

## Exploring the Impact of Information Technology on AIS

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### ABSTRACT

This paper explores how information technology has transformed Accounting Information System (AIS). Several innovations in information processing technology have brought about revolution in methodologies, techniques, quality and design of AIS. Increasing use of information technology has further fueled emergence of new processes, models and channels to communicate accounting information. There are a number of tangible reasons to consider information technology as a sophisticated tool for designing AIS. One of the crucial reasons is the enhancement of competitive advantage due to exploitation of the potential of information technology in accounting applications, especially, in the areas that are related to cost reduction and maximization of business profits. The transformations in accounting social system (matrix of accounting skills, literacy, and education) due to use of information technology have been researched and frame worked. The key feature of this paper is the statistical measurement of the physical transformation aspects in AIS, due to use of information technology. A survey of 338 professionals (accountants and executives) was used to test the design parameters of AIS, which have been affected by the use of information technology.

**Keywords:** Information Technology, Accounting Information System (AIS), Accounting Processing System.

### 1. INTRODUCTION

During the entire history of business, accounting model has been classified as the primary formal information system, on which management decisions were based. It was special-purpose (ad hoc) information system that has been developed over the years to meet particular information needs. At the beginning, AIS was a simple system for documenting financial performance of management. Later, adopting calculating methodology has led AIS to be viewed physically, as a structure of accounts providing routine mechanism to report result of processing transactions of business organization. The introduction of information technology has initiated a debate centered on the essence of accounting and how AIS is affected by the use of a new technology. The early studies have concentrated on the validity of conventional processing model, and the functional content of accounting. Information technology has had huge impact on nature, number, content and skill of accounting processing model (James, 1958). Use of information

technology has consolidated accounting processes and affected functional content of these processes. Mechanization of unskilled and routine accounting processes within the accounting-processing model has come due to a new technology (Applegat et al., 1988; Lee and Tweedi, 1977).

The explosive growth in information technology and the desire of business organizations to obtain competitive advantage, have led to seismic shifts in the accounting processing model and have triggered the development of new ways to process, store and communicate accounting data (Tucker, 2001). Information technology has created a new model for accounting processes, which demanded from accountant new information standards. The existing of AIS is in need to be reviewed in the light of new accounting processing model (Ida, 1960).

Much of the literature on AIS and information technology in recent years has shifted their focus of attention to search the validity of conceptual processing model of AIS. Existing AIS and its logical and conceptual models were established 500 years ago. A number of significant economic transformations have taken place since then, but no innovation in the practice of accounting has evolved (Lev, 2001). The traditional accounting conceptual model has focused on tangible

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assets such as: inventory and fixed assets (the assets of industry revolution). In order for the new business organizations to continue, a new set of information and a new conceptual model are required (Drucker, 1999; Elliot, 1992). AIS needs revision for the performance of knowledge organizations and the new model should be able to measure new cost items of products such as R&D, intellectual assets and services (Thomas, 1994).

Information technology has introduced a new business model with different financial reporting risks. Conceptual model of AIS should be modified to reflect the new model in the financial statements. Global competition, decentralization, and rise of knowledge-based assets have changed the AIS emphasis from cost control to cost reduction and from vertical to horizontal reporting. Even one of accounting's most cherished principles (to match income with expenditure) is struggling to cope (Hope and Hope, 1997). The biggest potential impact of information technology on Generally Accepted Accounting Principles (GAAP) lays in the areas of assets impairment and the appropriateness of going concern assumption (Lindsey, 2001).

The first purpose of the current paper was to investigate how information technology has transformed AIS and how this transformation differed according to sophistication level of information technology. A second purpose was to quantify impact of information technology on critical design factors of AIS. And finally, the third purpose was to model impact of information technology on AIS.

The following section discusses how the use of information technology has found new methodologies for designing entire functional accounting systems in Total AIS. Then, research methodology has been discussed in details and followed by a section providing analysis, discussion and conclusions.

### **Accounting Processing System**

One of the most recognized facts is the advent of information technology, as a processing tool has affected the matrix of the organizational change. This matrix includes change in business processes, organizational structure, organization roles and technology (in particular, information technology). These elements are often interrelated, so that appropriate functioning of one element depends greatly on those of other elements (Bhattacharjee and Hirschheim, 1997). Understanding and evaluating the linkage between accounting processing

system and information technology are crucial in improving the accounting applications. The impact of information technology on accounting processing system has triggered radical changes in many processes and laid the foundation of new logical and physical infrastructure for AIS. The impact has taken different phases and differed according to the level of information technology. This justifies the use of information technology to formulate a new approach for designing AIS (Carsberg and Hope, 1989).

### **Automation of Accounting Tasks**

This methodology was described as the traditional paradigm of exploiting information technology for accounting purpose. Machines and Mainframe were primarily used as data processing tool to facilitate the execution of so many accounting tasks such as computing, calculating, billing, tabulating and bookkeeping. In other words, information technology was an adaptive technology, which has been used to transform accounting tasks from its old system to the computerized systems (Matusow, 1968). Automation of accounting tasks has led to redesign processing system of accounting in terms of:

- Obsolescence of the traditional accounting tasks (Carlson, 1957).
- Creation of new processing tasks (Matusow, 1968).
- Standardization and integration of accounting Tasks (Hein, 1969).
- Downsizing components of accounting tasks and increasing its processing capabilities (Perry, 1989).

However, distinction of AIS into traditional and computerized, was the key result for automation of accounting tasks. As a result to freeing the accountant from the time-consuming burden of routine calculation and bookkeeping, this methodology segregated the accountants into two categories: data accountant (Bookkeeper Accountant) and information accountant (Information Communicator) (Murray, 1967). Organizationally, automation of accounting tasks was accompanied by some impacts, which primarily resulted from that there has been a revolutionary change as regards the location and new functions of accounting department (Adams and Williams, 1966). There are critical aspects have to be considered in transformation of accounting processing system, due to automation of accounting tasks. These aspects are related to accelerating bookkeeping tasks, cutting time, cost reduction and increased efficiency (Carsberg and Hope, 1989).

### **Automation of Accounting Functions**

The invention of transistor and integrated transistor is the major force behind automation of accounting functions. The new technological revolution led to the development of the operating systems, control engineering and system engineering. Such developments affected the detailed analysis of the function components, system cost and use of simulation techniques (Morries and Vining, 1987). These laid the foundation for development of decision-oriented applications and defined decision technology. Automation of accounting functions was active at all the levels in business organizations, but with varying degrees. Automation of the operational decisions was more than strategic management decisions. Further, automation of the accounting decisions has made a clear distinction between the operational and strategic applications (Turban et al., 1996). The applications of this methodology have demonstrated the ability of information technology to increase profitability and achieving competitive advantages, through automating logic of accounting functions such as: automation of sales functions, inventory control functions, cost control functions and accounts receivables/payables control functions (Good and Schultz, 2000). As shown in Figure (1.1), the ultimate philosophy within this methodology was how to maximize the exploitation of information technology to replace personal involvement and professional judgment within accounting functions to gain more competitive advantages.

### **Integration of Accounting Processes**

The integration of accounting processes is the significant consequence of changing production processes and increase in focusing on quality. This is the new paradigm where information technology can be linked with the core of accounting processes, to facilitate organizational change and to generate new sources of a competitive advantage (Somogy and Galliers, 1987). In other words, information technology is a disruptive technology that has been used to change the way AIS operate and the way it is designed. Technologically, the development of microchip technology is considered the driving force behind the integration of accounting processes. It has created new technological tools such as: microcomputers, databases, networks, telecommunications, local area networks, intranets and extranets (Zeleny, 2000). Integration methodology is based on re-engineering practical rules of accounting processes and

then exploiting information technology to implement and integrate these processes. Reducing repetition and misuse for accounting data among accounting processes either within or among business organization, is the key objective for this methodology. By concentrating on sharing and integration, this methodology has brought revolutionary changes in AIS design in terms of:

- Changing processing techniques of AIS (Hein, 1969).
- Merging processing of non-accounting information into AIS (Brady et al., 2001).
- Increasing flexibility and forward looking of AIS (Perry, 1989).
- Easing integration of AIS with other functional systems (Brady et al., 2001).
- Reengineering accounting processing models (Rigelsford and Sharp, 2000; Everest, 1977).
- Creating new AIS knowledge and skills (Carr, 1985).
- Establishing information technology oriented approach as a new direction for designing AIS (Carsberg and Hope, 1989).
- Finding new information technology based applications on AIS such as Electronic Point of Sale (EPOS), Electronic Inventory Management (EIM), Just In Time (JIT) and Electronic Data Interchange (EDI) (Rewenyi and Brown, 2002).
- Establishing Just-in-Time and Real Time AIS (Carter, 2001; Bragg, 1996).

### **Accounting Reporting System**

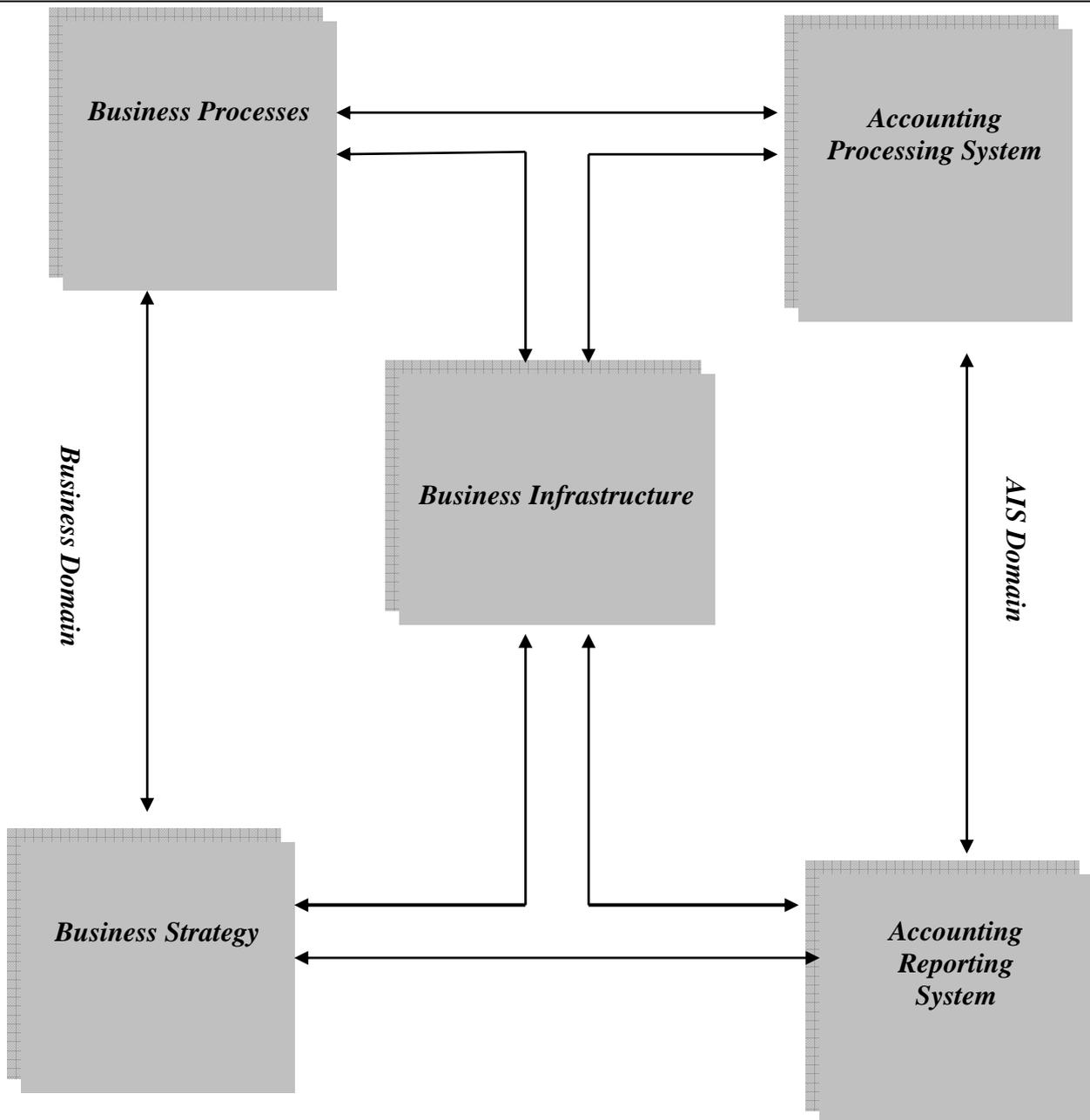
Among the sets of imperatives for the new economy is that information technology; information system and information are indispensable in any creative business organization (Clark, 2001). Accounting reporting system has seen significant transformations in reporting model as a result of using information technology. The new applications of information technology in AIS have presented tangible evidence, that it has the potential to unleash extraordinary changes and establish a new paradigm in both the physical and logical components of accounting reporting system. Different mental model, techniques and channels to disseminate accounting information, have characterized the new reporting model. Information technology based accounting reporting system is a practical and economic solution to the problem of scope and quality of accounting information (Green and Spaul, 1997; Strong et al., 1997).

<b>Methodology Perspectives</b>	<b>Automation of Accounting Tasks</b>	<b>Automation of Accounting Functions</b>	<b>Integration of Accounting Processes</b>
<b>Vision</b>	Elimination of processing inefficiencies	Reducing personal involvement, personal judgment, and risk of operating decision-making	Increasing efficiency and effectiveness of accounting processes
<b>Target</b>	Accounting Tasks	Operational and Tactical Accounting Functions	Interrelated accounting processes
<b>Improvements</b>	Accelerating bookkeeping tasks and cutting time and cost	Increasing speed and efficiency of decisions within accounting functions	Reducing repetition and misuse and integrating accounting data within and among accounting processes in business organizations
<b>Supporting Technology</b>	Machines and Mainframe (Vacuum Tube)	Mainframe (Transistor or Semiconductor)	Minicomputers, Networks, Databases, Terminals, Intranet, Telecommunications, Microcomputers and Extranet
<b>Prototype</b>	Automating rules of tasks of accounting cycle	Automating logic of the accounting functions	Reengineering practical rules of accounting processes on technological bases. Considering multiuse of accounting data between accounting applications within and among business organizations.

**Figure 1.1: The new methodologies for Designing Accounting Processing System.**

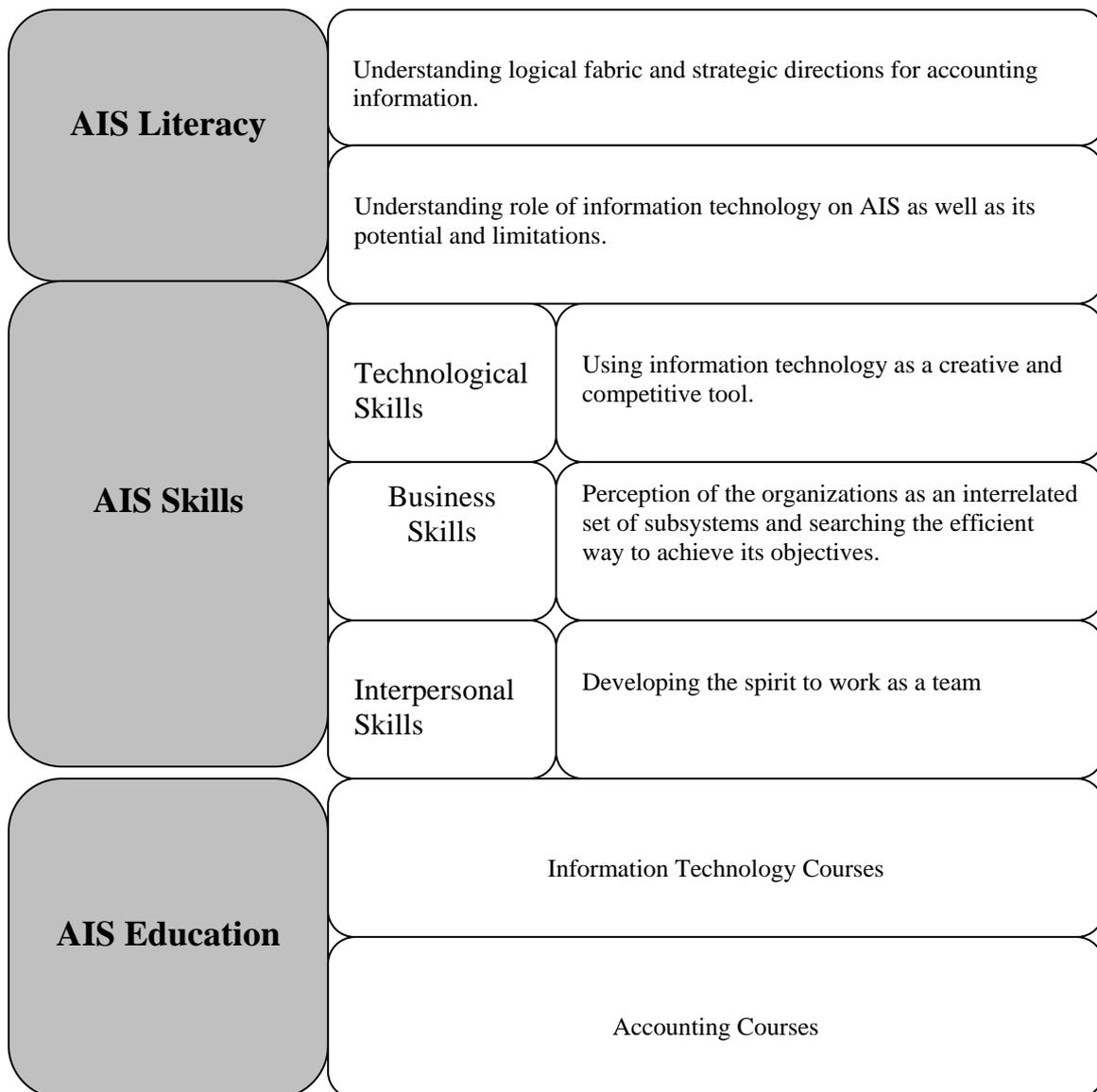
A new accounting reporting system is based on innovations and development of the reporting processes from purely historical, financial reporting to encompass management planning and decision-making. This is the genesis of profitability accounting, which is based on more systematic and effective profit planning through the integration of modern techniques of accounting reporting with mathematical techniques, operational research, social sciences and market research (Summers, 1989). On the other hand, information technology has reengineered accounting information and its controversial characteristics in terms of changing nature, dimensions, and directionality of this information. The new characteristics of accounting information are as following:

- Looking forward rather than purely historical (Green and Spaul, 1997).
- Financial, social, environmental and ethical (has a new directionality) (Eccles and Mavrinac, 1995).
- Creative, innovative, rapid and screening in systematic way (Summers, 1989).
- Statistical, multiscenario and provides real time indications and analysis (Somogyi and Galliers, 1987).
- Not annual information (Bury, 1999).
- Series of statements (Bury, 1999).
- Real time, accuracy, timeliness, flexible, available, and more adaptable to reporting problems (Summers, 1989).
- Based on idea and comprehensive to all organization's activities (Brady et al., 2001).
- High quality of communication (Eccles and Mavrinac, 1995).



**Figure 1.2: Integration of Accounting Reporting System and other Business Critical Success Factors.**

- Taking the form of continues dialogue with users and prompts them toward creative thinking (Bury, 1999).
- Take a very different form and structure to meet the needs of different users with different level of skills, interest and time available (Bury, 1999).
- Has different implications and value (Keen, 1997).
- Integrated with decision-making (Carter, 2001).
- Another perspective of information technology based accounting reporting system is the organizational impacts represented by downsizing business organizations and increasing integration of its management. Figure (1.2) summarizes a standard model of the organizational integration in terms of relationship of accounting reporting processes and business processes. The key results of such integration are:
  - Disseminating data and information directly to the top management, due to downsizing middle management (Hein, 1969).
  - Downsizing financial and legal departments (Bhattacharjee and Hirschheim, 1997).
  - Reducing indirect administrative expenditures due to downsizing business organizations (Hein, 1969).



**Figure 1.3: A New Accounting Social Model.**

- Establishing direct interaction with shareholders (Lindsey, 2001).
- Providing practical bases to reengineer accounting processes (Carter, 2001).

#### **Accounting Social System**

The impact of information technology on AIS was no longer technical and restricted to processing and reporting processes, but extended to include social matrix of AIS. Social matrix or accounting social system relates to the human infrastructure of AIS and is concerned with intellectual knowledge, professional skills and literacy, which acts as one of the fundamental pillars of information technology based AIS. Critical design factors of accounting and roles between the accountant and computer (Murray, 1967).

#### **AIS Education**

AIS education was primarily concerned with bookkeeping education. The dominant aim of accounting education was to develop the practical aspects, which supported recording processes (Er and Ng, 1989). As a result, accounting values and recording methods were developed. Using information technology in AIS, has prompted a massive need to rethink about the technological items in AIS education. Also, more knowledge about the logical fabric of accounting information and the technological requirement to achieve its quality has determined (Eccles and Mavrincac, 1995). In fact, it is widely recognized that information technology has become an integral part of AIS education, and led to development of new requirements to qualify

the accountant. The following are some practical reasons answering why information technology has become a mantra of AIS education:

- The knowledge revolution, which has been propelled by the twin engines of computer technology and communication technology, is a revolution of minds and ideas (Ives, 1996). Adopting these technologies for AIS purposes require radical change in the vision and directions of AIS education.
- A new form of accounting processes has given rise to new business infrastructure, organizational structure and business communication. A new AIS infrastructure required that AIS education should be information technology based to equip the accountant with the knowledge of computer and management of data (Er and Ng, 1989).
- Automation of recording processes by using information technology has created a new role of the accountant as an information communicator. A new role requires technological skills, which cannot be provided by traditional education. For example, implementation of client/server technology (C/ST) requires from the accountant the knowledge of how he can get unlimited real time access to accounting data. Further, new business applications have obligated the End-User (including the accountant) to be technically more sophisticated, so as enable him utilize information technology resources toward accomplishing organizational goals in better ways (Bhattacharjee and Hirschheim, 1997; Kliem, 1996).
- On line-Real Time reporting is likely to emerge as future policy that could be widely used in AIS. This kind of reporting requires, direct performance of certain functions by the accountant like accessing and updating data of accounts, through the use of personal computers configured for on line information system (Green and Spaul, 1997).
- Computerization has yielded new accounting strategic trends, which require computerized AIS education that provided the accountant with unique skills to maintain his role as an important communicator of information in the market of economic information (Brady et al., 2001).
- Use of information technology has created a new style of implementation of the organizational performance such as: Group Decision Support System (GDSS). This new style triggered the need for new AIS education, which qualify the accountant to be creative,

competent and be able to work with other specialist in business organization (Zeleny, 2000).

- Using information technology led to the development of a new kind of business organization such as: hypertext, hyper competitive, learning, knowledge and virtual organizations. In such environment, the professional linking between AIS education and information technology is essential. It may lead to development of alternatives of great significant particularly, in regard to framing of accounting policies and in search of cost reduction (Zeleny, 2000).
- Accountant's prestige and role in an organization in information technology era will depend much on the quality of AIS education, and how much information technology is exploited in (Green and Spaul, 1997).

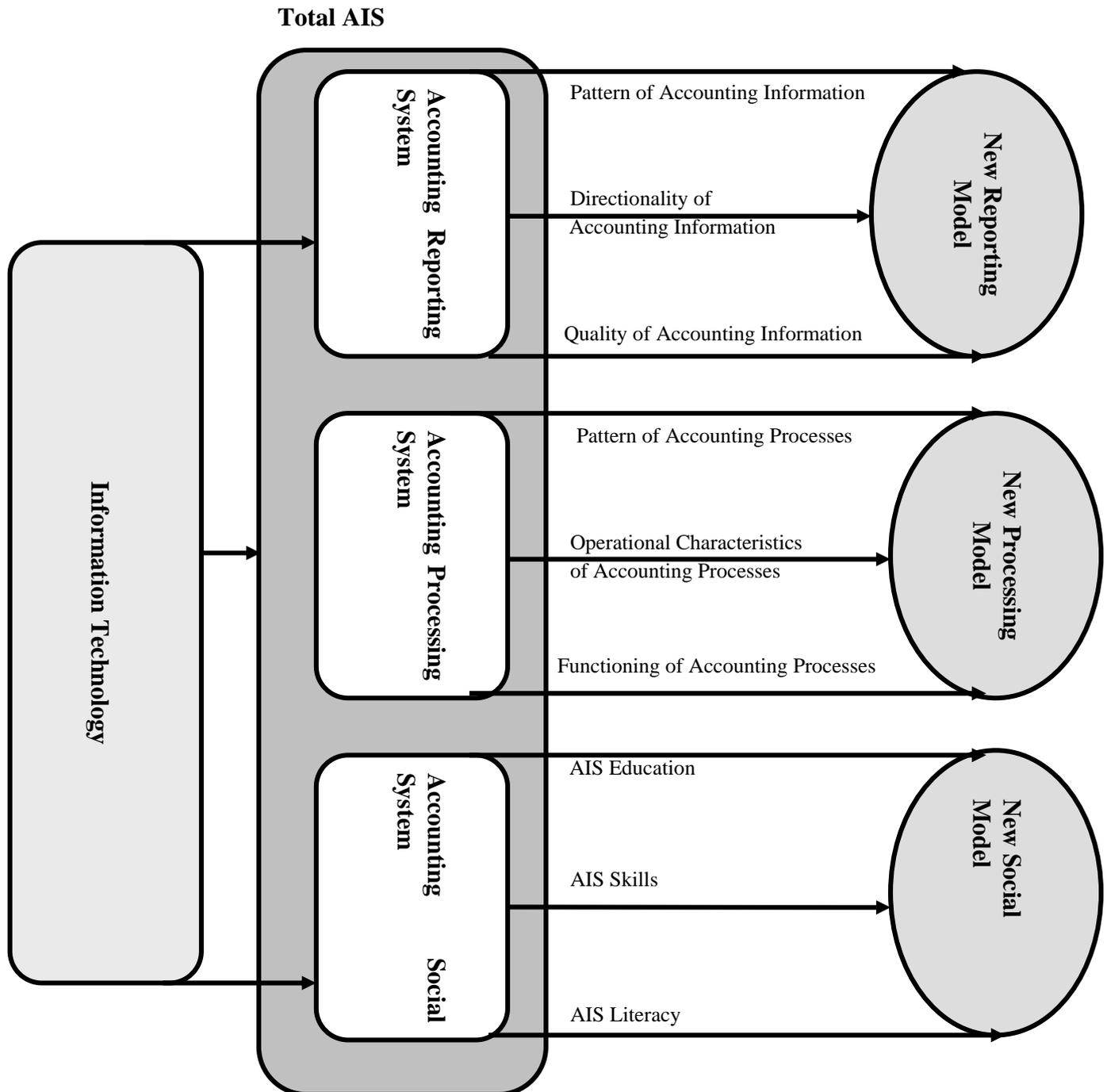
Harnessing the emerging infrastructure requires a new vision and radical changes. Many suggestions have been made to improve AIS education by several accounting bodies and professionals (Er and Ng, 1989). AIS education should integrate technology, connectivity and creativity so as to provide the accountant with essential knowledge to seek and use information technology in a collaborative and creative way. In short AIS education should be "information education".

### **AIS Literacy**

It is not difficult to realize that increasing use of information technology for AIS demands from the accountant a high level of computer and information literacy. The term technology or computer literacy refers to accountant's ability to understand the mechanism of processing and reporting in information technology based AIS. Part of this understanding is to know how to maximize exploitation of information technology as a competitive tool.

The accountant must be competent enough and have full knowledge of that processing and reporting mechanism to determine and adjust important considerations of accounting control in information technology based AIS (Carr, 1985).

On the other hand, the term of information literacy is referred to as accountant's knowledge of how data and information are used by internal and external users. Information literacy reflects how an accountant understands the new strategic directions for using accounting information which is now available due to the use of information technology and which has led to changes in the culture of business organization. Some of the new directions are as following:



**Figure 1.4: Theoretical Model.**

- Reestablishing the logical fabric of AIS, particularly the principles and dimensions of measurement to ensure more reliability on accounting information (Eccles and Mavrinac, 1995).
- Adopting a new system of believe and values in respect of innovation and intangible assets. Approaching intellectual capital is one of the new accounting values (Lev, 2001).
- Engineering and efficient use of professional software in accounting analysis, which providing information on past trends and future projections under different environmental assumptions and different scenarios (Brown, 1994).
- Creating new dimensions of research in Green Accounting and including more challenging environmental factors such as: ecosystem functioning and environmental resources constraints (Simon and Proops, 2000).

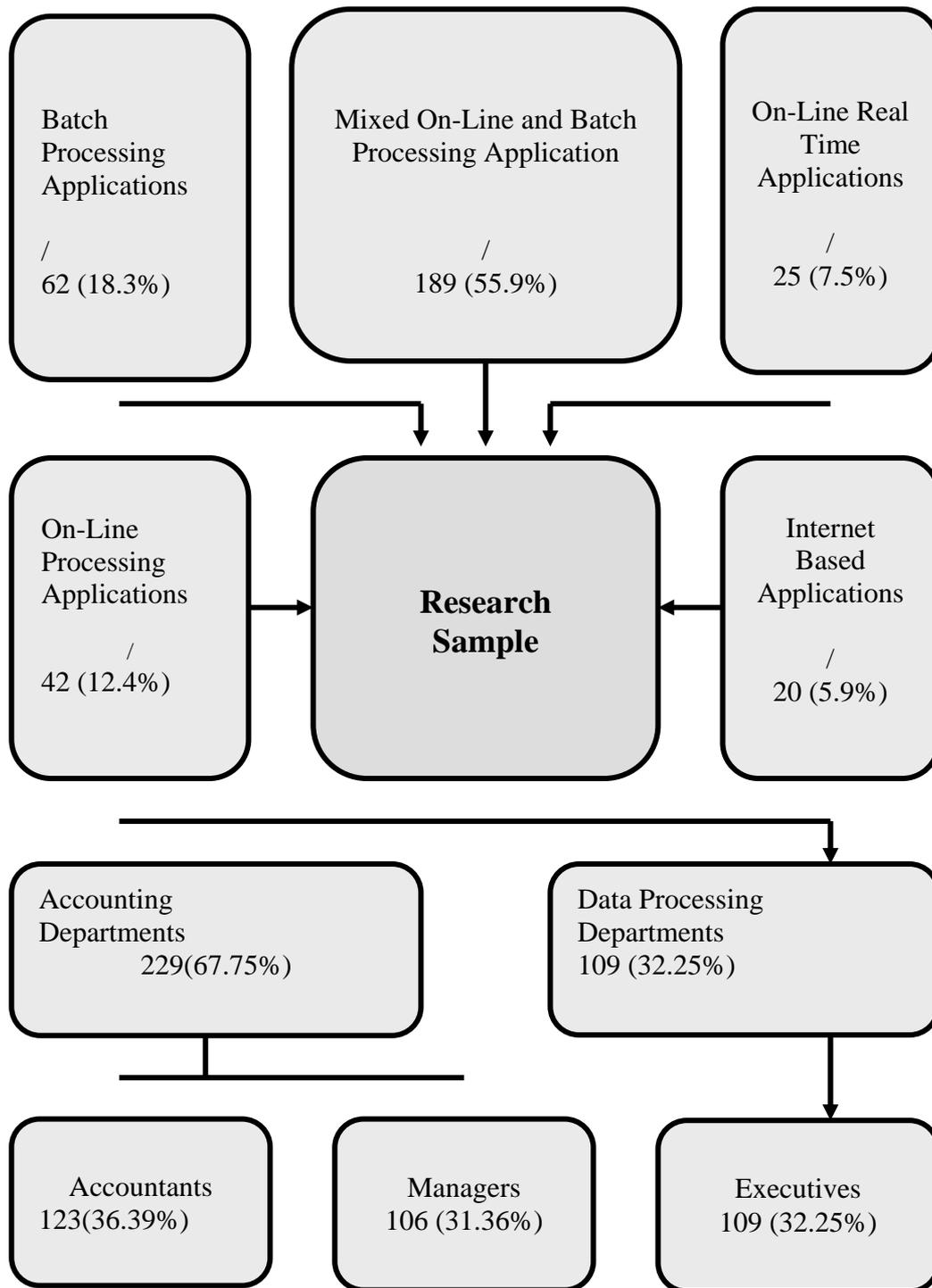


Figure 1.5: Research Sample.

As pointed out above, it is very important for the accountant’s community to be aware that the use of information technology provides accountants an opportunity to shift from the “accounts literacy” or “figure literacy” to “information literacy”.

**AIS Skills**

Understanding of the impact of information

technology on business organizations is essential to understand the extent information technology that has affected the levels of skills and skill contents in AIS. As mentioned previously, using information technology, that established a new infrastructure and new patterns of business organizations such as: net organizations, electronic organizations, and dynamic organizations (Zeleny, 2000). Such kind of organizations is built on the

change philosophy to meet its user needs. People (managerial teams or employees) are the lifeblood of these organizations. It is the people vision and dimension, rather than the organizational structure, which guides the strategic choices to be made (Friedman and Gyr, 1998). Also, this kind of organizations adopt dynamic business systems (one of them AIS) to promote knowledge creation and the utilization processes effectively and efficiently. The dynamic business system integrates the structural and procedural components, and is reacting continuously to changing scenarios (Zeleny, 2000). In the dynamic business system every specialist in any scientific field will have to acquire new knowledge every four or five years, otherwise, he will become obsolete (Drucker, 1988). Further, knowledge of a certain skill is not enough to meet the demands of business organizations, as a blend of several skills is necessary to cope with changes.

The nature of accounting applications within the dynamic organization clearly shows that information technology changed the very character of AIS from largely a transactional system to be a strategic information system (Carr, 1985). In such strategic accounting systems, the craft of accountants has moved from bookkeeping to provide information for decision-making. Consequently, the accountant is in an urgent need to acquire a new set of skills if he wanted to be active member in the dynamic business system. The new skill requirements are technological skills, business oriented skills and interpersonal skills (Feeny, 1998). The impact of information technology on the overall level of skill requirements and skill content of AIS differs according to the nature of accounting applications, nature and maturity of computer applications and length of time which information technology has been used in business organizations (Carr, 1985). It can be reasonably argued that if the accountant is to remain effective in his role, he must not only be ware of wider organizational issues, but also how information technology will demand changes in his knowledge, literacy and skills. In a nutshell, information technology has generated a new integrated model for the accounting social model. Figure (1.3) proposes key features of the new accounting social model, due to use of information technology.

## 2. RESEARCH MODEL AND DESIGN

The Figure (1.4) shows that the research adopts accounting functional systems as a research model to reflect a seismic change in AIS, due to the use of

information technology. According to the research model, AIS is a super system and a hybrid one consists of three dynamically to perform processing and reporting of accounting data. These systems are accounting processing system, accounting reporting system and accounting social system. However, estimating the impact of information technology on AIS, contains a combination of measurable and non-measurable factors.

Despite the huge arguments on measurement basis, this paper attempts to develop a satisfactory methodology can be adopted as a guide in this regard. To quantify and assess the impact of information technology on the above accounting functional systems, the appropriate design parameters have been developed and adopted. These parameters have been formulated according to critical design factors, which have been discussed in detail in the conceptual part of this research.

Collecting the perceptual data from the accountants and other professionals was conducted by constructing detailed questionnaire designed by using Likert 5-Point Scale. The full questionnaire contains 32 parameters focusing on critical aspects, which govern the design of AIS. The structure of responses has been categorized into five groups: strongly agree, agree, indifferent, disagree and strongly disagree. For the purposes of providing more accurate information when analyzing the data of the questionnaire. The questionnaire structured into three groups according to the research model.

The first group is related to accounting reporting system and contains 11 parameters. Each parameter is considered as critical design factor for the requirements of AIS design. Pattern, directionality, quality and content of accounting information, have been adopted as key design parameters reflecting nature and mechanism of accounting reporting system. These design parameters are listed in detail in Table (1.2). The second group is related to accounting processing system and contains 12 parameters. Patterns, operational characteristics, and functioning of accounting processes have been adopted as critical design parameters of accounting processing system. These design parameters are listed in details in Table (1.3). The third group is related to accounting social system and contains 9 parameters. Educational and professional requirements of the accountant have been adopted as critical design parameters of accounting social system. These design parameters are listed in details in Table (1.4). Design and content of the questionnaire were reviewed by a number of specialists and professionals in

information technology and AIS to gauge creditability and validity of parameters. The questionnaire was pre-tested by collecting data from a sample of fifteen professionals randomly selected, to check understandability and quality of questionnaire design.

### 3. RESEARCH HYPOTHESES

AIS is not a static phenomenon. An elaborate examination of the literatures set forth many characteristics, above all adaptation with changes. AIS scholars agree that an important potential for developing AIS lies in identifying the interrelationships between individuals, technology, legal, economic and social customs. Tracing the changes in these dynamic relationships is very important as they impact AIS development over the time (Report of the Committee on Accounting and Information Systems, 1972). The socio-technological approach is a new ideology to study AIS. Technological and social systems always act as a reflection of the philosophy on which AIS design and methodologies are based. A changing technology has a dynamic relationship between innovation and exploitation of technological possibilities (practices) and development of solution to the problems. The crucial role of the technological change must not be overlooked, because it's considered as an indicator for quality of AIS. Accordingly, this research adopted a holistic and quantitative approach to test these hypotheses.

Investigating how much the impact of information technology on traditional AIS first requires testing validity of the traditional AIS in information era. Firmin and Linn (1968) highlighted that the traditional AIS lacks the technological requirements to fit the information era (Hein, 1969). Moscovice and Simkin (1981) developed framework to analyze the lacuna of traditional AIS. Large balance of accounts receivable, malfunctioning investments, losing income, increasing write off of bad debit, malfunctioning of cash flow and customer dissatisfaction are negative aspects of traditional AIS (Moscovice, 1981). Wilson, 1997 pointed out that the traditional processing models of AIS are suitable for the industrial enterprises not the intelligent one (Lev, 2001). Elliott, 1992 argued that the traditional accounting model has focused on tangible assets such as: inventory and fixed assets. These assets always appear in the statement of financial position at cost, which is production side rather than the customer side (Elliot, 1992). This leads to hypothesize the following:

#### **Ho.1:**

**Traditional Accounting and Its Systems, Which Came In Reaction To The Industrial Revolution Is Obsolete In Information Technology Era.**

Information technology as a processing and decision tools, has created new potential for accounting processes and has highlighted the limitations of traditional AIS. Hoos (1960) argued that the use of information technology has caused dramatic changes in the implementation of the accounting processes. Nature of accounting processes was most affected in AIS by using information technology. A new model for accounting processes demands from the accountants new information standards (Ida, 1966). According to Lee (1969) restandardization of accounting processing system and integration of accounting data have come to the existence; due to use of information technology (Hein, 1969). Smith and Taffler (1984) stated that a new technology has created a dramatic change in the measurement of revenue power for business organizations from financial assets to intangible assets.

Information technology offered the opportunity to adopt new processes to disseminate accounting information (Smith and Taffler, 1984). Rose (2001) remarked that the biggest potential impact of information technology on AIS, lays in the area of assets impairment and appropriateness of going concern assumption (Rose, 2001). Building on that, the following hypothesis has been suggested:

#### **Ho.2:**

**Information Technology has Originated New Accounting Models to Process and Implement Accounting Applications Within Business Organizations.**

The role of information technology was not confined to create new processes, but extended to establish new accounting models. Means and Schneider (2000) highlighted that the change in conventional business models established a new pattern of accounting models, which should provide continuous financial analysis and reporting. These models have technological vision and based on different critical design factors (Means and Schneider, 2000). According to Summers (1989), formulating a new approach for designing AIS is the outcome of integrating information technology within the entire systems of Total AIS (Summers, 1989). Tucker (2001) pointed out that new techniques and mechanisms to process, store and report accounting information have

emerged, due to information technology (Tucker, 2001). Based on these arguments, the following hypothesis has been derived:

**Ho. 3:**

**Information Technology has Established a New Approach for Designing AIS Based on Visions and Implications, Which are Quite Different Compared to the Traditional One.**

Information technology as processes enabler has impacted the way that AIS is designed. The disappearance of paper processes and integration of information systems within business organizations, have generated an urgent need for the accountants to revise AIS. Wilkinson (1982) stated that information technology is an inevitable tool to achieve an adequate design of AIS, because technology (in particular information technology) provides the required infrastructure to successful design for each element such as: outputs, data processing, data inputs, control and security (Wilkinson, 1982). Schumpeter (2001) argued that use of information technology has changed dramatically every thing associated with the old technology. It has created a new processing and reporting models (Mcknight et al., 2001). Drucker (1999) discussed that information technology offered a real challenge to design vision of AIS (Drucker, 1999). According to these arguments, the third hypothesis of this research has been formulated:

**Ho. 4:**

**Information Technology has Affected the Critical Design Factors in Each Functional Accounting System Inside Total AIS**

Adopting an effective information policy is stipulated by using information technology. Joplin (1966) stated that information technology based AIS facilitated access to alternative accounting reporting systems, which meet both operational and strategic purposes (Joplin, 1966). Carter (2001) mentioned that information technology is the driving force behind real-time AIS and this kind of systems offer the opportunity to integrate accounting reporting systems with a decision-making processes. Real time or virtual AIS by improving the analysis processes, offers competitive weapons to gain competitive advantages (Carter, 2001). Keen and Balance (1997) argued that the use of information technology has

established a new AIS and a new value for accounting information (Keer and Balance, 1997). Drucker (1999) pointed out how new business organizations to continue its need four sets of diagnostic tools: foundation information, productivity information, competence information and resource allocation information. Provision of such information seems to be difficult without use of information technology (Drucker, 1999). These arguments have hypothesized the following:

**Ho.5:**

**Information Technology has Casted a New Value on AIS by Reorienting its Focus From Bookkeeping Towards Sophisticated Analysis of Organizational Policies And Problems.**

**Data Collection**

In order to match the purposes of this research, the sample was drawn from a set of more than 60 companies with their offices in and around Delhi. Research questionnaire was distributed to those companies as well as the professional accountants of Institute of Chartered Accountants of India (Delhi). The characteristics of research sample had varied to include 56 percent: service companies, 37 percent: manufacturing companies and 7 percent: trading companies. In terms of size, the research sample has included 54 percent: large companies, 36 percent: medium companies and 10 percent: small companies. The population of sample has consisted of accountants and information technology specialists, who could compare AIS prior and post implementation of information technology. Accounting departments and data processing departments were the key preferred targets. The questionnaire was distributed to approximately over 1020 accountants and executives. The number of responses, which obtained were 338 representing a response rate of (33.13%). The data collection was completed during five months. Figure (1.5) shows profile for the characteristics of research sample. Organizational biases in the analysis were avoided by limiting the number of questionnaires distributed to each organization. Each organization was given five questionnaires. To test the stability of data analysis and then reliability of research results, standard deviation has been used to estimate the ideal sample size and the stability of results (Table 1.1).

**Table 1.1: Standard Deviation for Different Sample Size**

Sample Size	55	103	159	210	267	305	338
Parameter-1	0.49	0.49	0.60	0.62	0.60	0.60	0.59
Parameter-4	0.94	0.96	1.02	1.02	1.02	0.96	1.03
Parameter-7	0.97	0.99	1.06	1.01	1.01	0.96	0.95
Parameter-10	1.13	0.97	0.96	0.97	0.97	0.95	0.95
Parameter-13	1.16	1.02	0.93	0.93	0.91	0.87	0.85
Parameter-15	1.24	1.09	1.24	1.16	1.15	1.11	1.09
Parameter-19	0.80	0.83	0.86	0.81	0.82	0.83	0.81
Parameter-23	0.94	0.93	0.92	0.90	0.97	0.97	0.96
Parameter-27	0.89	0.90	0.82	0.80	0.83	0.87	0.87
Parameter-32	1.16	1.02	0.93	0.93	0.91	0.87	0.85

**Table 1.2: Statistical Test for Design Parameters of Accounting Reporting System.**

Design Parameters	Strong (P<0.01)	Medium (P<0.05)	Weak	r square
P-13 / Timeliness of Accounting Information		0.121		0.015
P-14 / Accuracy of Accounting Information	0.196			0.32
P-15 / Reliability of Accounting Information	0.186			0.35
P-16 / Availability of Accounting Information			0.012	0.000
P-17 / Strategic Uses of Accounting Information			0.055	0.033
P-18 / Relevance of Accounting Information	0.143			0.026
P-19 / Value of Accounting Information	0.164			0.020
P-20 / Quality of Accounting Information			0.064	0.004
P-21 / New Kinds of Accounting Information			0.32	0.001
P-22 / Content of Accounting Information			0.68	0.04
P-23 / New Dimensions of Accounting Information			0.008	0.000

**Table 1.3: Statistical Test for Design Parameters of Accounting Processing System.**

Design Parameters	Strong (P<0.01)	Medium (P<0.05)	Weak	r square
P-1 / Smoothing of Accounting Processes	0.166			0.021
P-2 / Automation of Accounting Processes		0.177		0.011
P-3 / Style of Accounting Processes			0.090	0.006
P-4 / Economic Feasibility of Accounting Processes			0.016	0.000
P-5 / Ergonomic of Accounting Processes			0.014	0.000
P-6 / Accounting Processing Control		0.124		0.015
P-7 / Effectiveness of Accounting Processes			0.011	0.000
P-8 / Scope of Accounting Processes			0.024	0.001
P-9 / Flexibility of Accounting Processes		0.131		0.017
P-10 / Functioning of Accounting Processes	0.155			0.019
P-11 / Logical Rules of Accounting Processes			0.031	0.001
P-12 / Importance of Accounting Processes			0.107	0.012

**Table 1.4: Statistical Test for Design Parameters of Accounting Social System.**

Design Parameters	Strong (P<0.01)	Medium (P<0.05)	Weak	r square
P-24 / Accountant's Role			0.76	0.005
P-25 / Accountant's Literacy			0.21	0.000
P-26 / Accountant's Skills			0.020	0.000
P-27 / Traditional Knowledge of Accountant	0.190			0.033
P-28 / Computerized Knowledge of Accountant		0.122		0.015
P-29 / Accountant's Training			0.016	0.000
P-30 / Organizational Importance of An Accountant			0.002	0.000
P-31 / Prestigious of An Accountant Job			0.032	0.001
P-32 / Future Interested Area of Accountant			0.007	0.000

#### 4. ANALYSIS AND DISCUSSION

Accounting and information technology scholars had unanimously agreed that the impact of information technology on AIS is a function of the automation level of accounting applications in business organizations (Carr, 1985; Bragg, 1996; Perry, 1989 and Tyron, 1978). In other words, use of information technology is a quality indicator for the sophistication level and the environmental development of AIS.

Due to this fact and for the purposes of data analysis, the research sample has been categorized into five groups according to automation level of accounting applications: Batch processing applications, On-line applications, Mixed On-line and Batch processing applications, On-line Real time applications and Internet based applications. The data from the returned questionnaires were tabulated and analyzed with the help of SPSS. Descriptive statistics (frequencies, cross tabulation, chi-square and standard deviations) were computed, as well as correlation and regression coefficients.

Preliminary findings from chi-square analysis indicate somewhat mixed perceptions. This can be attributed to the reasons of varied experiences of interviewed organizations in terms of age of computerization, applications profiles and sophistication of professionals involved. Pattern of accounting information such as relevance, accuracy and timeliness had been affected by using information technology. At the same time there is generally a majority in favor of the idea that quality of information technology are playing an important role in enhancing the value of accounting information. The impact of information technology on the content and directionality of accounting information is viewed positively. New kinds and new dimensions of accounting

information, due to the use of information technology have been represented in providing future and social indications about the trends of business activities. On the other hand, these improvements in characteristics, value and content of accounting information have been considered as adequate reason to enhance quality of accounting information.

Analyzing chi-square for design parameters of accounting processing system showed good level of satisfaction over the pattern of accounting processes since use of information technology. For example, flexibility, smoothening and functioning of accounting processes have been attributed to the use of information technology. The respondents felt that the current level of the environmental problems as a by-product of computerized accounting processes is acceptable. But still change in the logical system of accounting processes is one of the critical issues among the user of information technology based AIS. In addition, computerization of AIS is perceived to have brought a certain changes in the style, scope and level of control. The users expressed their dissatisfaction over the economic feasibility of computerized accounting processes, and express the need for further cost reduction. On the other hand, the responses received, demonstrated that the effectiveness and importance of accounting processes have improved since the use of information technology.

Regarding accounting social system, a general view of the respondents is that information technology has substantially changed the nature of the accountant's knowledge and skills. There was consensus among respondents that an accountant in his new role, as information communicator, has massive needs to acquire information technology based knowledge and skills to

remain effective. In addition, the study showed a significant transformation in the style of training of accountants so that they turn out to be the competent users of computers. The picture was encouraging in regard to the level of accountant's awareness about the impact of information technology on his work fields. The overall responses indicated that there is an increasing call for accountants to come close to system design and development.

Further, correlation ( $r$ ) and coefficients of determination ( $r^2$ ) analysis has been performed on the data to quantify and provide significant indications about the association between information technology and design parameters of AIS, if any and how much the impact is. Correlation analysis has been divided into three groups according to the level of impact: strong correlation (highly significant  $P < 0.01$ ), medium correlation (significant  $P < 0.05$ ) and weak correlation (No significant difference).

Analyzing the impact of information technology on design parameters of accounting reporting system has shown undeniable correlation between pattern and directionality of accounting information and information technology (Table 1.2).

Accuracy, reliability, relevance and value of accounting information are design parameters, which have improved strongly since use of information technology. To evaluate how much the improvement,  $r^2$  analysis for the above parameters has shown satisfactory level of impact (.032, .035, .020, and .026), respectively. Timeliness of accounting information has had significant correlation with the use of information technology. ( $r^2$ ) analysis for the timeliness of accounting information has shown level of impact equal to (.015). Other design parameters such as availability, strategic uses, new dimensions and quality of accounting information have had no significant correlation with using information technology. (The above analysis and results prove the validity of the fourth hypothesis in terms of information technology has affected the critical design factors of each functional accounting system (one of these is accounting reporting system). Examining the organizational details of the surveyed companies revealed that a possible explanation for this level of correlation is that the above parameters largely varied with other changing factors such as:

- Reporting Style.
- Frequency of Reporting.

- Level of User Satisfaction.
- Strength of Competition within Industry Sector.
- Type of Information System.
- Level of Reporting System.
- Sophistication of Accounting Applications within This System.

On the other hand, the accounting processing system was most affected by using information technology. Functioning and smoothening of accounting processes have improved strongly, due to use of information technology. ( $r^2$ ) analysis for these parameters has shown level of impact equal to (.019 and .021), respectively. Flexibility and control of accounting processes have had significant correlation with use of information technology. Assessing the range of improvement,  $r$ -square analysis for flexibility and control has shown level of impact equal to (.017 and .015). As shown in Table (1.3), other design parameters of accounting processing system has had no significant correlation with use of information technology such as: style, economic feasibility, effectiveness, ergonomic, scope, change in logical rules and importance of accounting processes. (Such result approves the validity of the first hypothesis in terms of a new pattern of accounting processes are a natural outcome of Information Technology based AIS. The previous result approves the invalidity of the second hypothesis as information technology has not originated new accounting models and processes). Analyzing the organizational details for a surveyed business organizations showed that implementation of information policy was partial for the purposes of speeding day-to-day operations, and not according to fully considered plan.

As a significant step in examining the techno-behavioral implications of information technology on the accountant, the design parameters of accounting social system have tested statistically. As a matter of fact, the accounting social system was least affected by using information technology. Traditional knowledge of the accountant was found to be having highly significant correlation with use of information technology, indicating that traditional knowledge for the accountant has been affected by using information technology. ( $r^2$ ) analysis for the impact of information technology on traditional knowledge of accountant was equal to (.033). However, computerized knowledge of the accountant was the only design parameters, which had significant correlation with use of information technology. An analysis of this

correlation level revealed that computerized knowledge has become an inevitable component in accounting qualification program. To evaluate the extent of need for computerized knowledge to qualify accountant,  $r^2$  analysis has shown level of impact equal to (.015). As can be seen from Table (1.4), other design parameters of accounting social system such as: the accountant's role, the accountant's literacy, the accountant's skills and prestige of an accountant's job have had no significant correlation with use of information technology. This result approves the invalidity of the third and fifth hypothesis. A possible explanation of this level of correlation is that the impact of the organizational changes on the accountant still restricted to a number of important factors such as:

- Sophistication of accounting applications and acceptability of Information Technology.
- Policy of applying Information Technology and information policy.
- Management style and organizational patterns.
- Performance Patterns.
- Limitations of the Accountant's Role.

## 5. CONCLUSIONS

This research has provided quantified indications about the impact of information technology on AIS. Based on the survey of 338 professionals (accountants and executives), the research has shown that exploiting

information technology for accounting purposes has developed and planted the seeds for a new approach and related methodologies for designing AIS. The implications of these methodologies varied according to sophistication level of information technology used. Vision of AIS design has differed according to the nature and role of information technology.

Information technology has positively impacted the pattern of accounting processing system. For example, flexibility, smoothening and effective functioning of AIS have been achieved, due to the use information technology. Information technology has brought positive changes in the style, scope and level of accounting control. Importance and effectiveness of accounting processing model have improved since the use of information technology.

A positive impact has been noticed in the pattern of information quality such as: timeliness, reliability, value and accuracy of accounting information. Dimensions of accounting information have elaborated and a new type of accounting information has reported. The research has provided good indications about improving quality of accounting information, which resulted in improvement in the quality of decision-making.

Information technology has substantially changed the nature of the AIS knowledge and the accountant's community is in a severe need to change the behavioral attitudinal considerations, which affect acceptability of information technology.

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338

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