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The Impact of The Effectiveness of Accounting Information Systems on Operational Performance in Public Listed Industrial Companies in Jordan

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Abstract:

The study examined the effectiveness of Accounting Information Systems (AIS) and its impact on the operational performance of the industrial public-listed companies in Jordan. The sample of the study consisted of 42 Jordanian companies from different sectors listed in Amman Stock Exchange (ASE) at the end of 2012. The findings indicated that AISs employed in industrial companies were effective, particularly, in meeting planning requirements. The results also revealed that most of companies' decisions were taken based on executives' personal opinions supported by the board of directors who affected by those opinions. Holding the last rank, AISs were deemed incapable basis for decision taking. Finally, the results confirmed that the effectiveness of AISs was significantly and positively related to the operational performance of Jordanian industrial companies, which in turn signifies AISs capability in generating relevance information related to operational processes. On the basis of aforementioned results, Jordanian industrial companies were exhorted to seize the opportunity of updated AISs to increase systems adaptability to changes in the external environment related to decision-making processes. Additionally, industrial companies are required to analyze information generated by AISs to improve the operational performance.

Keywords:

AISs, effectiveness, operational performance.

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Introduction

On the basis of numerous factors such as advancements in information technology and communications, extensive competition, and market liberalization, companies are required to diagnose and manage risks as well as seize future opportunities by developing and utilizing their resources. As a result of technological and economic advancements along with globalization, information systems (ISs) have evolved at a rapid pace with numerous applications that could be used in all administrative levels even for technical and strategic aspects. In fact, ISs were deemed as essential foundation of decisions rationalization that contribute to performance improvement and competitive advantage achievement, which in turn positively reflected in the market value of the organization and the maximization of shareholders' wealth.

The accounting information systems (AISs) were regarded as one of the supporting information systems used in carrying out managerial functions such as planning, organizing, controlling and decision-making, for the better exploitation of the available resources at the time when complexities of financial and accounting operations are increasing due to the vast amount of financial operations as a result of large size of companies and diversity of its operations and scope, where operations are no longer limited to the production of a single product or a specific service. These conditions require accounting information systems that provide the management with relevance, accurate and timeliness information that help in identifying strengths and weakness of systems and thus the access to decisions that serve the achievement of organizations' goals. Due to the increased need for AISs in public-listed industrial companies in Jordan as well as its relationship to the functions of management such as planning, organization, control and performance appraisal; the aim of this study is to investigate the impact of the effectiveness of AISs on operational performance of public-listed industrial companies in Jordan.

Statement of the problem

One of the most important requirements for companies to improve performance and maximize profit is the use of highly effective, stable and safe information systems. Hence, the problem of the current study is related to the determination of the effectiveness of AISs and their performance in public-listed industrial companies in Jordan. This can be illustrated by asking the following questions:

1. What is the effectiveness of AISs in public-listed industrial companies in Jordan?
2. What is the impact of the effectiveness of AISs on operational performance of public-listed industrial companies in Jordan?
- 3.

Significance of the study

The importance of the present study stems from its domain related to the effectiveness of AISs that enable companies to keep abreast of major developments in the administrative styles in the era of knowledge and the globalization of markets. As well as, the importance of the study stems from the examination of the relationship between the effectiveness of AISs and operational performance. The importance of the study can be summarized as follows:

1. Highlight the key requirements that should be met in ISs used to ensure the effectiveness of these systems in the public-listed industrial companies in Jordan.

2. Identify the most effective AISs that contribute to the improvement of performance and the optimal use of resources available to the company.
3. Study the impact of the effectiveness of AISs and operational performance of public-listed industrial companies in Jordan.
- 4.

Objectives of the study

This study seeks to achieve the following objectives:

A. Recognize the reality of AISs and their effectiveness through:

1. Assessing the role of AISs in increasing capacity and ease of access to financial and non-financial information.
2. Evaluating the role of AISs in activating the internal control systems.
3. Assessing the role of AISs in supporting planning requirements.
4. Investigating the correlation between AISs and the organizational structure of the company, and the extent of integration between them to harmonize the activities of the company.
5. Identifying the role of AISs in facilitating the performance evaluation process.
6. Assessing the consistency of financial data processing with accounting standards, laws and regulations followed by the companies.
7. Evaluating ways and means adopted by companies to ensure information security against theft and manipulation.

Assessing the impact of the effectiveness of AISs on operational performance.

Theoretical framework

The increased need of companies for AISs has called for building a special information systems in accordance with specified specifications and measures that enable controlling the flow of information and impose controls as to ensure a high degree of information relevance as well as reliability on which a company depend on for making appropriate decisions, which in turn increase its competitive advantage (Shane, 2005).

Kieso et al. (2013) defined AISs as systems responsible for the collecting and processing operations data and dissemination of financial information to the interested parties. Those systems are varied from one organization to another depending on the size of the organization and the nature of its activity and operations. Rommeny and Stenbart (2006) defined AISs as a specialized system of organization's financial information performs all the functions carried out by information systems such as collecting, categorizing, processing, analyzing and disseminating of information to those involved within or outside the organization to make appropriate decisions. For the purpose of the current study, the researcher defines AIS as one of information sub-systems in the economic unit that is responsible for the collection, storage, processing and dissemination of financial and non-financial information related to the unit's activities and include production processes, expenses, sales as well as personnel. These systems are designed to provide information to all parties related to the economic unit, helping the organization to achieve its goals.

The components of AISs

AISs consist of six components (Rommeny and Steinbart, 2006)

1. Individuals: people who control the functions of a system and undertake diverse functions.
2. Data: all data related to the operations of an organization.
3. Procedures: all methods that collect, operate, store data related to operations carried out by the organization whether manual or automatic.

4. Software: all applications used to run organizations' operations.

5. Information technology infrastructure: all means and devices that serve the AISs.

6. Internal control and the requirements of information security: all means necessary to save the information and procedures.

A review of the above-mentioned components revealed that it does not exceed the basic components of any information system, except the advantage embedded in processing the quantitative functions of accounting operations and reporting.

The objectives of accounting information systems

AISs seek to achieve many goals. First, collecting data related to the organization's activities, results of its operations and financial position within a specified period of time, and storing data for future use. Second, processing the accounting data and provide it to the management in order to take advantage of such information in the planning, monitoring and evaluation of performance and support the decision-making process. Third, provide the necessary controls to protect data and other related assets, follow up and monitor the activity of management and employees, and assess its efficiency in carrying out activities and achieve goals. Finally, preparing necessary reports and accounting statements (Vaassen, 2002, 8).

Sub-systems of AISs

AISs are divided into sub-systems based on historical and legal documents used in the preparation of financial reports: (O'Brien, 1995, 467)

1. Orders processing system:

This system is designed to record, process, follow up customers' orders, and produce necessary bills as well as requirements of sales analysis and inventory control. The reliance of such system on computers in the registration and selection of customer orders results in processing sales transactions in a fast and accurate manner, feed the system of control follow up with the required data.

2. Inventory Control System

This system is designed to process the bills of stored materials, identify materials that need to be re-supply, and generate reports showing the inventory situation. The reliance of this system on the computer help the organization in customer service, recording changes in the level of inventory, reducing costs, and preparing documents.

3. Customers' accounts system

This system is designed to determine amounts owed by customers in accordance with the information of payment and purchase processes. Additionally, the system is intended to produce a monthly customer accounts and credit reports. A computer-based customer accounts system provide the organization with accurate bills and monthly reports on credit provided to customers, which in turn enhances the processes of payment, collection and provision of liquidity.

4. Suppliers accounting system

The aim of this system is to provide daily information on procurement and payment to suppliers, preparing checks, pay bills and treasury reports. The reliance of this system on the computer results in establishing good working relationships and achieving a good

credit price and taking advantage of discounts through the payment to suppliers quickly and accurately, and financial control on the amounts paid by the organization.

5. Payroll system

This system is designed to display daily data on workers and attendance cards, generate payment checks and workers' payrolls, prepare special reports on work analysis. The reliance of the system on the computer help the organization in the preparation and submission of special reports related to tax, returns, deductions and analysis of labour productivity and labour costs.

6. Ledger system

This system is designed to collect data and information on AISs, customers, suppliers and wages, closure of accounting books, preparation of trial balance and a list of results and the budget of the organization and the reports of income and expenses and submit these statements to the owners and investors. The reliance of this system on the computer help the organization in cutting costs and using the fewest number of workers as well as in the completion of the accounting task in an accurate and orderly manner, and conducting financial control process

Effectiveness of AISs and related factors

The effectiveness of an AIS contribution is embedded in its ability to provide appropriate and timely information so that positively affect the decision-making process. According to Chang (2001), AISs play an important role in enhancing organizational effectiveness in the global competitive environment. Tong and Yap, (1996, 601) defined the effectiveness of an AIS as "the information system's ability to achieve the organization's goals". Using the same concept, the effectiveness of AISs can be defined as the degree of accounting system contribution to the provision of information, which is characterized by convenience and reliability, in order to support and assist decision makers from both inside and outside the organization in achieving its goals.

For an organization to achieve the effectiveness of AIS it is required to identify factors affecting the AIS and its outputs along with the decision related to adjusting the current system or using new one. Moreover, the organization is required to assess the system by studying its operations as well as data flows in order to identify strengths and weaknesses in the flow of data and internal audit system. This assessment can be used to identify the extent to which AIS is relevance in its ability to apply technical characteristics (Sambasivam & Assefa, 2013).

Factors affecting the effectiveness of AISs can be summarized as follows:

1. Physical and human competencies possessed by the organization, programs and data, as well as procedures used to provide information at the right time.
2. Resources and information required for the operational activities related to market, competition and technological advancements along with systems' ability to provide information in order to evaluate the performance in line with objectives.
3. Organization's surrounding environment and its elements such as social and cultural habits and consequent information needed for planning processes.
4. Legal systems, legislations and technical rules specify the nature of financial information and financial disclosure requirements that the organization must be adhered to.
5. The nature of managerial relationships and information flow according to the authorizations in the organizational structure.

6. Quality of activities carried out by the organization to achieve specific goals, design of control system and how information are maintained.

Consequently, the effectiveness of AIS stems from its design suitability with the method adopted by the organization for managing and implementing its business operations, and its ability to provide reliable timeliness accounting information for decision-making process. According to Sambasivam & Assefa (2013), there is a relationship between good design and implementation of AIS and the effectiveness of internal control system. Therefore, the effectiveness of AIS depends on the availability of physical and human resources, the ability of an organization to interact with the surrounding environment and approval of legislations and the nature of the organizational structure.

The role of accounting information systems

AISs play an important role in the implementation of the managerial functions of the organization such as planning and control. In the planning function, AISs provide data relating to study and analyze the goals set for the organization, and the relationship between cost, volume and profit required to determine the amount of interdependence and interaction between them, preparing lists of future needs and financial flows and planning of budgets for the development of quantitative criteria and converted them into financial standards reflect the different aspects an organization's activities and presentation of the detailed plans and policies of the work and coordination across different departments (Frezatti et al., 2011). On the other hand, in the control function, it requires a clear and specific plan that shows the desired objectives and defines the foundations on which results are evaluated and analyzed in order to correct distractions. This function is regarded as a practical test of decision making and implementation, follow up the actual implementation in accordance with the plans, policies and standards established, the discovery of deviations and correct them, provide reasons to protect the property of the shareholders and the preservation of their interests, resource development and follow up the activity of the organization, and to achieve the desired goals (Garrison et al., 2006), thus ensuring the effectiveness of the organization (Onaolapo & Odetayo, 2012).

Operational performance

Performance has been defined as the final outcome of all the functions and activities carried out by the organization efficiently and effectively (Molina & Callahan, 2010). Daft (2008) defined performance as scale determines the organization's ability to take advantage of its resources to serve its interests and achieve its goals efficiently and effectively. The operational performance defined as the extent to which set targets used for the purpose of manufacturing (Leong & Snyder, 1990). Krajewski & Ritzman (1999) defined operational organization as dimensions that must be owned by the productive system to enable the organization to meet market demands and compete on the basis of these demands. Hence, operational performance can be considered as outcomes of operational processes and financing operations carried out by the organization to meet the needs of customers and achieve their desires and to ensure its competitiveness through the use of its resources efficiently and effectively.

Evaluation of operational performance

For an organization to achieve its goals, it is required to compare planned and achieved objectives in order to identify its strengths and weaknesses and to adopt solutions. Performance appraisal process can be used to investigate the organization's ability to perform its tasks and activities and achieve the desired results (Lebas & Euske, 2004).

Various measurements of operational performance were proposed. According to Dikolli and Sedatole (2007), those measures are related to the general objectives of the organization and can be applied on all organizational units. Examples of operational measurements include customer satisfaction, and new product development and quality (Collins et al., 2004), productivity and the percentage of the damaged (Wright et al., 2004).

Customer satisfaction: Meeting customers' needs and demands is one of the most important requirements for organization's survival, growth and sustainability. Collins et al. (2004) demanded customer satisfaction as a measurement of operational performance by which an organization can explore its ability to satisfy its current customers and attract new ones.

Inventory: The invested capital in the organization employed to achieve the organizational objectives, which consists of full and under production inventory, the costs of machinery, buildings and research and development (Hornegren et al., 2000).

Quality: an organization seeks to provide products that characterized by a good quality in order to meet its customers' satisfaction (Collins et al., 2004).

Numerous studies have highlighted the significant role of AISs in operational performance. Grande et al. (2011) indicated that AISs positively related to operational performance. Soudani (2012) confirmed the positive influence of the effectiveness of AISs on organizational performance, particularly productivity.

Research Methodology

Population and sample

The population of the study consists of all Jordanian Industrial companies listed in the Amman Stock Exchange before until 2012. There were 70 companies at the end of 2012. Out of the population, a stratified representative sample consists of 42 (60%) companies was randomly selected (Sekaran, 2000). Managers of financial, control, internal audit, production, human resources, and information technology units comprised the unit of analysis. Hence, the sample included 490 managers (60%). A total of 294 questionnaires were distributed in order to collect data from managers (7 questionnaires for each company). Out of them, 280 questionnaires were returned. The final number of the questionnaires used for statistical analysis purpose was 266 questionnaires (i.e., 90.5% of the distributed questionnaires). The internal consistency coefficient (Cronbach's alpha) was calculated to assess the scale reliability. The results can be seen in Table 1.

Table 1. The results of internal consistency coefficient

No.	Dimension	Cronbach's alpha
1.	Speed and ease of access to information	0.826
2.	Meeting planning requirements	0.751
3.	Meeting internal control requirements	0.885
4.	Meeting performance evaluation requirements	0.874
5.	Compatibility with the organizational structure	0.928
6.	Commitment to accounting standards and regulations	0.923
7.	Meeting information security requirements	0.774
8.	Meeting the requirements of the decision-making	0.868
9.	Operational performance	0.882
10.	Total	0.920

Table 1 shows that the values of Cronbach's alpha were ranged from ranged (0.751 - 0.928). All of the values were greater than (0.60). it was concluded that the scale used for the present study was reliable.

Research model

Figure 1 portrays the conceptual model of the study. It illustrates the hypothesized relationship between the effectiveness of AISs (predictor variable) and operational performance (response variable).

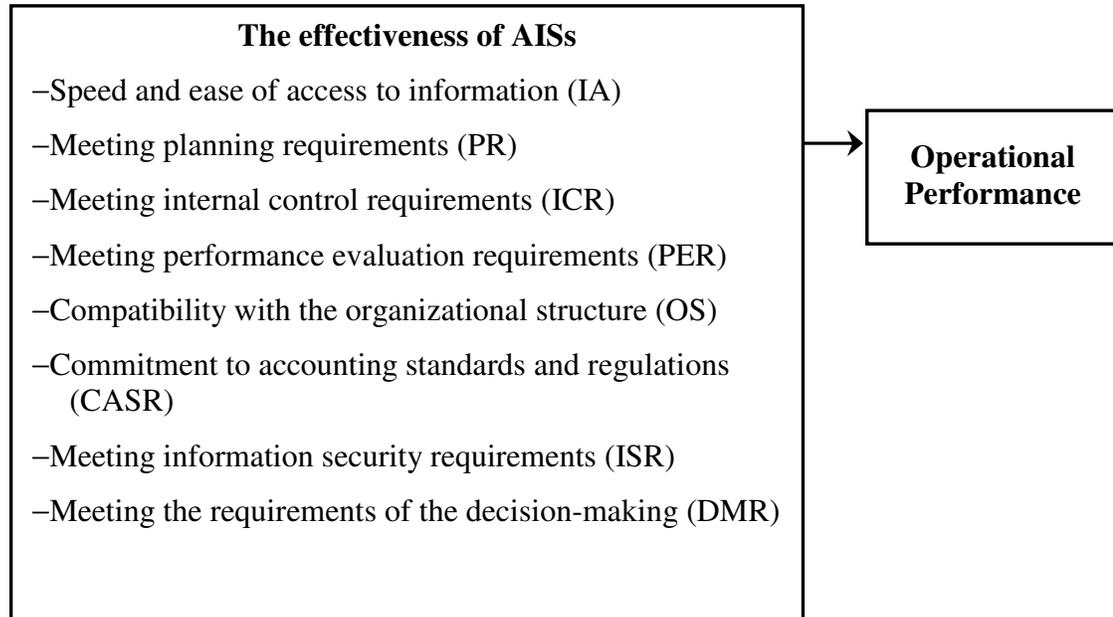


Figure 1. Research Conceptual Model

Research hypotheses

On the basis of research questions and objectives, the current research is drawn by the following hypotheses:

H01: there is no statistically significant impact of AISs effectiveness on operational performance of Industrial public shareholding companies in Jordan.

H01.1: there is no statistically significant impact at $\alpha \leq 0.05$ of Speed and ease of access to information on operational performance of Industrial public shareholding companies in Jordan.

H01.2: there is no statistically significant impact at $\alpha \leq 0.05$ of meeting planning requirements on operational performance of Industrial public shareholding companies in Jordan.

H01.3: there is no statistically significant impact at $\alpha \leq 0.05$ of meeting internal control requirements on operational performance of Industrial public shareholding companies in Jordan.

H01.4: there is no statistically significant impact at $\alpha \leq 0.05$ of meeting performance evaluation requirements on operational performance of Industrial public shareholding companies in Jordan.

H01.5: there is no statistically significant impact at $\alpha \leq 0.05$ of compatibility with the organizational structure on operational performance of Industrial public shareholding companies in Jordan.

H01.6: there is no statistically significant impact at $\alpha \leq 0.05$ of commitment to accounting standards and regulations on operational performance of Industrial public shareholding companies in Jordan.

H01.7: there is no statistically significant impact at $\alpha \leq 0.05$ of meeting information security requirements on operational performance of Industrial public shareholding companies in Jordan.

H01.8: there is no statistically significant impact at $\alpha \leq 0.05$ of meeting the requirements of the decision-making of Industrial public shareholding companies in Jordan.

Data analysis

Respondents profile

Frequencies and percentages were used to describe sample characteristics, the results can be seen in Table 2.

Table 2. Respondents' distribution based on demographic characteristics

Category	Sex	Age	Experience	Edu. level	Job
Male	217(81.6%)				
Female	49(18.4%)				
Less than 30 Yrs		19(7%)			
30-less than 40 Yrs		86(32.3%)			
40-less than 50 Yrs		126(47.5%)			
50 Yrs or more		35(13.3%)			
1-less than 5 Yrs			15(5.7%)		
5-less than 10 Yrs			69(25.9%)		
10-less than 15 Yrs			72(27.2%)		
15 Yrs of more			109(3.2%)		
High school or less				9(3.2%)	
Diploma or less				42(15.8%)	
Bachelors				187(70.3%)	
Postgraduate				29(10.8%)	
General manager					22(8.40%)
Division manager					66(24.7%)
Dept. Manager					88(32.9%)
Other					91(34.2%)
Total					266(100%)

Table 2 indicates that 81.6% of the research sample was male and 18.4% were female. This result may be due to the reluctance of women to work in the private sector and industrial sector and the difficulty of the work and the length of daily working periods. In terms of age, 7% of the respondents were less than 30 years. In accordance with the fact

that career progression requires a period of time, the age of 47.5% of the respondents were in 40 to less than 50 years category. The results revealed that the respondents have a relatively high experience. The lowest category (less than 5 years) comprised 5.7% of the sample, the largest percent (41.1%) of the respondents have 15 years or more of experience. In relation to educational level, 70.3% of the sample holds a bachelor degree. The lowest percent (3.2%) was for those who have a high school degree or less. Finally, the percent of the general managers was 8.4%, and the percent of the division managers was 24.7%. the findings indicated that the higher the managerial level, the less the number of employees.

Multicollinearity test

Pearson correlation coefficients were used to examine multicollinearity between the predictors. The results can be seen in Table 3.

Table 3. Correlation Matrix

Variable	1	2	3	4	5	6	7	8
1	1							
2	0.726**	1						
3	0.724**	0.739**	1					
4	0.710**	0.667**	0.747**	1				
5	0.472**	0.464**	0.580**	0.642**	1			
6	0.631**	0.606**	0.713**	0.733**	0.699**	1		
7	0.725**	0.711**	0.780**	0.701**	0.786**	0.783**	1	
8	0.613**	0.661**	0.769**	0.787**	0.668**	0.510**	0.654**	1

1: IA, 2: PR, 3: ICR, 4: PER, 5: OS, 6: CASR, 7: ISR, 8: DMR.

Based on the findings shown in Table 3, the highest correlation coefficient ($r = 0.787$) was between meeting performance evaluation requirements and meeting the requirements of decision-making. The remainder coefficients were less than 0.787. according to Gujarati (2004), a correlation coefficient greater than 0.80 means that one or more of the predictors are a function of other predictors. Therefore, the research sample is free of multicollinearity problem.

Descriptive statistics

A comparison of means of the effectiveness of AISs was carried out in order to identify whether the respondents attitudes reflect the required effectiveness of AISs. One-sample t-test was used to determine whether the obtained means were statistically different from a neutral value (3). Table 4 shows the effectiveness of AISs.

Table 4. Effectiveness of AISs

No	Dimension	Mean difference	Mean	SD	t	Sig.
1.	IA	0.5956	3.5956	1.2201	12.602	0.000
2.	PR	0.8966	3.8966	0.9424	20.094	0.000
3.	ICR	0.6819	3.6819	1.2788	10.894	0.000

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4.	0.6149	3.6149	1.3257	10.855	0.000	0.6149
5.	0.7448	3.7448	1.1211	13.313	0.000	0.7448
6.	0.6413	3.6413	1.0805	11.453	0.000	0.6413
7.	0.6015	3.6015	1.1547	10.104	0.000	0.6015
8.	0.6015	3.6015	1.1547	10.104	0.000	0.6015
Effectiveness of AISs			0.6605	3.6605	1.1558	13.638

Based on the findings in Table 4, the overall mean of the effectiveness of AISs used in the industrial public shareholding companies has reached to (3.661). hence, the AISs used in the industrial companies are characterized by the required effectiveness. The means of the dimensions of the effectiveness of AISs ranged for (3.548) to (3.897) and this is an indication of industrial companies interest in AISs as well as awareness of the organizational units of the importance of these systems to meet the job requirements and make decisions easily, quickly and safely. The dimension meeting planning requirements" was ranked first with a mean of (3.897) with a high relative importance, followed by the dimension "meeting the requirements of the decision-making" ranked last with mean value of (3.548).

Hypotheses testing

The first main hypothesis postulated that there is no statistically significant impact of the effectiveness of AISs on operational performance in of Industrial public shareholding companies in Jordan. Multiple regression analysis and stepwise regression tests were used to test the first main hypothesis. The results are shown in Table 4.

Table 8. Results of second hypothesis testing

DV	R	R ²	F	Sig.	Regression Coefficients				
					β	SE	t	Sig.	
OP	0.755	0.570	42.604	0.000	IA	.100	.050	1.976	.048*
					PR	.221	.057	3.867	.000*
					ICR	.229	.051	4.524	.000*
					PER	.038	.048	.801	.424
					OS	.055	.069	.798	.425
					CASR	.071	.076	.935	.351
					ISR	.075	.084	.886	.376
					DMR	.031	.081	.385	.701

The results in table 8 indicates a significant impact of independent variables on operational performance (F = 42.604, Sig. = 0.000). the independent variables explained 57% of the variance in operational performance (R² = 0.570). The effect of three independent variables on operational performance was significant, which were speed and ease of access to information, meeting planning requirements, and meeting internal control requirements. Based on the results, the first main hypothesis as well as the first three sub-hypotheses was rejected. In order to investigate the independent variable that provided the most to the explanation of the impact on operational performance, a stepwise regression was conducted and the results shown in Table 6.

Table 9. Stepwise results of the impact of AIS effectiveness on operational performance

Model	MV	β	Sig.	R ²	F	Sig.
1	ICR	0.422	0.000	0.504	268.436	0.000
2	ICR PR	0.277 0.266	0.000 0.000	0.560	167.317	0.000

The results in table 6 displayed that ICR explained 50.4% of the total variance in the operational performance. The percentage was increased to 56% when PR was entered to the regression model. Based on β -values, the impact of the two variables was positive.

Discussion and conclusions

The aim of the study was to investigate the impact of the effectiveness of accounting information systems on operational performance of public listed industrial companies in Jordan. It was hypothesized that the effectiveness of AISs is significantly and positively related to the operational performance of public listed industrial companies in Jordan. The findings of the study revealed that speed and ease of access to information, meeting planning requirements, and meeting internal control requirements have a significant and positive impact on operational performance. Similar results were reached by related works. The study concluded that AISs used in Jordanian industrial companies are effective. Particularly, AISs were effective in meeting the requirements of planning process. Secondly, decision-taking process in many industrial companies depends on the personal view of points of executives supported by the board of directors and this is why the effectiveness of AISs in meeting the requirements of decision-making process ranked last indicating moderate importance. Finally, it was concluded that the effectiveness of AISs have a significant impact on the operational performance of the industrial companies.

On the strength of the above-mentioned conclusions, it was recommended that industrial companies need to focus on speed and ease factor in access to information by improving the effectiveness of the automated processing system to increase its capacity to retrieve information and data when needed, and to organize accounting transactions stored in files with specified date and time. Additionally, industrial companies are called upon to increase the effectiveness of AISs in order to be able to meet the requirements of planning process using quantitative and qualitative information, which provided by the system and used for planning of activities and profits. Industrial companies are required also to focus on the effective contribution of accounting information provided by AISs in the achievement of objectives and development of policies, procedures and planning budgets, along with the activation of AISs' role in performance evaluation, dissemination of knowledge culture for the exchange of information between all levels of management to make AISs able in determining the procedures and accounting policies used in the company, and to ensure compatibility of accounting recording with the international accounting standards and generally accepted principles. Finally, further studies are required to tackle more independent variables and its influence on both financial and operational performance of industrial companies.

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