# THE ROLE OF ACCOUNTING INFORMATION SYSTEMS IN REDUCING INDIRECT INDUSTRIAL COSTS
# (ANALYTICAL STUDY TO THE SURVEY OF WORKERS IN JORDAN CHEMICAL INDUSTRIES CO)

**Mohamed Mahmoud Bshayreh, Al Huson University College,
Al-Balqa Applied University
Aiman Mahmoud Abu Hamour, Amman University College,
Al-Balqa Applied University**

## ABSTRACT

*This study aims to clarify the role of accounting information system IAS, in reducing indirect industrial costs in companies within the chemical industries companies in Jordan. A questionnaire was designed and distributed to the accountants– specifically while 66 of them were retrieved for statistical analysis. The findings of the study reveal that both conceptual and statistical analysis have a considerable impact on IAS, namely in regards to reducing all factors of indirect industrial costs (material, wages, other industrial expenses).*

*Design, Methodology: This paper used 66 usable questionnaires from accountants, the collected data were analyzed utilizing Statistical Package for the (SPSS).*

*Originality/ Value: This study presented unique research results in the relationship between AIS and how they affect the reduction of indirect industrial costs in Jordanian chemical industries companies.*

**Keywords:** Indirect Industrial Costs, IAS, Jordan Chemical Industries Co.

## INTRODUCTION

Al-Dalabeeh et al. (2012) pointed out that both the accelerated industrial development and the massive revolution –whether in its techniques, methods, and theories– have increased and varied the productive functions. As such, they played a role in increasing indirect industrial costs. Increased industrial costs led to installing and developing IAS which maintains the connection among operational, regulatory, and financial processes in industrial companies. This study clarifies how products can become less costly for indirect industrial costs (additional). In particular, the population of the study was chosen from Jordan Chemical Industries Co. because they are an appropriate environment for the nature of the research. The findings of the study could be generalized to other industrial companies.

### The Problem of the Study

AL-Bataineh (2018) indicated that the problem of the study stems from considerable weakness in accounting literature related with the role of accounting information system in reducing indirect industrial costs. The previous studies focused only on reducing production

costs in general. It is worth mentioning that this study seeks to clarify that reducing such types of costs is considered difficult because the output product needs a fixed amount (Al-Rajabi, 2012). Therefore, the first way to reduce the production costs is to reduce indirect industrial costs. Reducing this type of costs will achieve many advantages, such as reducing unit cost, increasing the contribution margin, (increasing gross profits), facilitating the oversight of indirect industrial costs (additional) due to its limitedness, and reduce the price of a good and the accessibility of its commercialization. Therefore, this paper seeks to explicate the role of accounting information system in reducing indirect industrial costs from the reality of labor system in Jordan Chemical Industries Co. Accordingly; the problem of the study is formulated in the following questions:

**The Primary Question:** what is the role of accounting information system in reducing indirect industrial costs in all its elements (indirect material, wages, and other industrial expenses) in Jordan Chemical Industries Co.?

## THE STUDY CONCEPTUAL FRAMEWORK

### The Importance of Accounting Information System

Accounting is a data identification, collection, and storage process as well as an information development, measurement, and communication process. By definition, accounting is an information system since AIS collects, records, stores, and processes accounting and other data to produce information for decision makers. (Romney et al., 2012).

AIS helps business units solve long-term problems in the areas of final prices, costs, and cash flows by providing information to support and supervise companies in the competitive environment, and help the companies to integrate their operations in a profitable way (Ismail, 2009).

Accounting Information System maintain and produce the data used by organizations to plan, evaluate, and diagnose the dynamics of operations and financial circumstances. Anthony et al cited in Advent of information Technology changed the way in which traditional accounting systems work. Electronically captured data need to be processed, stored and distributed through IT-based Information Systems. Information Technology has dramatically increased the ability and capability of processing accounting information (Emeka-Nwokeji, 2012).

The importance of information technology manifests designing and preparing of a relational dataset. This relation between departments is electronically connected in order to achieve better oversight. On the other hand, threats are be revealed precisely, with an easy maneuvering in controlling or eliminating them (Romney et al., 2012).

Several studies and theories point to the importance of accounting information system in increasing the productivity, richness, and growth. Accounting information system provides a road map for the company to determine the administrative procedures and the extent these procedures are commensurate with financial procedures. Also, the speed and accuracy of these procedures in accessing executive department points to the quality of AIS (Susanto, 2017).

For the purpose of producing quality information between the integration components in the system, people as users of information systems is a major factor. They integrate the components of hardware, software, databases and telecommunication network, so that the integrated accounting information system between components and sub-systems can provide an edge (McLeod & Schell, 2007). (Susanto, 2017) in addition to that, the accounting information system is also Achieve the expected goals of an organization. Furthermore, the quality system

information can be identified by the quality of hardware and software, as well as the usefulness of the information system (Dellon & McLean,1992).

## The Role of Accounting Information in Reducing Production Costs

The administrative information system helps in reducing production costs primarily through the accuracy of the data provided to the decision-makers. Taking decisions concerning the reduction of the production costs relies on the quality of accounting information, since it constitutes an integral input for the correctness of a decision. The only caveat is that reporting errors in accounting information system can be a result from errors in provided datasets, which might increase production costs. Therefore, correcting these mistakes help tremendously in reducing production costs (Emeka-Nwokeji, 2012).

Enterprise development planning reduces production costs, while the planning of the direct material stock system that interfere with the productive process reduces its costs in terms of the accuracy of calculating prices and quantities, the selection of suppliers, the method of stocking materials appropriately as well (Strobel, 2002).

The reduction of indirect industrial costs is implemented by developing the systems of using mechanization in productivity. The process of calculating the quantities requires modern origins that works within sophisticated information systems. The overall production costs will reduce by using modern productive assets (Azemi et al., 2019).

Improving the quality of accounting information system leads to increased ability in determining the deviations in production costs. M that, modifying the deviations of costs and reducing the waste is an important part of the process. The comparison between the standard costs within actual costs helps in reducing the productive (or production?) costs. Also, the financial reports that have a predictive capacity in improving decision making in the field of reducing production costs (AL- moqbel, 2015).

The whole recourses of accounting information system (datasets, networks, communication, human resources, and procedures) have a positive relation in reducing the costs. The speed of performing the productive process, the speed of access of information in relation with productive costs, the limiting of credit, the skills of workers, the safety of productive procedures and accounting control all have a positive impact in reducing the productive costs (AL-bataineh, 2018).

Reducing the time of completing the productive process lead to reducing the salaries paid to the workers. Also, conducting and implementing the information system process reduces additional industrial factors- such as stationary, brokerage costs, the costs of damaged production, the cost of non-essential storage, the cost of the lost time for completing production, reducing the: the time of paid production and the costs of products storage, as well as small industrial expenses that are reduced in the light of accounting information system. In fact, the efficient accounting information system effectively contributes in to reducing both production and overall costs, which, in turn increases both net and overall profits (Al-Bashabsheh, 2019).

## Jordan Chemical Industries Co.

The financial data for Jordan Chemical Industrial Co. has been obtained from the electronic website of financial Amman market (www.ase.com.jo). It constitutes six companies, which all work in the field of manufacturing chemical products. The most important information concerning such issues boiled down as follows:

| Table 1 THE NAME OF THE COMPANY, ITS WORK NATURE, AND ITS CAPITAL | | |
|---|---|---|
| **The Name of the Company** | **The Work Nature** | **Capital** |
| Agricultural, commercial, and industrial | Producing cleaning materials | 14.956.389 |
| Jordan chemical industries | Producing Sodium and other chemical materials | 1.799.624 |
| National for Chlorine Manufacturing | Producing Chlorine | 20.000.000 |
| Jordan Industrial Resources | Manufacturing vegetable oil | 16.625.000 |
| Arab Pesticides Mfg. Co | Pesticides and veterinary medicines | 12.000.000 |
| Intermediate Petrochemical Industries | Petrochemical industry | 7.000.000 |

Determining the population of the study since these companies are based on manufacturing products enables dividing cost factors into direct and indirect industrial costs. The importance of the study lies in the extent of benefit for the population in terms of determining how AIS reduces indirect industrial costs to the lowest possible level.

## Hypothesis of the Study

**Main Hypothesis**: there is no role for accounting information system in reducing indirect industrial costs. The following sub-hypotheses are derived from the main hypothesis:

*First sub-hypothesis: There is no role for accounting information system in reducing indirect material costs.*

Both questionnaires and conclusions taken from previous studies in this regard such as Strobel (2002) and Susano (2017) studies.

*Second sub-hypothesis: There is no role for accounting information system in reducing indirect wages costs.*

Both questionnaires and conclusions taken from previous studies in this regard such as Al-Dalabeeh (2012) and Al-Bataineh (2018) studies.

*Third sub-hypothesis: There is no role for accounting information system in reducing other industrial expenses.*

Both questionnaires and conclusions taken from previous studies in this regard such as Emeka (2012) and Al-Meqbel et al. (2015) studies.

## METHODS AND PROCEDURES

In this study, a descriptive analytical approach was used. The population of the study is constituted of the whole Jordan chemical industries Co., comprised of six companies. The targeted sample consisted of accounting employees, particularly those who work in the cost accounting field and the employees of information technology. Such categories were taken from the employees because they are the primary stakeholders in the field of accounting information system and they have a better understanding of the subject of the study.

For the purpose of collecting data, both primary and secondary resources were used. The primary data was collected from both interviews and questionnaires. On the other hand, the secondary data was collected from school books, journals, and internet materials. To illustrate, seventy questionnaires were distributed to the concerned accountants; only 66 of them were filled and returned correctly. The questions were designed by using fifth Likert scale (strongly agree, agree, neutral, disagree, and strongly disagree). The order of the value ranges between 1-5.

The maximum value is 5, while the minimum value is 1. The neutral value is 3 and above Emeka (2012).

Statistical hypotheses testing (t-test) was used by the help of SPSS for social sciences. If t-cal is bigger than the value of the test, the null hypothesis will be rejected and vice versa. In case the significance level was ($\alpha \leq 0.05$), the null hypothesis will be rejected.

**Tests Related with The Study Tool**

**The Stability of the Study Tool**

It means the ability to obtain the same data after the restudy by using the same study tool on individuals themselves in light of similar circumstances (Sekaran, 2003). Cronbach Alpha was used for the responses of the study sample that were been obtained for knowing the extent of reliability on the study tool. The statistical accepted value for this measurement is (60%) since the value of this test accounted for (0.637) which indicates the validity of the questionnaire paragraphs and confirms the high stability between each of the paragraphs.

**Normal Distribution of Data Test**

Kolmogorov–Smirnov test (1-Sample K-S) examined if the data followed natural distribution or not. It is essential for hypotheses testing because most of the parametric tests require normal distribution of data. Table 2 illustrated below indicates the findings of the test (Bshayreh, et al, 2019).

| Table 2 SAMPLE KOLMOGOROV- SMIRNOV NORMAL DISTRIBUTION OF DATA | | | |
|---|---|---|---|
| **Field** | **The Number of Paragraphs** | **Z Value** | **Significance Level** |
| Reducing the costs of indirect industrial materials. | 10 | 1.21 | 0.105 |
| Reducing the costs of indirect industrial wages. | 10 | 0.99 | 0.274 |
| Reducing other industrial expenses. | 10 | 1.02 | 0.249 |

The findings of the data indicated in Table 5 show that statistical significance value is larger than significance value ($0.05 \geq \alpha$) for all the study fields. This, consequently, indicates that data follows normal distribution.

**Discussing the Findings of Statistical Analysis for Study Variables**
Discussing the findings of statistical analysis for the first field
The findings of the statistical analysis for the samples of the study around the role of accounting information system in reducing indirect industrial costs (indirect material) by using mean, standard deviation, t-value, p-value.

| Table 3 AIS AND REDUCING INDIRECT MATERIAL | | | | | | |
|---|---|---|---|---|---|---|
| No | Paragraph | Mean | S.D | t- value | Value t-cal | p-value |
| 1 | The order of indirect material is issued electronically. | 4.42 | 0.58 | 3 | 17.8 | 0.000* |
| 2 | The economic quantity for the stock is taken into consideration upon request. | 4.33 | 0.53 | 3 | 17.2 | 0.000* |

| 3 | The indirect material is delivered by using an official receipt memorandum. | 4.57 | 0.47 | 3 | 23.4 | 0.000* |
| 4 | Each material is stored according to appropriate storage conditions to guarantee there is no damage. | 4.33 | 0.61 | 3 | 15 | 0.000* |
| 5 | The employee is not allowed to receive the material by entering them into system. | 4.4 | 0.49 | 3 | 22.1 | 0.000* |
| 6 | Each material takes its specific code. | 4.44 | 0.54 | 3 | 19.4 | 0.000* |
| 7 | Each employee has a specific entry number from others. | 4.66 | 0.64 | 3 | 14 | 0.000* |
| 8 | Indirect materials are taken from the warehouse by a permission of official electronic exchange. | 4.35 | 0.53 | 3 | 17.4 | 0.000* |
| 9 | Indirect materials are spent on production floors for retrieving the surplus of it. | 4.46 | 0.69 | 3 | 11.5 | 0.000* |
| 10 | Enterprise resource planning (Erp) system is used for assuring the safety of the adopted procedures in all the fields of buying indirect materials until it becomes a part of the product. | 4.44 | 0.57 | 3 | 16.1 | 0.000* |

* Statistically significant at the level of significance (5%)

As shown in the afore-mentioned Table, the opinions from the sample indicated a high agree level concerning the paragraphs of the first variable since the means were confined only between (4.33-4.66). The sample believes that reducing the costs between orders and storage lead to reducing the cost of indirect materials. In fact, tackling the threats of possible malfunctioning of information systems yields positives in reducing indirect industrial costs.

**The Findings of The Statistical Analysis for The Second Field**

The findings of the statistical analysis for the sample of the study around the role of the accounting information system in reducing industrial costs (industrial wages) by using mean, standard deviations, t-value, and p-value.

| Table 4 AIS AND REDUCING INDIRECT WAGES | | | | | | |
|---|---|---|---|---|---|---|
| No | Paragraph | Mean | S.D | t-value | Value t-cal | p-value |
| 1 | The departments of employees working in factory are sorted. | 3.97 | 0.89 | 3 | 7.35 | 0.000* |
| 2 | The productive departments are determined accurately. | 4.06 | 0.86 | 3 | 8.28 | 0.000* |
| 3 | Human resources system is calculated. | 4.48 | 0.5 | 3 | 19.75 | 0.000* |
| 4 | Accounting programs are connected with productive programs. | 4.04 | 0.2 | 3 | 33.61 | 0.000* |
| 5 | The time of work for the production process accurately with electronic means. | 4.42 | 0.49 | 3 | 19.1 | 0.000* |
| 6 | The employees who are classified into indirect industrial wages accurately. | 4.71 | 0.45 | 3 | 25.04 | 0.000* |
| 7 | Such categories are paid after permission is granted from the manager concerning getting their salaries and wages paid. | 4.57 | 0.49 | 3 | 21.19 | 0.000* |
| 8 | The system does not allow one manager to supervise on calculating indirect wages for employees. | 4.13 | 0.34 | 3 | 22.11 | 0.000* |
| 9 | The system does not allow modifying the dataset for this category | 4.66 | 0.47 | 3 | 23.54 | 0.000* |

| 10 | The dysfunctions in information system is reviewed by calculating indirect industrial wages and amending them if necessary. | 4.22 | 0.47 | 3 | 17.39 | 0.000* |

* Statistically significant at the level of significance (5%)

As shown in the aforementioned Table that studies the sample's opinion, achieved high degree on the paragraphs of the second variable since the means were confined between (4.22-471). The sample believes that reducing the number of those working in computer programs lead to a reduction in indirect wages. Also, reducing their operational costs is considered essential for achieving the purpose of the study. In fact, addressing the threats faced by the disruptions in information system in this field yields positive results in reducing the costs of indirect industrial wages.

**The Findings of Statistical Analysis for The Third Field**

The following Table reveals the findings of the statistical analysis for the study sample concerning the role of accounting information system in reducing indirect industrial costs (other industrial expenses), by using mean, standard deviation, t-value, and p-value.

| No | Paragraph | Mean | S.D | t- value | Value t-cal | p-value |
|---|---|---|---|---|---|---|
| | **Table 5** <br> **AIS AND REDUCING OTHER INDUSTRIAL EXPENSES** | | | | | |
| 1 | You have a private account concerning various indirect industrial costs. | 4.42 | 0.49 | 3 | 19.1 | 0.000* |
| 2 | The credits of these costs are classified and departed appropriately in a separate and primary accounts. | 4.33 | 0.47 | 3 | 18.67 | 0.000* |
| 3 | The flow of various industrial costs is monitored and the imported and exported is calculated electronically. | 4.57 | 0.54 | 3 | 19.48 | 0.000* |
| 4 | Periodical invoices for small industrial numbers are determined and scrutinized before the acceptance of buying them. | 4.33 | 0.67 | 3 | 13.26 | 0.000* |
| 5 | The company organizes the account of other industrial costs by archiving all of its data. | 4.4 | 0.53 | 3 | 17.41 | 0.000* |
| 6 | They are scrutinized officially by verifying their credits at the beginning and the end of the period. | 4.44 | 0.5 | 3 | 19.28 | 0.000* |
| 7 | The invoices related with various industrial costs are sent to the responsible manager for approval. | 4.66 | 0.47 | 3 | 23.54 | 0.000* |
| 8 | It is not allowed for one employee to manage and monitor various indirect industrial accounts. | 4.35 | 0.57 | 3 | 15.94 | 0.000* |
| 9 | Various industrial costs among various years for the same productive cases are compared. | 4.46 | 0.58 | 3 | 16.73 | 0.000* |
| 10 | The payment of voices and other industrial costs are monitored due to the fear of recurrence. | 4.44 | 0.5 | 3 | 19.28 | 0.000* |

* **Statistically significant at the level of significance (5%)**

The above-mentioned Table shows that the study sample achieved a high degree on the paragraphs of the third variable since the means were confined only to (4.33-4.66). The sample of the study believes that reducing the industrial cost, such as petrol, maintenance, and so forth happens by controlling the movement of paid invoices. Its necessity, importance, and electronic precision are confirmed. Monitoring other industrial expenses is essential in industrial companies

due to their diversity and their multiple uses. Addressing threats related with manipulation of their credits and their method of payments are considered essential for reducing these costs.

## Hypotheses-Testing

Table 6 shows the results of Simple Regression analysis of the effect of AIS in reduce indirect industrial costs in the Jordanian industrial firms. As mentioned earlier, three types of the indirect industrial costs have been examined in the current study, namely; indirect material costs, indirect wages costs and other industrial expenses.

| Table 6 REGRESSION ANALYSIS OF THE EFFECT OF AIS ON THE INDIRECT COSTS | | | | | | |
|---|---|---|---|---|---|---|
| Models | (R)Correlation | $R^2$ | F value | $Bi$ | T value | Sig. |
| AIS and indirect material costs | 0.363 | 0.114 | 7.270 | 0.363 | 10.500 | 0.000* |
| AIS and indirect wages costs | 0.369 | 0.118 | 7.570 | 0.369 | 10.890 | 0.000* |
| AIS and other industrial expenses | 0.322 | 0.112 | 7.325 | 0.322 | 6.420 | 0.000* |
| AIS and indirect costs | 0.366 | 0.118 | 7.550 | 0.366 | 10.760 | 0.000* |

The first hypothesis indicates, "Accounting information system does not reduce indirect material costs". As shown in the Table 5, the value of Correlation (**R**) is (0.363), and **$R^2$** value is (0.11) which reflect that the AIS explain 11% of the variance in the indirect material costs. In addition, **Bi** value is (0.363) which means that if the AIS increase by one unit, the indirect material costs will decrease by 0.363. The significant of this effect was statistically significant at the level of (0.01). Based on these results, the null hypothesis is rejected and the alternative hypothesis should be accepted, which states "Accounting information system reduces indirect material costs".

Similarly, the second hypothesis indicates, "Accounting information system does not reduce indirect wages costs". As shown in the Table 5, the **R**-value is (0.369), and **$R^2$** value is (0.118) which reflect that the AIS explain 12% of the variance in the indirect wage's costs. Furthermore, **Bi** value is (0.369) which means that if the AIS increase by one unit; the indirect wages costs will decrease by 0.369. Also, the significant of this effect is statistically significant at the level of (0.01). Based on this discussion, the null hypothesis should be rejected and the alternative hypothesis should be accepted, which states "Accounting information system reduces indirect wages costs".

The third hypothesis indicates, "Accounting information system does not reduce other industrial expenses". As shown in the Table 5, the **R**-value is (0.322), and **$R^2$** value is (0.112) which reflect that the AIS explain 11% of the variance in the other industrial expenses. Moreover, **Bi** value is (0.322) which indicates that if the AIS increase by one unit, the other industrial expenses will decrease by 0.369 too. Further, the significant of this influence is statistically significant at the level of (0.01). Based on the above discussion, the null hypothesis is rejected and the alternative hypothesis must be accepted, which states "Accounting information system reduces other industrial expenses".

Finally, the results revealed that all of the variables together of the current study were statistically significant at the level of (0.01). Since the value of Correlation (**R**) is (0.366), and **$R^2$** value is (0.118), then, this indicates that the AIS explain 12% of the variance in the all indirect industrial costs among the industrial Jordanian firms. In addition, since the **Bi** value is (0.366), it indicates that if the AIS increase by one unit, the indirect industrial costs will decrease by 0.366 too. Based on the above results, the general null hypothesis is rejected and the alternative

hypothesis is accepted, which states "Accounting information system is significantly reduces indirect industrial costs".

## CONCLUSION

Cost reduction and cost control is imperative for efficient management and this study was aimed to understand the role of accounting information system in reducing indirect industrial costs. We primarily applied regression analysis and found that AIS positively and significantly affects indirect material, indirect wages and other indirect costs. The highest explanation of the effect of AIS was observed for indirect materials (R-squared=12%). Also, AIS was found to be positively correlated with all the other costs. All the four-null hypothesis (*H01, H01a, H01b, H01c*) were rejected. It can be broadly concluded that the AIS of firms can be used to control indirect costs. The accounting system is also found to be positively correlated with the cost variables indicating that there is a positive association amongst cost and the information system. Analysis of the responses indicated that the managers believe that reducing the industrial cost, such as petrol and maintenance can be done by controlling the movement of paid invoices. Monitoring other industrial expenses is essential in industrial companies due to their diversity and their multiple uses. Addressing threats related with manipulation of the cost credits and their method of payments are considered essential for reducing these costs.These findings were confirmed by the responses from the sample. The findings from the study will surely enable the managers to better understand the linkage between AIS and cost control and make efficient decisions regarding the same.

**Limitation and future research:** The study is limited with a small sample size and restricted to one particular sector (chemicals) and one economy (Jordan). The study can be extended to other sectors such as extraction companies and consumer goods companies. Adding other independent variables, such as internal control system or electronic administration will result in a comprehensive study.

## REFERENCES

Al-Dalabeeh, A., & Al-Zeaud, H. (2012). Accounting information systems and their role in the measurement and cost thrifting in public shareholding industrial companies in Jordan. *International Journal of Business and Management*, *7*(12), 97-106

Azemi, F., Šimunović, G., Lujić, R., Tokody, D., & Rajnai, Z. (2019). The use of advanced manufacturing technology to reduce product cost. *Acta Polytechnica Hungarica*, *16*(7), 115-131

Bataineh, A. (2018). The effect of using computerized accounting information systems on reducing production costs in jordanian pharmaceutical companies. *International Journal of Business and Management Invention (IJBMI)*, *7*(7), 1-10.

Boockholdt, J. (1999). Accounting information systems transaction processing and control. The Mac-Graw-Hill companies, *5*, 433-444.

Bshayreh, M.M., Tawaha, M.S., & Al-Khasawneh, R.O.H. (2019). The effect of electronic management in improving the quality of internal audit through developing the performance of internal auditor: An empirical study in the jordanian insurance companies. *Academy of Accounting and Financial Studies Journal*, *23*(5), 1-10

Castells, M. (1996). *The Information Age: Economy, Society and Culture.* Volume I, The Rise of the Network Society. Oxford: Blackwell.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297–334.

Emeka-Nwokeji, N. A. (2012). Repositioning accounting information system through effective data quality management: A framework for reducing costs and improving performance. *International Journal of Scientific & Technology Research*, *1*(10), 86-94.

Flynn D. (1992). *Information systems Requirements: Determination and Analysis.* MCGRAW – HILL Book Company.

Hair, J.F., Hult, J.G.T.M., Ringle, C.M., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).* Sage, Thousand Oaks, CA.

Hollander, A., Denna, E., & Cherrington, J. (1996). *Accounting, Information Technology, and Business Solutions.* Chicago, IL: Richard D. Irwin.

Ismail, N.A. (2009). Factors influencing AIS effectiveness among manufacturing SMEs: Evidence from Malaysia. *The Electronic Journal of Information Systems in Developing Countries*, *38*(1): 1-19.

Ittner, L.B., & Abernethy. (2000). Quality strategy, strategic control systems, and organizational performance. *Accounting, Organizations and Society, 22*(3/4), 293-314.

Langfield-Smith, K. (1997). Management control systems and strategy: A critical review. *Accounting, Organizations and Society, 22*(2), 207-232.

Meredith, J.R. (1987). The strategic advantages of the factory of the future. *California Management Review*, Spring: 27-41.

Moqbel, M.A., Al-Rjoub, A.M., & AL-Shwiyat, Z.M.M. (2015). 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. *International Management Review*, *11*(2), 5-20.

Moscove, S., Simkin, M., & Bagranoff, N. (1999). *Core Concepts of Accounting Information Systems,* New York, NY: John Wiley & Sons, Inc.

Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. MIS Quarterly, *31*(4), 623-656.

Rajabi, M. (2012). *Cost Accounting Principles.* Dar Wael for Publishing, Amman, Jordan.

Romney, M.B., & Steinbart, P.J. (2012). *Accounting Information Systems. Global Edition. 14th Edition.* England: Pearson Education Limited.

Strobel, M., & Redmann, C. (2002). Flow cost accounting, an accounting approach based on the actual flows of materials. In *Environmental Management Accounting: Informational and Institutional Developments* (pp. 67-82). Springer, Dordrecht.

Susanto, A. (2017). How accounting information systems quality influenced by internal control. *Journal of Engineering and Applied Sciences*, *12*(12), 3147-31.