

## The Effect of Applying Accounting Information Systems on the Improvement of Production Costs: An Applied Study on Jordanian Industrial Firms Listed on the Amman Stock Exchange

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**[Abstract]** This study aimed at identifying the degree of applying accounting Information Systems (Accounting System Efficiency, Decreasing production costs and the identification of costs' deviations) and their effect on the improvement of production costs among Jordanian industrial firms. For the purposes of the present study, a questionnaire was developed and distributed to the participants of the study (n=160) who were chosen from among financial managers and accountants at Jordanian industrial firms. Results of the study showed that industrial firms implement accounting information systems efficiently and effectively and that the most important degree of implementation is that the system seeks to identify the deviations of the production costs to a large degree. Results showed the existence of a positive effect of the adoption and implementation of accounting information systems that are related to the identification of production costs' deviations, the efficiency of the accounting information systems, and the improvement of the production costs. The capacity of the accounting system in relation to decreasing production costs is the most effective factor in the improvement of production costs among Jordanian industrial firms.

**[keywords]** Accounting information systems; production cost; shareholding Jordanian industrial firms

### Introduction

An accounting information system is considered among the most important minor systems within the administrative system at an industrial firm facility. This is due to the financial data derived from the system, and which is needed by internal and external parties and which is the result of input processing, which includes economic data and events. An accounting information system is the basis of different administrative levels and assists the different administrative levels achieve their goals. In order to operate efficiently, the system depends on inputs, both external and internal, which consequently yield information. The outcomes differ based on the inputs, which vary among different organizations.

The function of cost accounting systems is related to specifying, classifying and allocating the actual costs that have emerged or are emerging (planned and standard costs) within a certain period, as well as the identification of the causes of deviations, and providing the required information to decision-makers, especially those related to the pricing policies. In order to achieve these goals, costs are specified and classified based on their types so that each center has its isolated cost and its allocation. This aids in identifying the amount, percentage, and point of emergence for each cost's type, as well as facilitating the process of costs' distribution based on the principle of causes within a certain period of time.

This study aimed at proposing a theoretical framework for the concept of Accounting Information System, as well as assisting in improving production costs by achieving the following aims:

1. Identifying the scope of accounting information systems' adoption among Jordanian industrial firms.
2. Identifying the scope of improvement in production costs among Jordanian industrial firms.
3. Exploring the effect of the adoption of accounting information systems on the improvement of production costs among Jordanian industrial firms.
4. Providing a set of recommendations that assist managers' decision-making and accountants in improving production costs among Jordanian industrial firms.

### **Problem of the Study**

The problem of the study is related to answering the following questions:

1. Is there an adoption and implementation of accounting information systems among Jordanian industrial firms listed on the Amman stock exchange?
2. Is there an improvement in production costs among Jordanian Industrial firms listed on the Amman stock exchange?
3. Is there an effect of the adoption of accounting information systems and their relevant dimensions (the efficiency of the accounting system, measuring production costs, decreasing production costs, and identifying the deviations in production costs)? On the improvement of production costs among industrial firms listed on the Amman stock exchange?

### **Importance of the Study**

The importance of this study is that it deals with an important topic in administrative accounting, which is namely the improvement of production costs, which is the essential means for effectively and efficiently achieving the goals of industrial firms and the success of their durability. Additionally, this study provides a realistic assessment of the scope of employing accounting information systems in guiding administrative decisions among Jordanian industrial firms and an assessment of the scope of investment related to the data provided through these systems in relation to guiding decisions and identifying available alternatives with the characteristics of each alternative, especially the decisions related to the improvement of production costs.

The practical importance of this study is the attempt at enhancing the attempts of managers, accountants, and auditors at the industrial firms identify the weaknesses and strengths of their accounting systems and the way to develop those systems so that they achieve higher outcomes in terms of the provision of accounting information at the right time so that they assist decision makers in those firms. This will be achieved thought exploring the effect of the accounting information system on the improvement of the production costs and the identification of the essential component of those systems that contributes to the realization of the main effect on auditing production costs. Additionally, this study contributes to the theoretical literature on accounting in the Arab region in general and Jordan in particular through its results and recommendations.

### **Hypotheses of the Study**

Hypotheses of the present study were formulated as null hypotheses as follows: *Hypothesis one: Adoption of accounting information systems is absent among Jordanian industrial firms.*

This hypothesis can be divided into the following minor-hypotheses:

1. There is no effect for the efficiency of the accounting system on the improvement of production costs among Jordanian industrial firms.
2. There is no effect for the decrease in production costs on the improvement of production costs among Jordanian industrial firms.
3. There is no effect for the identification of the deviations of production costs on the improvement of production costs among Jordanian industrial firms.

### Review of Literature

Several studies have explored accounting information systems and the improvement of production costs, which include the following.

Alyahya (2014) aimed at specifying the effects of using computerized administrative information systems on decision-making at the Hussein medical city, as well as specifying the differences between the effects on administrative decisions compared to medical decisions. This study aimed, also, at analyzing the actual situation of the scope of computerized information systems' employment among different departments, as well as the effects of those systems on the medical and financial areas. The study aimed also at identifying the main limitations and barriers to their adoption, in addition to the identification of the main types of systems in terms of their use. Results of the study suggest that the systems facilitated the process of preparing financial reports for higher management, preparing and providing monthly payroll and the wages of employees, facilitating comparing the estimated expenses to the actual expenses, and, finally, facilitating real costs accounting for the various activities at the hospital.

Muhannad Akram Moqbel's (2014) study examines the effect of accounting information systems for listed companies in the services sector on the Amman Stock Exchange on e-commerce using three main aspects: The presence of an accurate accounting information system requires companies to develop methods to handle e-commerce. The effects on accounting information systems under the e-commerce will relate to influencing the components of accounting information systems. The last aspect is the effects on accounting information systems under the e-commerce will change the resources of the physical and human resources companies.

Moqbel and Alrjoub's study (2014) examines the evaluation of the relationship between accounting information systems and standard costs; researchers used a sample of 27 insurance companies belonging to the insurance sector listed on the Amman Stock Exchange Securities. The study discussed several major themes: The standard cost system, as part I of the cost accounting information system, has a strong relationship with the budgeting system. Evaluation of performance using a standard cost system as a method of cost control. A standard cost system remains appropriate with the new business environment. The study found many of the results were the most important, focusing on an objective accounting information system and the possibility of supporting the standard costs to ensure making true decisions or to correct decisions taken previously; this would preserve the continuity of the enterprise and increase the useful life or its product age; it would, also, guarantee a competitive advantage in the business environment.

Al soothsayer's study (2005) aimed at explaining the role of accounting information systems on the supervising credit facility among Libyan commercial banks through accounting information provided by the available information systems, through the identification of the characteristics of those systems and the information they provide, and the relation between credit and the accounting information provided by the systems used among Libyan financial banks. Findings of the study suggest that information systems employed at Libyan banks are efficient, in general, and that the accounting information they provide is characterized by qualitative characteristics that make them suitable for auditing credit provision because they are modern, easy to use and reliable, and they provide information at the right time, so they can be relied upon in making relevant decisions.

The study of Al-Shebly (2005) aimed at exploring the role of accounting information systems in auditing through the use of the conditional theory to identify how facilities apply information systems realistically, as well as to identify the sources and reasons behind this level of application. The actual use of the accounting information and the variable factors of the conditional theory and their role in interpreting those causes are explored, also. In order to achieve the purposes of the present study, a questionnaire was developed and distributed to a sample consisting of 30 accountants at the Saudi Airlines company. Results of the study suggested that the administrative use of the accounting information systems employed are not advanced and were designed on the basis of traditional services' facilities. Conditional factors had their effect on the administrative use of the accounting information, and

that effect varies based on the different factors, which calls for solutions that increase the efficiency of the accounting information.

The study of Judah (2004) aimed at exploring the accounting information systems employed at the Directorate of Income Tax and their effect on the efficiency of the Directorate in Jordan through the effect of the development of the accounting information systems and the administration attempts at providing qualified staff and material resources for the information directorate. The sample of the study included 14 employees at the Directorate of Income Tax. The results showed that the efficiency of the Directorate is affected by the various variables. The study recommended increasing the number of the staff at the information department and providing training to the cadre so that it can deal with the systems and information available.

The study of Al-Awadd (2004) aimed at exploring the effect of the cost of commodities' requirements on the production costs at industrial facilities as one of the factors of production for the purposes of auditing and supervising the available factors of production and measuring the factors of the commodities' requirements. Results showed the absence of a department whose role is related to the reception and inspection of the purchased commodities' requirements and the lack of policies related to the training and qualifying the accountants. Results showed, also, that the costs accounting department is headed by the financial manager, which affects the accounting and auditing role of the department.

The study of Ismail and king (2007) aimed at identifying the factors which affect the use of accounting information systems at medium and small factories in Malaysia. The sample of the study consisted of (214) firms employing accounting systems. The study found that the use of information systems in a way that relates upper and lower information assists the workers and employees in achieving their goals. Additionally, the use of these systems enables the provision of accurate information to the relevant governmental agencies by the firms.

The study of Brazil and Agoglia (2004) aimed at exploring the effect of the information systems' audit in terms of efficiency and experience on the estimates of the external audits in the accuracy of auditing in the light of the modern complications in the environment of accounting information systems. For the purposes of the study, two values were assigned to the efficiency of the information system audit: high efficiency and low efficiency. The experiences of audits were calculated. Results of the study showed that both the efficiency of the audit of the information system and its experience affect significantly the evaluation of the risks of auditing as part of accurate planning. The reaction of the (X) audit to the change in the efficiency of the information system depended on the experience of the accounting audit in terms of accounting information systems.

## Method of the Study

### *Sources of Information*

For the purposes of the present study, two sources of information were used as follows: 1) *Secondary sources*--Reviewing books and articles that related to the topic of the study to clarify the concepts relevant to the study and the variables of the study and their causes and effects to formulate the hypotheses of the study and enrich the discussion. 2) *Primary Sources*: This study can be described as a field study aiming at collecting primary data, and employs the descriptive analytical method in order to identify the attitudes of financial managers and accountants at Jordanian industrial firms concerning the effect of applying accounting information systems on the improvement of production costs. To test the hypotheses of the study, a questionnaire was used, and its items were developed based on the relevant theoretical framework and the previous literature.

### *Tool of the Study*

The tool of the study is a questionnaire that was developed by the researcher for the purposes of the study. The questionnaire consisted of two sections: *First section*: The section was aimed at collecting demographic data about the participants within. The sample of the study included the academic qualification, academic specializations, practical experience and the job title. *Second section*: The section

consisted of four areas; the first contained 6 items related to measuring the efficiency of the accounting information system; the second area contained 6 items related to measuring the decrease in the production costs; the third area consisted of 6 items related to the identification of deviation. These three areas represented the independent variables of the study. The fourth area consisted of 6 items related to the level of improvement in the production costs among Jordanian industrial firms, and represents the dependent variable of the study. The researcher used a five-point Likert scale to identify the degree of agreement of the study participants with the content of the items and transform them into quantitative data that could be analyzed statistically (Shwiyat, 2013) and were given the weights illustrated in Table 1.

Table 1  
*Degrees of the Likert Scale Used in the Study*

Scale point	Strongly agree	agree	neutral	disagree	Strongly disagree
Degree of agreement	5	4	3	2	1
Relative weight	81-100%	61-100%	41-100%	21-40%	0-20%

To identify the degree of the importance of each item within the tool of the study, a statistical standard based on classifying the means into three classes (1-less than 2,3) indicates a low level, (from 2.5 to less than 3.5) indicates a medium degree and (3.5 to 5), which indicates a high level were used.

#### ***Population and Sample of the Study***

The population of the study consists of financial managers and accountants working at the corporate Jordanian industrial firms listed on the Amman stock Exchange in 2014, and whose total number is 72 firms (The Guide to the Jordanian Industrial Firms, 2014). The sample of the study was chosen randomly and consisted of 40 firms (56% of the population of the study). Questionnaires were filled by financial managers and accountants (4 questionnaires for each firm). Thus, the sample consisted of 160 individuals, and 148 questionnaires were returned, 6 of which were eliminated due to the incomplete information they contained. So, the total number of questionnaires which were analyzed was 142, with a percentage of response of 88, 7%.

#### ***Statistical Processing Used in the Analysis of Data***

To analyze the data of the study items, SPSS software was used. Several statistical methods were employed to achieve the purposes of the study, which included: 1) Central tendency measures: means, standard deviation, and frequencies were calculated. 2) Pearson Correlation coefficient test. 3) Alpha Cronbach test. 4) Simple linear Regression Analysis, in order to test the effect of each independent variable on the dependent variable (improving the financial performance).

#### ***Tests Related to the Tool***

**First: Validity of the Tool:** This process aimed at checking whether the tool used in this study measures actually the construct it was developed to measure (Sekaran, 2013). Validity tests employed in this study included the following: 1) Face – Validity: This is the process of ascertaining that the items contained in the tool of the study result in collecting accreted data (Sekaran, 2013). In order to achieve this, the researcher sent the questionnaire to a number of referees to check the clarity of the items and their ease and comprehensiveness. The researcher adjusted the items that were difficult to understand. 2) Content validity: This was measured by measuring the relations between the items and the areas and dimensions to which they belong. Attention was focused on ascertaining that each dimension was represented accurately by its items appropriately and that the items measured their dimensions (Sekaran, 2010) and the content validity of the questionnaire through measuring the relation between the items and the dimensions they represent by using Pearson correlation coefficient. The confidants higher than 30% were employed with the

significance level at  $(0.05 \geq \alpha)$  (Nunnally, 1978). Table 2 shows these relations.

Table 2

*Pearson Correlation Coefficients Related to the Content Validity of the Items*

Order	Area	Number of items	Correlations coefficients' average for the items
First	Efficiency of accounting information systems	6	0.609
Second	Decreasing production costs	6	0.703
Third	Identifying deviations of production costs	6	0.704
fourth	Improving production cost	6	0.618

Pearson correlation coefficients related to the measurement of the content validity of the items of the areas of the study. Table 2 shows the results of Pearson correlation coefficients among the items and the areas of the study. The values of correlation coefficients and the levels of significance show the presence of statistically significant relation ( $0.01 \geq \alpha$ ) among the items of the area, which indicates the construct validity of the items.

***Second: Reliability of the Tool***

Reliability refers to the possibility of collecting similar data on replicating the study on the same participants and in similar conditions (Sekaran, 2013). Internal consistency measure (Cronbach Alpha) was applied to the responses of the study sample participants to determine the reliability of the tool of the study. The value that is statistically acceptable in this context is (60%) at least, as shown in Table 3.

Table 3

*Cronbach Alpha consistency Coefficients for the Areas of the Study and the Tool As a Whole*

No. of area	Title of area	Number of items	Correlations coefficients (internal consistency)
1	Efficiency of accounting information systems	6	0.744
2	Decreasing production costs	6	0.732
3	Identifying deviations of production costs	6	0.719
4	Improving production cost	6	0.719
Total average of performance		24	0.905

Table 3 shows the results of the Cronbach Alpha for the areas of the study. Reviewing the values shows that they are high, with the lowest value being related to identifying the deviation of 0,719, while the value for the tool as a whole was 0, 905. All the values of the Cronbach Alpha, which were calculated for the purposes of the study, were suitable, which indicates a high reliability of the questionnaire.

***Characteristics of the Sample of the Study***

The study sample consisted of 142 individuals working at Jordanian industrial firms. Table 4 shows the distribution of the sample participants according to the personal variables.

Table 4  
*Distribution of the Sample Participants*

Variable	Category	Frequency	Percentage
Academic qualification	Diploma - lower	21	0.148
	B.A	106	0.746
	Higher education degrees	15	0.106
Specialization	Accounting	117	0.824
	Accounting information systems	18	0.127
	Finance and accounting	7	0.049
Job experience	Less than 5 years	15	0.106
	From 5-less than 10 years	62	0.437
	From 10-less than 15 years	42	0.296
	15 years or more	23	0.162
Job title	Financial manager	13	0.092
	Financial manager assistant	11	0.077
	Head of accounting department	31	0.218
	Accountant	87	0.613
	Total	142	100%

Distribution of the participants of the study according to personal variables: Table 4 shows that the highest percentage of the participants of the study based on the variable of the academic qualification is the bachelor degree (74, 6%). Higher education percentage was 10,6%, and the lowest percentage was for the diploma and lower, which suggests that the population of the study was educated and that 89,8% of the sample of the study hold higher education degrees, which enhances the reliability of the results of the study. Concerning the academic specialization, results showed that the majority of the participants were specialized in accounting (82,4%), and that 89,4% had an experience of more than 5 years. The results indicated, also, that the majority of the employees had job titles of accountants, which refers to the reliability of their responses and indicates the high reliability of the study results.

### **Analysis and Discussion of the Results of the Study**

#### ***Adoption of Accounting Information Systems***

**Efficiency of the Accounting information Systems:** Table 5 shows the means and standard deviations of the efficiency of the accounting information system variables from the perspective of the participants of the study sample working at the Jordanian industrial firms; they are ordered based on their importance, which is determined through their means.

Table 5

*The Attitudes of the Participants of the Study Concerning the Efficiency of the Accounting Information Systems*

Order	No	Item	mean	Standard deviation	Degree
1	6	Accounting information system provides financial information with a high predictive power which assist the management in formulating future plans	4.43	0.63	High
2	4	The accounting information systems provide a basis for planning financial and human resources	4.17	0.61	High
3	2	The accounting information system at the company provides information for the managers to make decisions not based on personal judgments	4.04	0.73	High
4	1	The accounting information system at the company provides feedback so that decisions made are reviewed and improved	3.98	0.84	High
5	5	Using accounting information systems contributes greatly to increasing the efficiency of the planning process	3.91		High
6	3	Accounting information systems provide additional information (Analytical lists, statistical tables, diagrams ...et) which assist the administration in comparing and evaluating performance be her	3.80	1.05	High
General tendency			4.05	0.43	High

The table shows also that the attitudes of the participants in the study sample were very high towards all the items related to the efficiency of the accounting information systems, which ranged between 3.80 - 4.43; reviewing the order of the items shows that the item stating that "Accounting information system provides financial information with a high predictive power which assist the management in formulating future plans" was ranked first with a mean of (4,43) and a standard deviation of 0.59.

The item which states that "The accounting information systems provide a basis for planning financial and human resources" was ranked second, with a mean of 4.17 and a standard deviation of 0.16. The item which states that "Accounting information systems provide additional information (analytical lists, statistical tables, diagrams ...etc.) which assist the administration in comparing and evaluating performance better" was ranked first with its mean at 3.80 and its standard deviation of 1.05 in comparison to the general mean.

In general, the total results suggest the presence of a high level of efficiency for the accounting information system, the mean for which was 0.43, which is relatively low, indicating that the attitudes are similar with the absence of variance among the responses of the participants of the study concerning the variables of the study.

**Decreasing Production Costs:** Table 6 shows the means and standard deviations of the variable of decreasing production costs from the perspective of the participants within the sample of the study who were working at Jordanian industrial firms ranked on the basis of their importance according to their means.

Table 6

*Attitudes of the participants of the study concerning degreasing production costs*

Order	No	Item	Mean	Standard deviation	Degree
1	5	Accounting information systems specify the indirect materials for every new order based on the reports of the specialized team	4.41	0.86	High
2	3	Accounting information systems assist in controlling the wages through the control of their indirect costs	4.24	0.51	High
3	1	Accounting information systems provide special systems for the warehouses , connected to all sections of the company and the general management	4.11	0.69	high
4	6	Accounting information systems specify the working time required for completing the production process	4.11	0.88	High
5	4	Accounting information systems provide accounting systems capable of estimating the indirect wages related to the product and controlling their deviations	3.91	0.81	High
6	2	Accounting information systems provides a category card for each material to the warehouses' attendant in order to supervise the inventory	3.48	1.06	medium
General tendency			3.96	0.41	High

Table 6 shows that the attitudes of the participants of the study sample were highly important towards all the items related to the efficiency of the accounting information system, except Item Number 2, which had a medium importance and ranged between 3.48-4.41. Reviewing the order of the items, it is found that the item that states that "Accounting information systems specify the indirect materials for every new order based on the reports of the specialized team" was ranked first (mean = 4.41; standard deviation = 0.86). the item that states "Accounting information systems assist in controlling the wages through the control of their indirect costs" was ranked second (mean = 4.24, standard deviation = 0.51), while the item that states that "accounting information systems provides a category card for each material to the warehouses' attendant in order to supervise the inventory" was ranked last (mean = 3.48, standard deviation = 1.06) in comparison with the general means. In general, the total results suggest the presence of a high level of reduction in production costs, with the mean being at 3.96 and the standard deviation at 0.41, which is low, indicating the similarity among attitudes and the absence of central variance among the responses of the participants of the sample of those working at Jordanian industrial firms and concerning the variables of the study.

**Identifying the Deviations in Production Costs:** Table 7 shows the means and the standard deviations of the production costs from the perspective of the participants of the sample of the study from among the employees at the Jordanian industrial firms ranked according to their importance, based on their means.

Table 7

*Attitudes of the Participants Concerning the Identification of the Deviations of Production Costs*

Order	No	Item	Mean	Standard deviation	Degree
1	4	Accounting information systems provide standards and supervisory indicators which enable the management to discover the deviations , analyzing their causes and resolving them	4.60	0.61	High
2	2	Accounting information systems provide an analysis of the deviations of the indirect industrial costs which account for a high percentage of the total costs	4.46	0.68	High
3	6	Accounting information systems assist in supervising the efficiency of decisions made at the company and determining their deviations	4.32	0.68	high
4	1	Accounting information systems provide a comprehensive database that determines the deviations of direct and indirect materials	4.22	0.93	High
5	5	Accounting information systems assist in exploring the elements of production for the previous periods and suggesting the future costs	4.16	0.91	High
6	3	Accounting information systems assist in distributing indirect industrial costs , and the identification of their deviations from what is planned	4.12	0.68	High
General tendency			4.35	0.58	High

The table shows that the attitudes of the participants of the study were highly important towards all the items related to the identification of the production costs, which ranged between 4.12-4.60. Reviewing the order of the items shows that the item that states that “Accounting information systems provide standards and supervisory indicators which enable the management to discover the deviations, analyzing their causes and resolving them” was ranked first with a mean of 4.60 and a standard deviation of 0.61, while the item which states that “Accounting information systems provide an analysis of the deviations of the indirect industrial costs which account for a high percentage of the total costs” was ranked second with a mean of 4.46 and a standard deviation of 0.68, less than the item that states that “Accounting information systems assist in distributing indirect industrial costs , and the identification of their deviations from what is planned,” which was ranked last (mean=4.12 and standard deviation=0.68) compared to the general and total standard deviation. In general, the results show a high level of the ability of the accounting information systems at the identification of the deviations of the production costs (mean=4.35 and standard deviation=0.58), which is relatively low, indicating the similarity of the attitudes and the absence of high variance among the responses of the participants of the sample of the study from among the employees at the Jordanian industrial firms concerning the variables of the study.

**Improving Production Costs:** Table 8 shows the means and the standard deviations for the variable of improving production costs from the perspective of the participants of the sample of the study, who work at Jordanian Industrial firms and are ranked according to their importance based on their means.

Table 8

*The Attitudes of the Participants of the Sample of the Study Concerning Improvement of Production Costs*

Order	No	Item	Mean	Standard deviation	Degree
1	4	Management works to increase the cost' clusters in which indirect costs are calculated based on the number of activities incurring costs	4.34	0.77	High
2	1	Management uses information systems in order to use what is available of resources in order to satisfy its needs in terms of production and pricing	4.28	0.78	High
3	6	Management tries to develop administrative performance and decrease costs through the elimination of activities which do not add value	4.20	0.70	high
4	2	Management uses accounting information systems which enable it to plan auditing costs better throughout the value chain from R & D and to customer service	4.18	0.72	High
5	3	Management tries to provide the sufficient number of costs employees who are able to operate costs systems efficiently and effectively	3.98	0.84	High
6	5	Management seeks to apply the recommendations of the costs' team in order to improve costs and achieve what has been planned	3.92	0.90	High
General tendency			4.14	0.46	High

The table shows that the attitudes of all the items related to the improvement of production costs, and ranged between 3, 92 – 4, 34. Reviewing the ordering of the items, we found that the item that states that “Management works to increase the cost’ clusters in which indirect costs are calculated based on the number of activities incurring costs” was ranked first, with a mean of 4,34 and a standard deviation of 0,77. The item that states that “Management uses information systems in order to use what is available of resources in order to satisfy its needs in terms of production and pricing” was ranked second with its mean at 4, 28 and standard deviation of 0.78. The item that states that “Management seeks to apply the recommendations of the costs’ team in order to improve costs and achieve what has been planned” was ranked last (mean = 3, 92, and standard deviation = 0.90) in comparison to the total mean. Generally, the results indicate the presence of a high level of improving production costs among Jordanian industrial firms (mean = 4,14 and standard deviation = 0.46). This indicates the similarity among attitudes and the absence of a large variance in the responses of the participants of the study from among the employees at Jordanian industrial firms concerning the variables of the study.

### Testing the Hypotheses of the Study

#### *Testing the First Hypothesis*

The first Hypothesis states that “There is no adoption of accounting information systems among Jordanian industrial firms.” To test this hypothesis, the variable of the adoption of accounting information systems was divided into three variables, which were explained previously. Table 9 shows the results of testing the first hypothesis. Results indicated that all the variables of the study were statistically significant at the level of 0.01.

Table 9

*Employment of Accounting Information Systems*

T	Variable	Mean	Standard deviation	T value	Freedom degrees	Significance level
1	Efficiency of accounting information system	4.05	0.43	11.992	141	0.000*
2	Decreasing production costs	3.96	0.41	8.757	141	0.000*
8	Identification of deviations of production costs	4.35	0.58	16.838	141	0.000*
	Level of total implementation	4.12	0.39	15.017	141	0.000*

\*statistically significant at  $\alpha=0.05$

Results suggest that the mean of the level of accounting information systems adoption was at 4, 12, with a standard deviation of 0, 39, which indicates that industrial firms employ accounting information systems effectively and efficiently, and the (+) value 15, 017 was statistically significant at the significance level of 1%. Thus, the first null hypothesis is rejected, and the alternative hypothesis accepted: "There is an adoption of accounting information systems among Jordanian industrial firms."

**Testing the Second Hypothesis**

This hypothesis indicates that "There is no effect system on the improvement of production costs among Jordanian industrial firms." In order to test this hypothesis, multiple regression analysis was carried out to identify the effect of accounting information systems on the improvement of production cost among Jordanian industrial firms from the perspective of the financial managers and accountants who work at Jordanian industrial firms listed on the Amman stock Exchange, as shown in Table 10 below:

Table 10

*Results of Multiple Regression Analysis of the Effect of Employing Accounting Information Systems on the Improvement of Production Costs*

Independent variables	Significance level	$R^2$ (	Calculated "f"	Listed "f"	Statistical decision
Implementation of accounting information systems	0.002	0.401	4.022	0.003	Rejecting the null hypothesis

Table 10 shows that the calculated value of "f" was 4, 22, while its listed value was 3,00. Through the comparison between the values derived through this hypothesis, it was found that the calculated value was higher than the listed value, so, the null hypothesis was rejected and the alternative hypothesis, which states that "There is an effect for the adoption of accounting information systems on the improvement of production costs among Jordanian industrial firms" was accepted. This is confirmed by the significance level 0.002, which is less than the level of significance 5%. Results indicated also that the variance in the employment of accounting information systems account for 0.401 of the variance of the improvement in production costs, which reflects the strength of the relation. Additionally, the level of relation between the variable of adoption of accounting information systems and the variable of improvement in production costs shows that 0.599 of the changes occur in the improvement of production costs as a result of other unspecified variables, which shows the importance of adopting accounting information systems.

***Testing the Minor Hypotheses***

In order to test the effect of employing accounting information systems in improving production costs among Jordanian industrial firms for each variable in isolation, the main hypothesis was divided into three secondary hypotheses. Simple regression analysis was used to test the secondary hypotheses. The decision basis for the test indicates the rejection of the null hypotheses ( $H_0$ ) and accepting the alternative hypothesis ( $H_a$ ) if the calculated (T) value is higher than its listed value and at the significance level of 5% (Malhotra, 2003). Tables 11-13 show the results of this test.

***Testing the First Minor Hypothesis***

This hypothesis states that “There is no effect for the efficiency of the accounting system on the improvement of production costs at the Jordanian industrial firms.” For the purposes of testing this hypothesis, simple regression analysis was used. Table 11 shows the results.

Table 11

*Results of Simple Regression test for the effect of the efficiency of the accounting system on the improvement of production costs*

Independent variables	Significance level	$R^2$ (	$\beta_i$	Calculated "t"	Listed "t"	Statistical decision
Implementation of accounting information systems	0.002	0.189	0.435	3.348	1.657	Rejecting the null hypothesis

Table 11 above shows that the calculated value of T was 3.348, while its listed value was 1.657. Comparing the values derived through the test of this hypothesis, it is found that the calculated value is higher than the listed value, so, the null hypothesis is rejected and the alternative hypothesis is accepted, which states that “There is an effect for the efficiency of the accounting information system on the improvement of production costs among Jordanian industrial firms,” which is lower than 5%. The effect level  $B_i$  was 0.435, which can be explained by the fact that the efficiency of the accounting system leads to improvement in production costs. Results suggest also that the variance in the efficiency of the accounting system accounts for 0.189 of the variance in the improvement in production costs, which reflects a medium level of the strength of the relation, as well as the level of interpreting of the variable of improving production costs through the variable of the efficiency of the accounting information system from the perspective of the financial managers and accountants, and 0.811 of the exchanges in the improvement of production costs are a result of different variables, which shows the importance of the efficiency of the accounting system.

***Testing the Second Minor Hypothesis***

This hypothesis states that “There is no effect for the decrease in production costs on the improvement of production costs among the Jordanian industrial firms.” In order to test this hypothesis, simple regression analysis was used. Table 12 shows the results derived in testing this hypothesis.

Table 12

*Results of "Simple Regression Test of the Decrease of Production Costs on the Improvement of Production Costs"*

Independent variables	Significance level	$R^2$ ( )	$\beta_i$	Calculated "t"	Listed "t"	Statistical decision
Decreasing production costs	0.020	0.145	0.144	0.2888	1.657	Rejecting the null hypothesis

Table 12 shows that the calculated value of T was 2.888, while its listed value was 1.657. Through the values derived in testing this hypothesis, it was found that the calculated value is greater than the listed value; thus, the null hypothesis is greater than the listed value, the null hypothesis is rejected, and the alternative hypothesis is accepted, which indicates that "There is an effect for the decrease in production costs on the improvement in production costs among the Jordanian industrial firms," which is confirmed by the significance level 0.002, which is below the significance level of 5%. The effect value  $B_i$  is 0.414, which can be explained by the fact that decreasing production costs results in improvements to the production costs. Results suggest also that the variance in professional skills related to internal auditing accounts for 0.145 of the variance in the improvement of the strength of the relation, as well as the degree of relation between the variable of decreasing production costs from the perspective of financial managers and accountants and 0.88,5 of the changes I show that improvement in production costs are the result of other changes, which shows the importance of decreasing production costs.

#### *Testing the Third Minor Hypothesis*

The third hypothesis states that "There is no effect for the identification of deviations in the production costs on the improvement of production costs among the Jordanian industrial firms." In order to test this hypothesis, simple regression analysis was used. Table 13 shows the results of testing Hypothesis 3.

Table 13

*Results of Simple Regression Test for the Identification to The Deviations of Production Costs on the Improvement in Production Costs*

Independent variables	Significance level	$R^2$ ( )	$\beta_i$	Calculated "t"	Listed "t"	Statistical decision
Identifying the deviations of production costs	0.000	0.221	0.509	3.124	1.657	Rejecting the null hypothesis

Table 13 shows that the calculated value of T was 3.124, while its listed value was 1.657. Comparing the values derived through testing this hypothesis, it was found that the calculated value is greater than the listed value, and, thus, the null hypothesis was rejected and the alternative hypothesis was accepted, and which states that "There is an effect for the identification of the deviations in production costs on the improvement of production cost at the Jordanian industrial firms." This is confirmed by the significance level, which was at 0.000 and which is lower than the significance level of 5%; the effect  $B_i$  0.509, which was explained by the fact that limiting the deviations of production costs results in improvement in the production costs. Results showed, also, that the variance in limiting the deviations in production costs accounts for 0.221 of the variance in the improvement in production costs, which reflects a medium level of the strength of the relation between the degree of the correlation between the deviations in the production costs and the improvement in production from the perspective of financial managers and

accountants. Additionally, 0.779 of the changes that occur to the improvement in production costs were the result of other changes, which reflects the importance of limiting the deviations of production costs.

### The Results

Through the analysis, testing, and discussing of the hypotheses of the study, the study arrived at the following important results:

1. Industrial firms employ accounting information systems efficiently and effectively. The most important degree of employment is the system's limiting of the deviations of production costs to a high degree.
2. A high degree of efficiency exists in the accounting information systems used by Jordanian industrial firms, and that the system provides financial information which is highly predictive, and which assists management in formulating future plans.
3. Using accounting information decreases production costs among Jordanian industrial firms to a high degree so that it attempts at limiting and identifying the amount of indirect materials for each order in advance based on the report of the specialized team.
4. Accounting systems enjoy a high ability to identify the deviations in production costs in order to provide standards and supervisory indicators that enable management to discover deviations, analyze their causes, and solve them.
5. Jordanian industrial firms seek to decrease the costs in the clusters in which the indirect costs are accumulated based on the number of activities that accrue the costs; they also seek to develop administrative work that decreases costs through the elimination of activities that do not add value to improving production costs.
6. Employing accounting systems related to decreasing production costs is considered among the most influential functions that improve production costs at Jordanian industrial firms.
7. The presence of a positive effect for the adoption of accounting information systems relates to the identification of the deviations of production costs, as well the efficiency of the accounting information systems and decreasing production costs on the improvement of production costs at Jordanian industrial firms.

### Recommendations

- 1- Organize training courses for the employees in the employment of accounting information systems for raising the efficiency of the individuals who work at this field.
- 2- Establish a database that is suitable to the requirements of costs for the purposes of improving production costs.
- 3- Conduct more research in this field in order to enhance the level of production costs to achieve the maximum benefit from the accounting information system.
- 4- Conduct future research concerning the evaluation of the role of accounting information systems in improving the internal audit and improving the work of internal auditing committees, as well as exploring the effective use of accounting information systems to enhance the quality of the commodities of the industrial firms.

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