

*Full Length Research Paper*

# **A study of the effect of information technology on internal auditing: Some Iranian evidence**

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**The main object of the current study is to review the effect of information technology (IT) on internal auditing and the main question of the study is: How is the effect of information technology on internal auditing and each of its aspects including planning, internal control, investigation and reporting? The results of the study reveal that IT helps its users improve their performance. IT enables its users perform their duties with a higher validity. Those using IT say that it helps them focus and have a good feeling for their promotion.**

**Key words:** Information technology (IT), internal auditing, internal control, planning, reporting, investigation of auditors, and computer.

## **INTRODUCTION**

Following the industrial revolution in Europe and the arrival of huge amount of capital, establishing big commercial units requires the investment of several investors in such commercial units for supplying the capital. Simultaneously, duration of such growth organization and management of these big units becomes more complex and leads to a professional, scientific and specialized management, and finally its separator from ownership and creation of the issue of auditing of managers to per organizational owners. Furthermore, in order to gain the organizational goal deals with the organizational groups, intra organizational relations department, like the granted responsibilities to managers, should be in accordance with predetermined policies. In this regard, in order for the executive and non-executive managers to fulfill their stewardship duties toward capital holders and their obligation to pressures, there is need to raise internal controls suitable for distinguishing, estimating and controlling the above items (Tucker, 2001). Not being engaged in the activities of commercial units and impossibility of direct control of operations of organizational system forces the director general to establish suitable internal control including generation of internal auditing

units as the management control for estimating and assessing the effectiveness of other controls (Victor and James, 1998). Accelerated, and increasing development, and complexity of economic units in today's advanced world pressures due to lack of sources and increase of competition, different financial, commercial and administrative menaces which are threatened by organizational goals and policies internally and externally, have made it impossible to control such units individually and directly and have made it necessary to establish an effective internal control system as an integral part of the efficient management system (Philee, 2009). Internal auditing plays an important role in internal control system and helps the management of organization fulfill its duties by strengthening controls. Actually, in addition to the possibilities of internal auditing including ascertaining the quality and accuracy of operations, financial information and reports, efficiency of internal control systems and eliminating its weakness, preventing mistakes or financial abuse and the like, the management benefits from this port in accurate performance of responsibilities and suitable decisions. The responsibilities of internal auditors exceed financial activity and involve examination of efficiency of different parts of organization with observance of the application of operational auditing (Gallous, 2004). Although the principles and basis of auditing in public and private segments are the same, in auditing organization and institutes profiting public budget, the responsibilities

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are accordingly more extensive and auditors of public service institutes plays a basic role in assuring the accurate and economically effective and efficient use of general fund toward the benefits of the community. So, internal auditing is an important part of an effective management in all economical units. According to auditing guidelines, its existence is necessary and upon the extensive necessities of auditing, even at small institutes, in the case of using sources especially public sources, one can not logically justify inexistence of internal auditing unit. On the other hand, the role of information is so complex nowadays that the current era is called information explosion era. However, few studies are performed regarding the relationship between these two and especially, the effect of information technology (IT) on internal auditing. According to these researches, although IT is applied extensively in order to strengthen internal auditor's duties, its effect on internal auditing operations is not investigated. In this research, besides studying different aspects of internal auditing, explanation and interpretation of them, the effect of IT on each of these aspects will be discussed and finally, it will be proved that the development of application of IT affects different aspects of internal auditing. In Iran, during the past two decades, various measures have been adopted to promote and advance accounting in Iran via harmonizing the domestic accounting practices with international norms and standards. Although Iran has employed international accounting standards as the basis for developing its national accounting standards, there are still some differences between Iranian and international standards, and there are some certain international accounting standards that are not applicable in Iran. A host of endemic factors, such as existing laws and rules, religious beliefs, culture, economic, and political conditions, have influenced the national accounting standards setting processes.

### **The emerge of IT**

For the first time that electronically processing of data came into existence, auditors worried about the basic changes that would be made in relation to the new technology in the nature of auditing. But today, it is clear that such things do not exist. By applying a set of standards, auditors continue their technical and independent appraisal of economical activities. The only different thing is that because of favorable grounds for some menaces in IT environment in comparison to manual environment, in order to decrease the potential damages resulting from inherent risks, more emphasis is put on internal control. It seems that by appearance of IT systems, administrative techniques of control have primarily changed and it has a great impact on the nature of auditing examples. Also, because of the changed nature of examples and more emphasis on control, techniques of gathering and

estimating auditing examples have developed. It appears that IT has also affected the reporting aspect of internal auditing. In other words, to be mentioned, it improved the quality of reporting toward the appeal of the illustration of report, decreased internal auditing mistakes, improved report presentation time and updated it (Tucker, 2001). By benefiting from new ideas and more extensive intuition in proportion to the situation, some regulations are being formed in organizational structure of internal auditing society in order to formulate standards and to present guidelines. So, it is worth while to investigate the role of IT in the process of internal auditing standards. Computers and networks provide most of the information needed for auditing. In order to be effective, auditors must use the computer as an auditing tool, audit automated systems and data, understand the business purposes for the systems, and understand the environment in which the systems operate. The other important use for computers and networks by auditors are in audit administration. By seeking new uses for computers and communications, auditors improve their ability to review systems and information and manage their activities more effectively. Automated tools allow auditors to increase individual productivity and that of the audit function.

By recognizing the importance of emerging environment and requirement to perform audit task effectively, auditors must recognize the key reasons to use audit tools and software, which will be further explored. The key reasons include:

- i. On a personal level, learn a new skill.
- ii. Improve company decision-making using improved data.
- iii. Increase the efficiency of an audit.
- iv. Reduce routine tasks to provide more time for creative and business analysis.
- v. Provide improved transparency governance of the organization.
- vi. Identify quantitative root causes for issues.
- vii. Reduce fraud and abuse.
- viii. Identify savings in supplier, customer, human resource, computer, and enterprise management.

Internal auditing profession is a dynamic one which is changed in reaction to its internal evolution. In the last years, an extensive change in computer and communication has caused some primary changes in different fields of human life. Man is always using technology. Human life report is full of different technological innovations all of which are in the direction of facilitating human life. In recent years, communication and information technologies which are new and great have the most effect on human life. Information production and communicant word are changing rapidly and nowadays, we see that they are more convergent than before so that data can be transferred to the farthest part of the

word and are available for users. Undoubtedly, the most important and the biggest development in the field of communication and IT goes back to the innovation of "web" by "Tim Brenerzly" in Cern in the late 1980s. After innovation of each technology, it takes a short time for it to be used (penetration coefficient).

For example, telephone, radio, personal computers, television and web succeeded in attracting 50 million users after 74, 38, 16, 13 and 4 years respectively. Without any doubt, IT has caused extensive changes in all social and economical fields and its effect on human society is so that today world is rapidly changing to an information society in which knowledge and extend of its availability and its beneficial use have a determining role (Philee, 2009).

By definition, IT refers to the aspect of information system including database hardware, software, networks and other tools. By another definition, in addition to the technological aspect of information system; IT expression is complex of information. In Tucker's viewpoint, it is using computer and telecommunications for collecting, processing, saving and issuing acoustic, pictorial, textual and numerical information. In a comprehensive definition, it refers to the way the equipment is used and IT means the application of technology for trading, collecting data and producing useful information for the managers.

### **The history of IT in Iran**

The first steps for establishing new transmission in Iran are taken by founding educational planning and research institutes, scientific documentation center (SDC), and library service network of transaction of scientific information (UNISIST) and by participation of the members of the international congress, international activities were examined by UNESCO.

Later, by participation of experts of international scientific information organizations like federation international de documentation (FID) issues discussed in UNISIST were studied and the results were published as a bulletin. After a large set of studies by participation of 83 agencies of countries, UNISIST congress was formed by UNESCO from 4<sup>th</sup> to 9<sup>th</sup> October in 1971. Iran's delegation participated in this congress on behalf of educational planning and research institute. The first document was a report written by Daneshi and his colleagues which was prepared for determining UNISIST congress.

Following this report, a detailed article Worldwide Network of scientific Information Transaction was published in technical bulletin of scientific evidence center in which the situation of developing countries was mentioned (Salehi, 2008a). After Iran's delegation participated in UNESCO congress (1971), scientific evidence center related to educational planning and research institute studied the possibility of adopting compatible policy in collecting scientific and technical information.

Scientific evidence center was supposed to prepare a report in this regard. This report was investigated at the meeting of those knowledgeable and after revision, was published. In all, activities done for establishing DS can be summed further.

Scientific documentation center (SDC) launched its activities by establishing coordinating center of documentation centers in 1971; SDC'S goal by establishing coordination center of documentation centers is to strengthen national basis of scientific information; by forming coordinating council of documentation center and the council relating to UNISIST by UNESCO natural commission in Iran in 1973, attempts were toward UNISIST's comments. Some suggestions were made about scientific information policy at state on August 1976. On July 1977, by cooperation between UNESCO and planning organization, establishing "state technical-scientific information policy meeting" was feasible. It provided the possibility of preparing draft of articles of association of UNISIST national commission. Before 1978, informatics office of planning and budget organization ran all mechanical activities of processing data as a department.

In 1978, pursuing issues related to national documentation system was cased due to political status of the country. But extensive use of computer and related equipment which had begun years ago was expanded. Extensive use of computer at state organizations and mechanical processing of data required a foundation, supervising all the mechanical activities. In 1980, after approval of establishment of informatics council in October by parliament, the responsibility of controlling state informatics system was undertaken by parliament, although, secretariat of informatics council at planning and budget organization joined it. Administrative of affairs of informatics council was undertaken to informatics deputy of planning and budget organization which include a set of administrating supervising and guiding activities. Until 1981, the issue of national information network and national documentation system was left unsaid but the need for organizing documentation status in all fields inspired public institutes and some scattered activities and studies were done; SDC'S studies is the most prominent one among studies. The first model was raised by SDC and even it was studied and its results were published as state technical- scientific documentation network proposal which at last, was not performed and remained only as a proposal.

### **Internal auditing**

Some types of internal audits date back thousands of years. As mentioned earlier, the Greeks, Romans, and Egyptians were conducting audits before the birth of Christ. Interestingly, the scope of these early audits was in many ways akin to that of modern internal audits; both included an examination of the correctness of accounting

records and an evaluation of the propriety of activities reflected in the accounts. Emphasis was on improving management control over the activities of the organization. Such broad emphasis was not to reappear on a wide scale until after World War II. In the United States, there was little need for internal auditing in the colonial period because there was little in the way of large industry. In fact, accounting textbooks of the period never referred to the subjects of internal auditing or internal control. In government, however, the need for an audit function was recognized. The first U.S. Congress in 1789 approved an act that included a provision for the appointment of a secretary of the treasury, a comptroller, and an auditor. The auditor's job, basically a clerical function, was to receive all public accounts, examine them, and certify the balances (Salehi and Biglar, 2008). Despite the aforementioned early references, railroad companies are usually credited with being the first modern employers of internal auditors. It was during the latter part of the nineteenth century that these first real internal auditors became commonplace. The title applied to these employees was 'traveling auditors', and their duty was to visit the railroads' ticket agents and determine that all the accounting for all monies was properly handled (Salehi, 2009a, b). Other early industries to use internal auditors included the large Krupp Company in Germany. Krupp apparently employed some type of internal audit staff, at least, as early as 1875 since there is a company audit manual dated January 17, 1875. Prior to 1941, internal auditing (IA) was essentially a clerical function with no organization and no standards of conduct. Because of the nature of accounting record keeping at the time (that is, manual), auditors were needed to check the records after they were created for accuracy for errors in postings or footings. Auditors were also concerned with the possibility of fraud. Thus, the internal auditor was a verifier, or a "cop," to protect organizational assets.

The old concept of internal auditing can be compared to a form of insurance: the major objective was to discover fraud more quickly than it could be discovered by a public accountant during an annual audit. That is, the internal auditor was performing a function similar to a police officer or detective. The modern concept of internal auditing is that of an arm of management. Today, internal auditors are an integral link in the management process and are just as concerned with waste and inefficiency as with fraud. Part of the development probably can be attributed to the change in technology. As accounting became mechanized and computerized, records became subject to automatic checking procedures. Thus, the need to check every transaction declined, giving internal auditors time to reach beyond the historical clerical limits. The year 1941 marked a turning point in the development of internal auditing as two significant events occurred. One of those events was the publication of the first major book on the subject-Victor Z. Brink's internal auditing. Also, in 1941, 24 individuals joined together to form The

Institute of Internal Auditors (IIA).

During the 1940s, internal auditors began to expand their audits to encompass more than the traditional financial audit. The shift to a war economy in the early 1940s was the primary cause for the expansion of internal audit scope. Management became more concerned with production scheduling, shortages of materials and laborers, and compliance with regulations. Also, cost reporting became more important than external reporting. As a result, internal auditors began directing their efforts toward assisting management in whatever way possible.

Internal auditing was formally recognized in America from 1930 to 1940 (Anderson, 2004). Because of the importance of internal auditing, it developed after 1940. The main reasons for development of internal auditing are increasing number of stock companies and increasing complexity of form and content of business transactions. Legal obligation indirectly leads to development of internal auditing as a structural internal control factor, too. Internal auditing activities can be classified in three groups: operational, observance and financial auditing. Financial auditing is done by independent auditors.

Observance auditing goal is to determine the extent of observance of rules governing organization. Operational auditing goal is to appraise management control which optimizes the usage of organizational resources. However, nowadays, operational auditing has set aside a part of internal auditing resources for itself. But financial and observance auditing are still most important activities of internal auditing.

### **IT and internal auditing**

The technology revolution in accounting and auditing began in the summer of 1954 with the first operational business computer. IT changed the way accounting data was stored, retrieved, and handled. These new systems led to radically different audit trails, if one at all (Salehi and Alipour, 2010). The revolution became a dynamic evolution as the computer industry sustained continuous, rapid, technical innovations. In addition to the introduction of computers to the business world, other IT-related events have also had a profound effect on the auditing profession and the way audits are conducted. These events included: 1) the commercialization of computers; 2) the introduction of AUDITAPE; 3) the Equity Funding scandal; 4) the emergence of Information Systems Audit and Control Association (ISACA); 5) the systems, auditability, and control (SAC) studies by the Institute of Internal Auditors (IIA); and 6) constant emerging technologies. Information technology affected, and continues to affect, auditing (Salehi et al., 2010). It became necessary to add new standards, affecting the body of auditing standards. The audit process itself has become different from traditional audits prior to 1954 (for example, audit tools and techniques). It was possible for an auditor

to retire in the 1950s having used similar audit programs throughout one's career. That will never happen again! The effects of IT on auditing have culminated in a set of knowledge, skills, and standards necessary to conduct the contemporary audit that were nonexistent in 1954. The introduction of computer technology into accounting systems disrupted the routine auditors had been able to establish to properly audit accounting systems (Salehi et al., 2010). General Electric is attributed with the first operational electronic accounting system, a UNIVAC computer, in the summer of 1954. Because of the new knowledge necessary to understand computers and electronic data processing (EDP), the auditing profession struggled to develop a new set of tools, techniques, and systems knowledge-and the training and standards to accompany them. A seminal event occurred very early in the history of business computers. This notable example of early innovation was an article, "Using a Computer to Reconcile Inventory Counts to Books," published in N.A.C.A. Bulletin (national association of cost accountants) in June 1956. In the article, the author, Frank Howell, member of the Auditor General's staff for the United States Air Force (USAF) in Washington, D.C., described how an organization used the computer to reconcile inventory counts to books. The computer was programmed to print out major differences between counts and inventory records while automatically adjusting the books to the count for minor differences.

Taking into account the length of publication cycles, this technique was being used as early as 1955, that is, at the beginning of IT history. Some nascent articles and discussions deliberated the possibility of using information technology (that is, the computer) as an audit tool, but Howell at the USAF was actually using technology as an audit tool. At the time, this idea was radical and innovative. Thus, one early effect of information technology was to provide the very tools auditors would need to adequately audit accounting data. This effect became perpetual as future technologies would also be used as tools in audits of EDP systems.

Not all creative tools and techniques were delivered using emerging technologies. As early as 1961, the U.S. Air Force adapted traditional separation of duties between programmers, systems designers, and keypunch operators. Other traditional auditing principles would be similarly altered to accommodate the effects of IT on auditing.

In the beginning, IT itself provided an inherent protection. From 1955 to the mid-1960s, the computer world included only mainframes. During this time, few people had the knowledge and expertise to program a computer. This situation prevented most accountants from preparing programs to audit through the system. It also provided its own form of security, because few people knew enough to violate the systems.

Beginning in 1963, the escalation of computer usage in accounting systems caused auditors to think about how

they were going to deal with this new technology. Several organizations had begun to manufacture computers to be used in business during the late 1950s and early 1960s. Some manufacturers, such as Singer and General Electric, soon exited the computer market. Others, such as Burroughs and IBM, became major suppliers of business computers. Up until then, all of the computers were mainframes. The cost of these machines made it prohibitive for most companies to purchase one.

The use of computers in accounting began to escalate in 1963 with the introduction of a new, lower-cost computer by IBM-the IBM 360. The plan at IBM was to introduce smaller machines at more affordable costs to businesses. The IBM 360 accomplished this objective, and a rapid increase in sales of commercial-use computers ensued. This increase in computer sales was instrumental in creating a greater need for EDP auditing concepts in businesses and a need for auditors skilled and knowledgeable about EDP. And the spiral of better IT, cheaper IT, and smaller-size IT was off and running.

From the beginning, external auditors had a difficult time in auditing through the computer. First, the majority of auditors audited around the computer ignoring, for the most part, the effect of EDP on the audit. In the 1960s, those auditors who audited through the system had to rely on expensive, time-consuming, and continuously changing custom audit programs. For example, Keagle Davis undertook a study at Touche Ross that showed that their programmers had written 150 to 250 customized audit programs in 1967 alone. While 75% of these were effective, 80% required major programming changes the next year because of changes in the computer system or changes in audit needs.

Meanwhile, the number and variety of financial accounting systems and clients with computers greatly increased in the last half of the 1960s. The need for skills required to handle the audit of computerized data significantly increased beyond those of an EDP technician. Together, these needs drove the development of generalized audit software (GAS).

A series of events and projects at Haskins and Sells (H and S) led to the initial GAS package. In the late 1950s, Kenneth Stringer began to develop a statistical sampling plan. In 1962, H and S formerly adopted the plan, probability proportional to size sampling (PPS). PPS was a precursor to AUDITAPE, but it was not the only motivation, or even the primary motivation, in developing AUDITAPE. Stringer and the management at H and S were also motivated by the fact that the more clients computerized their accounting, the more dependent auditors would become on computer expertise. The growth of computerized accounting systems would create an environment in which auditors would be unable to perform the audit steps once done manually. That is, access to data was gradually slipping away from auditors.

The introduction of AUDITAPE in October 1967 by Haskins and Sells at the American Accounting

Association (AAA) annual meeting in Portland, Oregon, was a key event for external auditors in particular (at that time), and internal auditors (later). Practitioners were excited when they saw the potential of AUDITAPE because external auditors who were not highly technical could now run the computer and use it as an audit tool. Very few auditors had yet acquired a high level of technical skills in 1967.

As a direct response to the introduction of AUDITAPE, several GAS packages were developed from 1968 to the early 1970s. Every Big Eight public accounting firm developed its own proprietary GAS package during this time. Independent organizations, such as Computer Audit Systems, Inc. (Joseph Wasserman, CARS software) and, in the late 1970s, P.I Corum (later Pansophic, Pan Audit software), also developed GAS packages.

The development and use of GAS was a breakthrough in audit tools. In 1967, very few audit tools existed, and there was a meager use of the tools that did exist. AUDITAPE was the impetus that led to the development and use of audit tools, specifically GAS, in EDP audits. AUDITAPE also affected other aspects of auditing. Although statistical sampling preceded AUDITAPE by several years, AUDITAPE affected the use of statistical sampling as much as it affected anything. Thus, AUDITAPE was born from a need to audit through the computers (information technology) in a simple, efficient, and effective manner. Information technology's effect on access to data by external auditors (that is, difficult to examine) drove the need for better audit tools. To this day, GAS is perhaps the most valuable tool an auditor has to audit data embedded in IT.

The AICPA added its contribution to EDP audits, even though it was without official standards or guidance. In 1968, Robert Trueblood of Touche Ross, president of the AICPA, pursued the theme of computers in accounting during his term. Trueblood used his influence to have the AICPA hire Gordon Davis to both assist CPAs in the use of computers and codify EDP auditing. Dr. Davis, a professor at the University of Minnesota, accepted the responsibility and took a leave of absence to be *de facto* chairman of the committee appointed by the AICPA. Each of the Big Eight firms was invited by the AICPA to participate on the committee in the development of this project, and seven firms provided representatives. The major result of the project was a book entitled *Auditing & EDP*. This popular book went through many printings and a revision in 1983. It included examples of how to document an EDP audit and a sample questionnaire for processing internal control review.

The Auditing and EDP project led to several changes in the auditing profession. Although the book itself did not present the official position of the AICPA (that is, it was not promulgated standards), it did present a number of audit and control concepts and procedures as an unofficial document. Perhaps, the most important chapter was one dedicated to explaining when and how to audit

around the computer. In the 1960s, auditors could officially audit input and output and still be in compliance with AICPA standards. If auditors did choose to audit around the computer, the chapter recommended that an evaluation of internal control be made to both review and test the system. Auditors could not simply ignore the presence of EDP in the accounting system. This recommendation was essentially the context of Statement on Auditing Standards (SAS) No.3: *The Effects of EDP on the Auditor's Study and Evaluation of Internal Control*, promulgated six years later in December 1974.

Another result of the auditing and EDP task force was the establishment of a permanent EDP auditing committee within the AICPA. The committee's efforts eventually led to the issuance of several audit guides and SAS No.3.

### Research objectives

Nowadays, remarkable change has occurred in IT and its development is so comprehensive that it has brought the possibility of change in different fields. Its most important properties include rapid data processing, its extraordinary accuracy, and haste availability of information, high quality, and cheapness. On the other hand, affairs are being complicated and operations size is being extended. By these factors, there is no need to justify the application of IT in today world. Accounting and auditing have to apply all or some parts of new methods in presenting their service. So, in order to recognize new technologies and to find which technology and how it should be used, it is necessary to research, to improve the quality of this profession and progress accounting and auditing, as some primary changes are occurring in IT (Bae and Ruth, 2003).

### LITERATURE REVIEW

Yang and Guan (2004) discussed on the evolution of auditing in the rapid escalation of technology, which openly contribute to IT auditing and internal control standards and guidelines. Technology, information system (IS) and electronic data processing (EDP) have changed the way organizations conduct its business, promoting operational efficiency and aid decision-making.

In this essence, and in the case of United States (US) as being explored by the authors, various authoritative bodies, such as the American Institute of Certified Public Accountants (AICPA) and the information systems audit and control association (ISACA), have issued standards to facilitate and provide sufficient guidance to auditors. According to AICPA's SAS No. 3, the objectives of accounting control are the same in both a manual system and an IT system. However, procedures used by an auditor may be affected. SAS No. 48, "the effects of

computer processing on the examination of financial statements," explained and recommends auditors to evaluate the methods of computer data processing and other significant factors. Under SAS No. 94, the AICPA specify factors auditors need to consider in financial statement auditing process and its implication to audits of all size of businesses. The authors have also reviewed and discussed the five most significant aspects of No. 94, and this is supported by Tucker (2001). In addition, SAS No. 94 recognized the types of systems, controls and evidence auditors encountered. The author has touched briefly on the statement of information system auditing (SISA), which defined mandatory requirements for IS auditing and reporting. This is reviewed through SISA 010 to SISA 080. The authors have provided thorough explanation on auditing standard and guideline available in US, and suggest on how this standards and guidelines can assist auditors fundamentally in IT auditing. However, the authors have not specified type of IT auditing application and how it directly affects auditing profession. The authors also failed to prove significance impact of technology to the auditor's roles and responsibility.

Khadaroo (2005) has explored on the widespread of corporate reporting on the internet and its implication to auditing profession. The phenomenal growth of Internet ultimately contributes to electronic, web-based Internet reporting information. The author first had revised several literature and accounting standards to understand the nature of best practice and code of conduct for web-based business reporting. The author later examined internet reporting practices in Malaysia and set the limit of the study to 100's Kuala Lumpur Stock Exchange Composite Indexed (KLSECI) companies in Malaysia for year 2003 and 2004. The author found out that there was a significant increase of companies using the internet to supply information to the public. The core activities of disclosing information are mainly on general web page attributes (line of product, business function and product promotional activities), investor relations, and financial information; including audit reports. The author has suggested that although usage of internet can benefit the company, reliability and verification of information disclosed has to be guarded. Based on his survey, a large number of the KSLE listed companies (14%) are hyper-linking audited financial statements to unaudited information. This may contributed to a potential manipulation by the company and influence users in profession has to play an important role in improving the quality of information provided and assuring users about their reliability. The author suggested that specific audit procedures to be taken, for instance, as recommended by auditing guidance issued in Australia and New Zealand. The author also suggested several security measures, for example, the hosting of audited information on an auditor's web site, may provide auditors with better control, reducing audit risks and further improve the credibility and reliability of information to users. Nevertheless, the author has only discussed and analyzed

implication of auditing profession on the surface level and did not conclude the real effect of internet's corporate reporting to auditors.

Goodwin (2004) has compared features of the internal audit function between organizations in the private and public sector. Several aspects has been carefully examined which includes organizational status, using internal audit as a "tour of duty" function, outsourcing of audit function, risk management, and interactions with external auditors. The study is based on a survey done in Australia and New Zealand organizations. Survey was done to indicate the length of time spent by respondents in internal audit process and it has appeared that internal audit has a higher status in the public sector rather than in private sector entities. On outsourcing, survey indicated that both sectors engaged in some outsourcing of internal audit activities particularly in information technology and system. The percentage outsourced is quite similar between these two sectors. Author has also discussed on the major activities affiliated with internal audit, specified as financial audit and internal controls, risk management operations and systems audits. The author has explored internal audit interaction with external auditors from the perspective of the chief internal auditor and results indicated that there are no significant differences between public and private sector responses. Further, in both sectors, external auditors have a high level of access to internal audit reports. This may reflect the greater level of competition in the private sector audit market compared to public sector. In conclusion, the author suggested that there are differences in status between internal audit functions in the two sectors but that internal audit activities and interactions with external auditors are similar. The author only discussed the comparison of internal auditing activities and features on structural basis without further elaboration on the functionality of internal audit process in the organization.

Jayalakshmy et al. (2005) have highlighted the pressures auditors would face in the era of globalization and challenges in order to maintain trust and integrity. The authors have reviewed a wide range of articles and journals published and covered areas of audit fraud, true and fair view interpretation, auditor independence and role of internal auditors. In addition, Roufaiel and Dorweiler (1994) expressed that computer fraud is easy to commit but difficult to prevent and therefore, the auditors should define their responsibility for computer fraud. The authors have defined the lack of independence, integrity and credibility of the auditing profession on the role and responsibility to detect and prevent audit fraud. They also discussed the accounting uncertainty and changes in standards over time have affected auditors in forming a true and fair view (TFV) opinion. The concept of "true and fair view" (TFV) is well known to accountants as well as auditors. It has been the fundamental basis of audited accounts for many years. The recent audit failure cases have revealed the issue on the concept of TFV and whether this concept certify by

auditors or not, needs an overhaul to strengthen the audit process. This should be supported by taking account the judgments from stakeholders of the company and the auditors. The authors have provided acceptable awareness to the auditors, corporations and general public on the necessity to revamp the existing auditing practices. This can help the auditors not only to be professionals, but also to be seen as professionals. It is noted that internal auditors, rather than external auditors, will be more helpful in detecting and reporting fraud, since internal auditors work with the management. This automatically brings into consideration that the internal auditors should possess the same level of independence, integrity and professionalism as the external auditors. The authors have suggested that apart from defining the role of the auditors, it is also necessary to consider whether an overhaul in the concept of TFV will help the auditors in performing their duties sincerely. Unfortunately, the authors have not thoroughly provides field and statistical data on study, and the argument is purely based on secondary data. The authors have also not defined each role and responsibility taken by the auditors to detect and prevent audit fraud. No analysis was done on the possibility of actual application.

Jackson (2004) explored the auditors approaches in utilizing the audit tools, software's and how technology evaluation affecting their practices. The author has illustrated the internal auditor's 10<sup>th</sup> annual software survey in discussing the issues interconnected with audit software in United States. The author observed that the limitation of implementing audit software was particularly concerned with cost implication, failure of software to meet audit departments needs, and resistance in training to auditors. The author has cited the key note presented by several experts in the audit-related software who have had various experience in implementing and maintaining the software inside the organization. Lanza, as one of them, an audit manager, and founder of AuditSoftware.net, has shared his extensive experience in the fields by suggesting several method in ensuring the successful implementation of audit software in the organization. He noted that, although audit programs in general are simple to open, they can be complex to run. This can be achieved through interactive training, and continuously monitoring of the learning process. Lanza has noted that the business sponsor (management) might be reluctant to accommodate and approve the training since they perceive the training-time might lead to un-productivity. The author also discussed the information on type of software adopted in the organization, its popularity, reliability and overall satisfaction. Many audit related software enable an organization to subscribe to and implement them in the organization. However, several issue on reliability and consistency arises when those software are not meeting auditors expectation. The author also discussed the availability of open-source software available in the web format. Using

open-source software has distinct operational advantages. Auditors with very specific software needs may have to look beyond the built-in capabilities of available products and consider crafting their own audit tools. The author also observed customization in developing fraud-auditing techniques. The article does not provide any detailed analysis on impact of technology advancement and availability of complex audit software could promote to efficient and effective audit performance.

Staciokas and Rupsys (2005) aimed to understand internal audit functions, explore implication of IT and analyze advantages of internal audit in the organizational governance. The author has explored the origin and acceptable definition of internal audit by reviewing literature, comparative analyses, and reviewing latest research. The definition of internal audit has continually changed and revised decade by decade, and still we are still facing certain issues understanding of internal audit function and it position within the organization. At present, the function of internal audit includes not only of internal control effectiveness, fraud investigations or assistance to external auditors, but also identification of organizational risks, consultations to the senior management with regard to risk management, process improvement or global operations. It is vital for all members of organization (management, accountants, audit committee, etc.) to have same and adequate understanding of what internal audit is all about. The author has also explained that there is some independency problem faced by internal audit being an integral part of organization. In exploring the implication of IT, the author has defined the significant benefits of IT in auditing process. Auditors aided by IT based application; computer assisted audit tools (CAATs) increased effectiveness of internal audit in the organization. On the other hand, IT development, for example, automation and computerization, had increased risk of discontinuing organizations activity, data loss, network breakdown and influence business monitoring and control process. The author has reemphasized the aim of internal audit function which is to monitor, evaluate and improve risk management, controls, and governance process. Unfortunately, the author has not provided enough analysis on how different corporate governance's approaches can influence internal audit process in the organization.

## Research hypotheses

With respect to research problem and recent review of literature, a main hypothesis and four sub-hypotheses are postulated in the study:

- H<sub>1</sub>: Applying IT affects the quality of internal auditing.
- H<sub>1a</sub>: Applying IT affects the structure of internal auditing.
- H<sub>1b</sub>: Applying IT affects internal auditing planning.
- H<sub>1c</sub>: Applying IT affects performance of probing methods.
- H<sub>1d</sub>: Applying IT affects internal auditing reports.



**Table 1.** The results of binomial test.

Result	Comparison	Statistical method	Statistical hypothesis	Hypothesis
H <sub>0</sub> is rejected at 0.95 so, H <sub>1</sub> is confirmed.	p-value < 0.05	T-Test binomial test	H <sub>1</sub> :u>3 H <sub>0</sub> :u≤3	H <sub>1</sub>
H <sub>0</sub> is rejected at 0.95 so; H <sub>1a</sub> is confirmed.	p-value < 0.05	T-Test binomial test	H <sub>1</sub> :u>3 H <sub>0</sub> :u≤3	H <sub>1a</sub>
H <sub>0</sub> is rejected at 0.95 so; H <sub>1b</sub> is confirmed.	p-value < 0.05	T-Test binomial test	H <sub>1</sub> :u>3 H <sub>0</sub> :u≤3	H <sub>1b</sub>
H <sub>0</sub> is rejected at 0.95 so; H <sub>1c</sub> is confirmed.	p-value < 0.05	T-Test binomial test	H <sub>1</sub> :u>3 H <sub>0</sub> :u≤3	H <sub>1c</sub>
H <sub>0</sub> is rejected at so; H <sub>1d</sub> is confirmed.	p-value < 0.05	T-Test binomial test	H <sub>1</sub> :u>3 H <sub>0</sub> :u≤3	H <sub>d</sub>

## RESEARCH METHODOLOGY

This study is a descriptive surveying one which is based on field and library research (upon collecting method). Information collecting methods are a combination of field and library methods. In library method, throughout the library studies, subject literature, research background and a suitable formwork for the subject are provided. In field method, throughout suitable questionnaire, the necessary data for verifying or rejecting research hypotheses are gathered (Abu-Musa, 2008). In order to test the reliability as well validity of questionnaire, Korunbakh Alfa coefficient method is used. At first, 30 questionnaires are distributed and collected among personnel of internal auditing units of listed companies on Tehran Stock Exchange then they are calculated by 0.97.10 Cronbach alpha. The calculated percentage implies that the questions were homogenous and those answering were accurate. In other words, the questionnaire is highly valid. Further, validity of questionnaire is provided by compiling questions on the basis of the theoretical principles of research and expert's comments and confirmation. Thus, upon expert's comments and confirmation, examining the effect of IT on different aspects internal auditing is the basis of determining the effect of IT on internal auditing finally research questions are designed on this basis.

## Statistical sample and society

Statistical society is composed of listed companies on Tehran Stock Exchange (nearly 450 companies) and internal auditors auditing of listed companies on Tehran Stock Exchange. According to statistical formulas relating confidence, the required number for this research is 100. Sampling is done randomly. Because data are qualitative for calculating sample size, formulas suitable for qualitative data are used. Therefore, sample size is defined as a function of ratio of success (p) and the minimum sample size at 0.05 uncertainty is calculated in this way:

$$n = \frac{\left(\frac{z_{\alpha}}{2}\right)^2 \times p_0 \times (1 - p_0)}{\epsilon^2}$$

$$n = \frac{(1/96)^2 \times (0/5) \times (0/5)}{(0/1)^2} = 96/04$$

Since at least 97 questionnaires could be used and some were not usable and the others were irrevocable, out of 108, only 100 questionnaires were analyzed. The results of testing of hypotheses are summarized in Tables 1 to 3.

The results of hypotheses test are shown in table (2) according to One Sample Test.

These hypotheses are studied at 0.95 confidence. Summary of which is illustrated in the above table. Information included in Table 2 shows a meaningful level lower than 0.05 for all hypotheses. Since in order to H<sub>1</sub> to be accepted meaningful level of table must be lower than 0.05. Therefore the main research hypothesis is so we can conclude that the all sub-hypotheses also accepted. Table 3 shows the results of research hypotheses testing according to statistical binomial test. Upon this test, if p be the proportion of those whose answer to the extent of effect of IT on internal auditing is a lot, H<sub>1</sub> and H<sub>0</sub> can be compiled in this way:

$$\begin{aligned} H_0: P \leq 50\% \\ H_1: P > 50\% \end{aligned}$$

to simple sampling, sampling uncertainty and 0.95

## DISCUSSION

As research results show, IT is used in internal auditing and this affects internal auditing. So, it is suggested that we use IT increasingly so that the quality of internal auditing can be improved and accordingly, systematic planning and performing internal auditing operations be in accordance with the same planning. Furthermore, applying IT by internal auditing units of companies

**Table 2.** One sample testing of hypotheses.

The relationship between IT and auditor's report	Test value=3					
	T	D.f	Sig.(1-tailed)	Mean difference	0.95 Confidence level	
					Lower	Upper
Fh	6.570	99	0.000	0.3979	0.3979	0.7421
Fb	11.070	99	0.001	0.7223	0.7223	1.0377
Fk	6.093	99	0.000	0.4046	0.4046	0.7954
Fr	8.745	99	0.002	0.5180	0.5180	0.8220
Fg	7.744	99	0.001	0.4983	0.4983	0.8417

**Table 3.** The results of testing of hypotheses.

Group	Category	N	Observed Prop	Test prop	Sig. (1-tailed)
Group 1	≤3	36	036	0.50	0.0007
Group 2	>3	64	064		
Total		100	1.00		
Group 1	≤3	38	038	0.50	0.021
Group 2	>3	62	062		
Total		100	1.00		
Group 1	≤3	36	036	0.50	0.007
Group 2	>3	64	064		
Total		100	1.00		
Group 1	≤3	37	037	0.50	0.021
Group 2	>3	63	063		
Total		100	1.00		
Group 1	≤3	35	035	0.50	0.004
Group 2	>3	65	065		
Total		100	1.00		

increases the quality of internal control, accurate examination, and accurate and efficient internal auditing reports. So, it is suggested that accounting and auditing system take steps in this direction and accounting and auditing system be developed in proportion to the new technology and all the auditing activities, especially internal auditing, be in harmony with the changes in commercial world.

## Conclusion

The results of the study show that using IT causes remarkable changes in internal auditing. According to these findings, IT is generally used in performing different phases of internal auditing, especially performing content tests and in the process of performing analytical

investigations and main operations. In a nut shell, the results reveal that:

- i. IT helps its users improve their performance.
- ii. IT enables its users perform their duties with a higher validity.
- iii. Those using IT say that it helps them focus and have a good feeling for their promotion.

Upon these findings, auditors can increase their benefit and their duties with a higher quality by using IT. It helps auditing improve the quality of different aspects of internal auditing. Software packages, extensive electronically sheets and other programs like planning software provide possibility of improving internal auditing operations. Research results also show that using IT causes auditors to spend less time on probing and performing content

tests and accuracy of mathematical calculations of office accounts rapidly.

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