applying standard 21 on reducing the risks of Enterprise resource planning (ERP) systems.

As the value of calculated (T) is bigger than the value of tabulated (T), we reject the null hypothesis and accept the alternative one according to the rule: “Null hypothesis is rejected when the value of calculated (T) is bigger than the value of the tabulated one and vice versa.” So this means that there is an impact of applying standard 21 on reducing the risks of Enterprise resource planning (ERP) systems.

Hypothesis (2):
Ho: the auditors of information technology do not realize the risks of the systems of planning the project’s resources.
Ha: the auditors of information technology realize the risks of Enterprise resource planning (ERP) systems.

As the value of calculated (T) is bigger than the value of tabulated (T), we reject the null hypothesis and accept the alternative one according to the rule: “Null hypothesis is rejected when the value of calculated (T) is bigger than the value of the tabulated one and vice versa.” So this means that the auditors of information technology realize the risks of Enterprise resource planning (ERP) systems.

Hypothesis (3):
Ho: auditors of information technology do not commit to apply standard 21.
Ha: the auditors of information technology commit to apply standard 21.

As the value of calculated (T) is bigger than the value of tabulated (T), we reject the null hypothesis and accept the alternative one according to the rule: “Null hypothesis is rejected when the value of calculated (T) is bigger than the value of the tabulated one and vice versa.” So this means that the auditors of information technology commit to apply standard 21 as one of the standards of information technology audit.

Hypothesis (4):
Ho: there is no significance for the application of standard 21.
Ha: there is significance for the application of standard 21.

We notice the attitudes of the sample were positive towards all the items, because all of the means are more than the mean of the measurement’s tool (3)

a) Reliability of the test
Cronbach Alpha test has been used to measure the reliability of the tool of the study which reached (76.00%) and it is a good percent since it is higher than the acceptable percent (60%).

Table 3: Results of testing the hypothesis

<table>
<thead>
<tr>
<th>Result of null hypothesis</th>
<th>SIG T</th>
<th>Tabulated T</th>
<th>Calculated T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection</td>
<td>0.000</td>
<td>1.9939</td>
<td>15.959</td>
</tr>
</tbody>
</table>

Table 4: Results of testing the hypothesis

<table>
<thead>
<tr>
<th>Result</th>
<th>SIG T</th>
<th>Tabulated</th>
<th>Calculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection</td>
<td>0.000</td>
<td>1.9939</td>
<td>13.63</td>
</tr>
</tbody>
</table>

Table 5: Results of testing the hypothesis

<table>
<thead>
<tr>
<th>Result</th>
<th>SIG T</th>
<th>Tabulated</th>
<th>Calculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection</td>
<td>0.000</td>
<td>1.9939</td>
<td>7.62</td>
</tr>
</tbody>
</table>

The lack of interest in auditing enterprise resource planning (ERP) systems may refer to the companies’ lack of use the software of enterprise resource planning (ERP) systems. The current control procedures in the organization are sufficient to protect enterprise resource planning (ERP) systems from manipulation. Applying standard 21 prohibit people who are not authorized to enter the enterprise resource planning (ERP) systems. Reason for lack of interest in auditing enterprise resource planning (ERP) systems may refer to the high cost of audit. Reason for lack of interest in auditing enterprise resource planning (ERP) systems is that auditing needs more effort and time. We notice the attitudes of the sample were positive towards all the items, because all of the means are more than the mean of the measurement’s tool (3).
Table 6: Results of testing hypothesis

<table>
<thead>
<tr>
<th>Result</th>
<th>SIG T</th>
<th>Tabulated T</th>
<th>Calculated T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection</td>
<td>0.000</td>
<td>1.9939</td>
<td>14</td>
</tr>
</tbody>
</table>

As the value of calculated (T) is bigger than the value of tabulated (T), we reject the null hypothesis and accept the alternative one according to the rule: “Null hypothesis is rejected when the value of calculated (T) is bigger than the value of the tabulated one and vice versa.” So this means that there is significance for the application of standard 21.

Hypothesis (5):
Ho: there is no significance for auditing Enterprise resource planning (ERP) systems.
Ha: there is significance for auditing Enterprise resource planning (ERP) systems.

Table 7: Results of testing the hypothesis

<table>
<thead>
<tr>
<th>Result</th>
<th>SIG T</th>
<th>Tabulated T</th>
<th>Calculated T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection</td>
<td>0.000</td>
<td>1.9939</td>
<td>13.22</td>
</tr>
</tbody>
</table>

As the value of calculated (T) is bigger than the value of tabulated (T), we reject the null hypothesis and accept the alternative one according to the rule: “Null hypothesis is rejected when the value of calculated (T) is bigger than the value of the tabulated one and vice versa.” So this means that there is significance for auditing Enterprise resource planning (ERP) systems.

III. Results

According to the statistical analysis, the researchers concluded the following:

a) There is an impact of applying standard 21 on reducing Enterprise resource planning (ERP) systems risks.

b) Auditors of information technology realize Enterprise resource planning (ERP) systems risks.

c) Auditors of information technology commit to apply standard 21 as one of the standards of information technology audit.

d) There is significance to the application of standard 21 as one of the standards of information technology audit.

e) There is significance for auditing on Enterprise resource planning (ERP) systems.

IV. Recommendations

Based on the results of the study, the researchers recommended the following:

1. The companies and the institutions’ movement from the traditional systems of information technology to Enterprise Resource Planning systems (ERP).

2. There should be within the financial and management specializations in the Jordanian universities special courses in information technology audit.

3. Establishing a local association in Jordan to follow up the specialized people in the field of information technology audit and issuing standards and local specialized systems in information technology audit.

4. Carrying out further studies in information technology audit and Enterprise resource planning (ERP) systems and on other different samples.

References


