

## EVALUATION OF THE EFFECTIVENESS OF ACCOUNTING INFORMATION SYSTEMS

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**Abstract** - In this study the effectiveness of accounting information systems of finance managers of listed companies at Tehran Stock Exchange is evaluated. The results indicate that implementation of accounting information systems at these companies caused the improvement of managers' decision-making process, internal controls, and the quality of the financial reports and facilitated the process of the company's transactions. The results did not show any indication that performance evaluation process had been improved.

**Keywords:** Accounting Information Systems, Quality of Financial Reports, Internal Controls, Decision Making, Performance Evaluation.

### INTRODUCTION

In managing an organization and implementing an internal control system the role of accounting information system (AIS) is crucial. An important question in the field of accounting and management decision-making concerns the fit of AIS with organizational requirements for information communication and control [19].

Although the information generated from an accounting information system can be effective in decision-making process, purchase, installation and usage of such a system are beneficial when the benefits exceed its costs. Benefits of accounting information system can be evaluated by its impacts on improvement of decision-making process, quality of accounting information, performance evaluation, internal controls and facilitating company's transactions. Regarding the above five characteristics, the effectiveness of AIS is highly important for all the firms.

AIS is defined as a computer-based system that processes financial information and supports decision tasks in the context of coordination and control of organizational activities [19].

## LITERATURE REVIEW

Accounting information system is considered as a subsystem of management information system (MIS). To regard accounting as an information system, perhaps, is the latest definition of accounting. For the first time in 1966, the American Institute of Certified Public Accountants (AICPA) [1] stated that:

“Accounting actually is information system and if we be more precise, accounting is the practice of general theories of information in the field of effective economic activities and consists of a major part of the information which is presented in the quantitative form”.

In the above definition, accounting is a part of general information system of an economic entity. Boochholdt [2] defines accounting information systems as systems that operate functions of data gathering, processing, categorizing and reporting financial events with the aim of providing relevant information for the purpose of score keeping, attention directing and decision-making.

Accounting information systems are considered as important organizational mechanisms that are critical for effectiveness of decision management and control in organizations.

Studies have shown that successful implementation of accounting systems requires a fit between three factors [17]. A fit must be achieved with dominant view in the organization or perception of the situation. Second, the accounting system must fit when problems are normally solved, i.e. the technology of the organization. Finally, the accounting system must fit with the culture, i.e. the norms and value system that characterize the organization [7]. Systems will be useful when information provided by them is used effectively in decision-making process by users. Otley [20] argues that Accounting Systems are important parts of the fabric of organizational life and need to be evaluated in their wider managerial, organizational and environmental context. Therefore, the effectiveness of accounting information systems not only depends on the purposes of such systems but also depends on contingency factors of each organization. Accounting information systems are said to be effective when the information provided by them serves widely the requirements of the system users. Effective systems should systematically provide information which has potential effects on decision-making process [12]. The effectiveness of accounting information systems has long been a subject of many researches [4,6,14,18]. Accounting information usually is categorized

under two groups; 1) information that influences decision-making and mainly used for the purpose controlling the organization and 2) information that facilitates decision-making process and mostly used for coordination within an organization [15,17]. Huber [11] argues that, integration of accounting information systems leads to coordination in organization which, in turn, increases the quality of the decisions. Some researches in accounting show that the effectiveness of accounting information systems depend upon the quality of the output of the information system that can satisfy the users' needs [3,8,13,16,21].

Generally, accounting information systems; 1) provide financial reports on a daily and weekly basis and; 2) provide useful information for monitoring decision-making process and performance of the organization. Simon [22] in his study used the first part of the above statement as measure of control for management and the second part for evaluating the effectiveness of the accounting information systems via continuous monitoring.

By reviewing research studies during 1987-1999, one finds out that 57 researches have been conducted on the issue of accounting information systems and decision-making the number of which shows the importance of the research in this area.

Accounting information systems provide primary data for decision-making. Information technology has caused many changes in reporting information. Thus, the characteristics of information currently prepared can help decision-makers seek more alternatives to the solution of the problem in hand. Accessibility to information related to the main transactions of an organization leads to a categorized detailed information which facilitates decision making in any difficult situation [18].

Accounting information system is a computer-based system that Nicolou [19] defines as a system that increases the control and enhances the corporation inside the organization. Management is engaged with different types of activities which require good quality and reliable information. They also need non-financial information such as production statistics, quality of production and so on. However, quality of information generated from AIS is very important for management [10].

Kim [13] argues that usage of AIS depends on the perception of the quality of information by the users. Generally the quality of information depends on reliability, form of reporting, timeliness and relevance to the decisions.

Effectiveness of accounting information system also depends on the perception of decision-makers on the usefulness of information generated by the system to satisfy informational needs for operation processes, managerial reports, budgeting and control within organization.

Effectiveness of accounting information systems can be analyzed on three bases: 1) information scope, 2) timeliness, 3) aggregation. Information scope is considered as

financial and non-financial information, internal and external information that is useful in prediction of future events. Timeliness quality is related to the ability of accounting information system to satisfy information needs by providing systematic reports to the user. Aggregation of information is considered as means of collecting and summarizing information within a given time period [5].

Doll and Torkzadeh [9] for studying the satisfaction of users use some concepts to measure the effectiveness of the accounting information systems. These concepts are information content, accuracy, format, ease of use and timeliness.

## **HYPOTHESES**

After reviewing relevant literature, five main variables and three moderator variables were hypothesized.

Hypothesis 1: Accounting information systems lead to better decision-making by managers.

Hypothesis 2: Accounting information systems lead to more effective internal control systems.

Hypothesis 3: Accounting information systems enhance the quality of financial reports.

Hypothesis 4: Accounting information systems improve performance measures.

Hypothesis 5: Accounting information systems facilitate financial transaction processes.

## **MODERATOR VARIABLES**

Hypotheses based on moderator variables are set up to see whether such variables have any impact on the respondents' responses to the research questions. One expects that such variables do not influence the way that respondents reply to the questions in the questionnaire.

Hypothesis 1: There is a relationship between the levels of respondents' education and evaluation of the effectiveness of accounting information system.

Hypothesis 2: There is a relationship between the job experience of the respondents and evaluation of the effectiveness of accounting information system.

Hypothesis 3: There is a relationship between the field of respondents' education and evaluation of the effectiveness of accounting information system.

## **RESEARCH METHOD**

### **- SAMPLE AND DATA COLLECTION**

This study is based on the companies listed at Tehran's stock exchange. No specific time

period is considered since it is not a time series study. A questionnaire was designed and after pilot study was sent to the sample firms.

A population of 347 companies has been listed at Tehran's stock exchange up to 1383. These companies are distributed along fifteen industries. Our sample has been randomly selected using sampling with no replacement process. For this, the below formula was supposed:

$$n = \frac{N (Z^2 \alpha/2) (\delta^2)}{e^2 (N-1) + (Z^2 \alpha/2) (\delta^2)}$$

$$n = \frac{347 (1.96)^2 (0.29)^2}{(0.05)^2 (347-1) + (1.96)^2 (0.29)^2} = 95$$

Based on the ratio of the companies in each industry to the total number of companies in the population, the number of companies in each industry for the firms sampled was determined.

The main data collection instrument in this study is questionnaire. For this purpose, a questionnaire was designed after reviewing the relevant literature. The questions were on the five point Likert-type questions, with a choice of very little to very much.

The questionnaire consisted of twenty questions, which were carefully designed to collect relevant data. The research instrument was pilot studied, by expert panels including faculty members. The revised instrument and a cover letter were mailed to the specific individuals who were listed as the financial managers of the firms sampled. A reminder was sent and non-respondents were followed up with two additional mailings. During the first questionnaire launching, 54 questionnaires were completed and returned. In the second and third mailings, a total of 33 more completed questionnaires were returned. Altogether 87 questionnaires were available for data analysis.

#### - STATISTICAL TESTS

To test the hypotheses of this research, we used  $z$  and  $\chi^2$  statistics at confidence level of 95%. The research hypotheses were put in the form of statistical hypotheses such as  $H_0$  and  $H_1$ . With regards to the nature of five-point scale questions, therefore, we tested whether the mean value of each question was less than or greater than 3. Number 3 was the average number of the five choices in each question:

$$\mu = \frac{1+2+3+4+5}{5} = 3$$

Thus, statistical hypotheses were set up as follows:

$$H_0: \mu \leq 3$$

$$H_1: \mu > 3$$

#### - TESTING MODERATOR VARIABLES

To test the moderator variables and see whether they had any impact on the main variables, in this research  $\chi^2$  tests were conducted.

#### TESTING HYPOTHESES AND ANALYZING THE RESULTS

To study the research hypotheses, eighty seven finance directors (financial managers) were selected as final sample in this study to answer the questions put forward to them in the questionnaire. The data collected in this way was edited and some questions merged to measure each hypothesis. Average number of 3 was taken as the mean of the five-point questions in the questionnaire. Table 1 shows a descriptive statistics of five hypotheses.

Table 1: Descriptive statistics.

Hypotheses	Ave.	Std. Error from Mean	Mean	Mode	Std.	Variance	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis	Max	in
H1	3.227	0.345	3.25	3.5	0.322	0.104	-1.087	0.258	0.094	0.511	3.5	2.5
H2	3.244	0.045	3	3	0.422	0.178	0.568	0.258	-0.799	0.511	4	2.5
H3	3.75	0.549	3.75	4	0.512	0.263	-0.364	0.258	-0.252	0.511	4.75	2.5
H4	2.80	0.399	2.75	2.5	0.372	0.138	0.825	0.258	-0.890	0.511	3.5	2.5
H5	3.58	0.474	3.5	3.5	0.442	0.195	-0.175	0.258	-0.419	0.511	4.5	2.75

#### - RESULTS OF THE FIRST HYPOTHESIS

Accounting information systems lead to better decision-making by managers. Z statistic concerning the test of first hypothesis is equal to 6.47 (Table 2). By comparing this value with the critical value of 1.645, we accept *H1* and reject *H0*. Therefore, the first hypothesis is accepted indicating that implementation of an accounting information

system in an organization could improve decision making by managers. The average of the questions measuring this hypothesis is 3.227 and with the skewness of -1.087. The kurtosis of 0.094 indicates that the distribution of our data is slightly taller than normal distribution with 0.322 standard deviation. Thus, we could conclude that our respondents on average and slightly above the average believe that accounting information systems lead to better decision-making by managers.

Table 2: Results of testing the hypotheses.

Hypotheses	Average	Standard Deviation	Z - value	Conclusions
H1	3.227	0.322	6.470	Accept
H2	3.244	0.422	5.389	Accept
H3	3.75	0.512	13.639	Accept
H4	2.80	0.372	-4.894	Reject
H5	3.58	0.442	12.298	Accept

#### - RESULTS OF THE SECOND HYPOTHESIS

Accounting information systems lead to more effective internal control systems. Table 2 shows the Z value of testing the second hypothesis equal to 5.389. Again, comparing this value with the critical value of 1.645, we accept *H1* and reject *H0*. This indicates that from the respondents' point of view accounting information systems would lead to better internal control systems. Descriptive statistics shown in Table 1 gives the average of 3.224 to the questions measuring the second hypothesis, skewness of 0.568, kurtosis of -0.799 and standard deviation of 0.442. This information indicates that the distribution of our data is slightly shorter than normal distribution.

#### - RESULTS OF THE THIRD HYPOTHESIS

Accounting information systems enhance the quality of financial reports. For this hypothesis, the z value is equal to 13.639 (Table 2), which is again above the critical value of 1.645 at the 95% confidence interval, therefore, *H1* is accepted and *H0* is rejected. Thus, we may conclude that according to the respondents in this study, accounting information systems enhance the quality of financial reports.

Table 1 reports some descriptive statistics related to this hypothesis. It shows that the average mark for the questions measuring the third hypothesis is 3.75, with skewness of -0.364, kurtosis of -0.252 and standard deviation of 0.512. The distribution of our data is slightly taller than the normal distribution. Thus, we may conclude that

respondents highly believe that accounting information systems enhance the quality of financial reports.

#### **- RESULTS OF THE FORTH HYPOTHESIS**

Accounting information systems improve performance measures. Table 2 reports the results of testing the forth hypothesis. The z-value is equal to -4.894 which when we compare it to critical value of 1.645, we find the *H1* in the rejection area. In other words, *H0* is accepted. Descriptive statistics shown in Table 1 gives the average of 2.80 to the questions measuring the forth hypothesis, skewness of 0.852, kurtosis of -0.890 and standard deviation of 0.258. The data indicates that the distribution of our data is slightly shorter than normal distribution. All together, we may conclude that the respondents on average do not believe that accounting information systems improve performance measures.

#### **- RESULTS OF THE FIFTH HYPOTHESIS**

Accounting information systems facilitate financial transaction processes. Z statistic concerning the test of the fifth hypothesis is equal to 6.47 (Table 2). By comparing this value with the critical value of 1.645, we accept *H1* and reject *H0*. Therefore, the fifth hypothesis is also accepted indicating that implementation of an accounting information system in an organization could facilitate financial transaction processes. Descriptive statistics shown in Table 1 gives the average of 3.58 to the questions measuring the fifth hypothesis, skewness of -0.175, kurtosis of -0.419 and standard deviation of 0.442. This information indicates that the distribution of our data is slightly shorter than normal distribution. We conclude that our respondents highly believe that using accounting information system would facilitate financial data processing.

#### **- RESULTS OF TESTING HYPOTHESES BASED ON THE MODERATOR VARIABLES**

Table 3, reveals the results of testing three hypotheses based on three moderator variables, like the level of education, job experience and field of respondents' studies. All the three hypotheses are rejected at 95% confidences interval indicating that moderator variables have no meaningful effects on the perception of the respondents' answers to the research questions. In other words, these variables have no impact on the results of this research.



Table 3: Results of testing hypotheses based on moderator variables.

Moderator hypotheses	Variables	$\chi^2$	Degree of Freedom	Critical Level	Critical value	Conclusion
1	Education	0.4559	2	0.05	5.99	Reject
2	Experience	4.632	4	0.05	9.488	Reject
3	Field of study	2.508	2	0.05	5.99	Reject

## DISCUSSION, LIMITATIONS AND CONCLUSIONS

This study examined the effectiveness of accounting information systems (AIS) in five different extents: better decision-making by managers, more effective internal control systems, enhancement of the quality of financial reports, improvement of performance measures, facilitating financial transaction processes.

The findings of the research indicated that implementation of accounting information systems could lead to better decision-making by managers, more effective internal control systems, enhancement of the quality of financial reports and facilitating financial transaction processes. We did not find evidence to support the fourth hypothesis, which indicates that according to the respondents of this study, the implementation of AIS would not improve performance measures. Lack of significant results to support the fourth hypothesis might be due to the choices of the questions which measured this hypothesis.

Like all empirical studies, the present research also has its own limitations due to the methodology employed. Use of questionnaire to collect data always has also its own limitations, since responses could be biased because of the common method used for the collection of all data. Although extensive care has been taken when designing the questionnaire and the pilot study refined the questions, still the criticism of the survey method can never be completely ignored and should be taken into account.

From generalization of the results point of view, measuring research questions based on the opinion of the respondents would limit our generalization of the findings. Despite the above limitations, this research has provided useful results in paving the way for future research in this area. Since in Iran, only recently increasing demand for AIS, as an effective tool in managing the Iranian organizations, has prevailed, this research could provide a supportive evidence for the implementation of AIS.

Avenues for future research could be:

1. Analysis of the effectiveness of AIS with corporation of AIS designer companies,
2. Analysis of the effectiveness of AIS as a part of MIS,
3. Study of the extent to which factors such as inflation, human resource accounting

etc. would be taken into account when designing an AIS, and  
4. The effects of user participation on the design of AIS.

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