

Impact of Information Technology on Competitive Advantage in Jordanian Commercial Banks. Accounting Information System Effectiveness as a Mediating Variable

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Abstract This study aimed to identify the Impact of Information Technology on Competitive Advantage, and the impact of Accounting Information System Effectiveness on Competitive Advantage in Jordanian commercial banks. The study population consisted the CFOs and their deputies, internal audit managers, information systems managers and heads of departments of all Jordanian banks (n=13) listed on Amman Stock Exchange (www.ase.com.jo). The authors distributed five questionnaires to each bank. For the purposes of this study, the researchers constructed a questionnaire and ensured its validity and reliability. To achieve the objective of the study a questionnaire was developed and distributed to all individuals of the study population (n= 65). Fifty-nine questionnaires were retrieved, of which 3 were disqualified from analysis due to their bad condition. Therefore, the number of questionnaires used in statistical analysis was 56, or about 86% of the total. Data were analyzed using the software SPSS, as statistical inference was used through simple regression analysis to test the first, second, and third hypotheses. The fourth hypothesis was tested through path analysis. The researchers found that there is an Impact of Information Technology on Competitive Advantage, and the impact of Accounting Information System Effectiveness on Competitive Advantage in Jordanian commercial banks. Based on the study results, the researchers recommend the implementation of the study in another context (Arab or foreign) to be compared with the results of the current study. Also, other studies can be conducted to explore other mediator variables such as knowledge management instead of accounting information systems, or the same study could be conducted on another sector such as public shareholding industrial companies.

Key words Accounting Information System effectiveness, competitive advantage, Jordanian commercial banks, information technology

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1. Introduction

An Accounting Information System plays an important and effective role in providing decision makers with suitable information that helps them take informed administrative decisions (Shehadeh, 2014). It is one of the major systems for accounting information production which help in rationalizing and supporting economic decisions which impact the resources and wealth of communities, thus impacting the welfare of individuals (Kahaleh and Hanan, 1997). On the other hand, the accounting system is closely related to various administrative processes, as it is one of the most efficient systems in satisfying the requirements of the organization's management, improving performance levels to achieve targets, helping in solving any issues, and providing useful information for relevant decision makers which contribute to supporting the performance and continuity of such organizations (Al-Dahrawi *et al.*, 2009). In addition, the accounting information system plays a major role in providing an integrated view of the organization to align capabilities with resources and functionalities in order to realize the full potential of such resources (Romney, 2011).

Samlali (2001) notes that obtaining and developing a competitive advantage is the strategic goal which banks aim to attain in light of the current competitive challenges. The continuous technological

innovation and the fierce competition between the components of the banking sector have contributed to the emergence of accelerated development in the banking industry. Accordingly, new forms of banking products and services emerged in the banking field such as e-banking, credit cards, ATMs and online banking (Abdullah and Qatanani, 2007), which required an organized relationship between the accounting system applied on the provision of banking services and the strategies in place to ensure the success of the banking services of commercial banks in general. Not only does the accounting system focus on accounting aspects, but also the provision of material and financial data required by decision makers (Al-Dhufairi, 2008).

The rapid technological developments, the emergence of large organizations and working in dynamic environments have led to the need for instruments to help businesses undertake their operations within their environments through the utilization of information technology (Sultan, 2000). In this context, Shahin (2012) notes that the effectiveness of the accounting information system at any organization is mainly based on technical and technological means which represent the supporting technical environment at the organization, which are needed to monitor its material and programming components and information outcomes, as well as the contribution of such means in achieving interconnection, coordination and integration among the department which support activities and provide an efficient information system, and also the contribution of technical instruments in developing management functions such as planning, monitoring and decision making.

Many prior studies have addressed the impact of IT on achieving a competitive advantage such as Al-Sabbagh (2001), Al-Shishani (2004), Chen and Tsou, (2007), Ismail (2008), Sulaimani (2012), and Al-Houri and Abdulsattar (2013), including an examination of the relation between IT and the effectiveness of the accounting information system such as Shahin (2012), Al-Ali (2013), Al-Matarneh and Al-Sharayri (2010), Fadel (2004), Abdullah and Qatanani (2007), Al-Qatawneh (2005) and Midah (2009). Other research explored the relation between the effectiveness of the accounting information system and competitive advantage such as Al-Shbiel (2011), Al-Shehadeh and Al-Assi (2008) and Al-Shbiel and Al-Dalabeeh (2012). However, none of the researchers studied the effectiveness of accounting information systems in Jordanian commercial banks and their impact on the relation between IT and competitive advantage. It is probable that there is a bigger positive impact between IT and the competitive advantage sought by banks, so the effectiveness of the accounting information system was utilized as a mediator variable between those two variable because it is impacts by IT and impacts the competitive advantage. Some prior studies, such as Al-Sa'ed and Harim (2004), showed that there is a medium positive impact between IT and competitive advantage. In addition, some studies affirmed that the relationship between IT and competitive advantage is weak such as Al-Jbouri (2015.). Therefore, the aim of this study is to identify the impact of the effectiveness of the accounting information system as a mediator variable between IT and competitive advantage of Jordanian commercial banks.

2. Literature review

IT and competitive advantage

The constant changes in business environments, the IT revolution and the scientific and technological advancements are the main reasons which led business organizations to pay attention to the competitive advantage and reconsider their competitive status. IT has become an important method to achieve and reinforce competitive advantage for many organizations (Al-Houri and Abdulsattar, 2013). Accordingly, organization managements need to enhance their understanding of the importance of IT, alongside other means, as an essential tool for achieving and supporting competitive advantage through cutting costs, improving quality and boosting productivity (Sulaimani, 2012).

Several studies noted that the competitive advantage for many organizations is impacted by the IT environment and the supporting technical instruments adopted by such organizations. For example: The study by Ismail (2008) was applied on pharmaceutical industry companies in Jordan which produce human medicine. The study found that there was an impact for the use of IT on achieving competitive advantage strategies. Research results showed that the use of networks is the best pillar of IT used in achieving competitive advantage strategies in such companies, followed by the use of databases, the use of devices and the use of software. Also, Al-Shishani (2004) conducted a field study on Jordan Telecom Group

(Orange) and found that there is a positive relationship between the use of IT and obtaining competitive advantage for Orange. Al-Helo (2002) conducted a study on the Jordanian banking sector and found that banks could not continue to operate and provide services to their clients without information and communications technology (ICT), as investment in ICT reduces costs, increases profits, attracts more depositors and upgrades the level of service provided to clients. Al-Sabbagh (2001) conducted a study on the same sector and found that the IT aspect has a positive impact on achieving competitive advantage. Further, Al-Saed and Harim (2004) found that there was an intermediate relationship between IT and competitive advantage in a study conducted on the pharmaceuticals sector in Jordan. In a study conducted in the Algerian context, Sulaimani (2012) found that IT is a strategic resource and important methodology used to achieve and develop competitive advantage for the country's state-owned gas giant Sonatrach. In addition, a study conducted by Al-Houri and Abdulsattar (2013) found that IT had a positive impact on competitive advantage in the Jordanian Banking sector.

Chen and Tsou (2007) conducted a study on financial companies in Taiwan and found that the adoption of IT had positive impacts on the quality of services provided by such companies, thus increasing their competitive advantage. Also, Sulaimani (2012) found in her study of Air Algeria that the use of IT had a significant impact on improving the airline's performance and achieving competitive advantage.

Information technology and the effectiveness of Accounting Information Systems

In light of the rapid developments across the Globe, IT has become an important strategic resource used by organizations to face competition through aiming to save and utilize a huge amount of information in their functions and activities, which leads to achieving various objectives such as reducing costs, improving the levels of service provided to customers and taking the right decisions which help the organizations survive and flourish (Sulaimani, 2012). In spite of the enormous and rapid developments in the use of IT, the functional usage remains the most important thereof due to the huge volume of software used and the massive impact of functions on the success of the organization. An essential system used in this context is the Accounting Information System which provides information on cash flows from and to the organizations, and helps management in increasing investments and provides necessary liquidity for channeling the organization's resources (Reix, 2001).

Several studies have highlighted the impact of information technology on the effectiveness of the Accounting Information System, such as: Shahin (2012) aimed to analyze and discuss the factors affecting the efficiency and effectiveness of computerized accounting information systems in Palestinian commercial banks. The study found that there significant impacts for technology-related factors on the efficiency and effectiveness of the accounting information systems. The study conducted by Fadel (2004) in Yemen found that there was a positive impact for technology-related factors in the effectiveness of accounting information systems. In the Jordanian context, several studies were undertaken in various sectors to explore the factors which impact the effectiveness of accounting information systems such as Al-Ali (2013) which found that the effectiveness of accounting information systems in public universities in Jordan were positively impacted by technological factors. Abdullah and Qatanani (2007) conducted a study on the commercial banks sector and found that there was a very high level of impact for technological factor on the efficiency and effectiveness of accounting information systems. Al-Qatawneh (2005) found that the use of IT had an impact on the effectiveness of the accounting information system. Midah (2009) found that there was an impact for technological factors on accounting information systems in industrial firms. In the Algerian context, Sulaimani (2012) found that IT had a significant impact on increasing the efficiency and effectiveness of the information system used by Sonatrach. Al-Matarneh and Al-Shairi (2010) conducted a study on Jordanian pharmaceutical companies and found that there was an impact for the use of IT on the effectiveness of accounting information systems.

Effectiveness of accounting information systems and competitive advantage

Several researchers affirmed that the effectiveness of accounting information systems on achieving competitive advantage, such as: Al-Shbiel (2011) conducted a study on the banking sector in Jordan and found an impact for accounting information systems on cutting costs and improving the quality of services provided by banks to customers. The study also found an impact for accounting information systems on

increasing market share, accelerating the provision of services and products, thus improving the competitive advantage of banks. Similarly, Al-Dhufairi (2008) conducted a study on commercial banks in Kuwait where he found that accounting information systems play an essential role in the success of pricing strategies of banking services. As for the cost-cutting aspect, which is a main pillar of the competitive advantage sought by organizations, Al-Quraan (2007) conducted a study on Jordan Electric Power Company (JEPCO) and found that there was a positive impact for accounting information systems on cutting costs. In the Jordanian health sector, Al-Shbiel and Al-Dalabeeh (2012) found that computerized accounting information systems played a major role in cutting medical costs. In a recent study conducted on public universities in Jordan, Al-Ali (2013) found that the effectiveness of accounting information systems has positive impacts on cutting costs. In the Iraqi context, Jill (2010) found that accounting information systems in Iraqi private commercial banks are effective and play a major role in helping management in the processes of planning, monitoring and decision making. Al-Shehadeh and Al-Assi (2008) conducted a study on banking institutions in Syria and found that accounting information systems play an important role in achieving competitive advantage by Syrian banks.

Accordingly, the following hypotheses can be assumed:

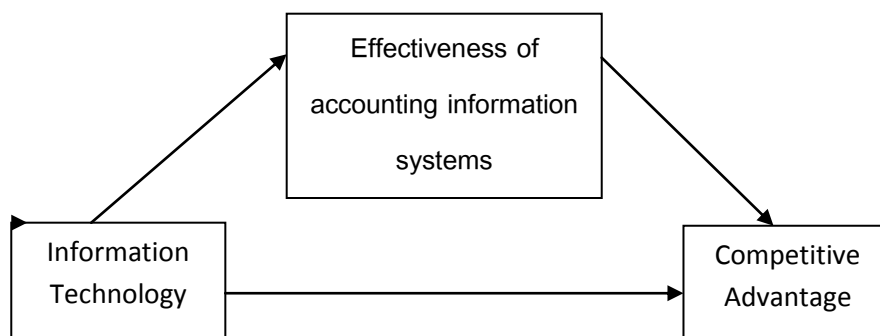
H1: There is no statistically significant impact for information technology on achieving competitive advantage for Jordanian commercial banks.

H2: There is no statistically significant impact for the effectiveness of accounting information systems on achieving competitive advantage for Jordanian commercial banks.

H3: There is no statistically significant impact for information technology on the effectiveness of accounting information systems at Jordanian commercial banks.

H4: There is no statistically significant impact for information technology on achieving competitive advantage when there are effective accounting information systems at Jordanian commercial banks.

3. Study Model:



Source: The Authors

4. Study Methodology of research

4.1. Study Population

The study population consisted all Jordanian banks (n= 13) listed on Amman Stock Exchange (www.ase.com.jo). Due to the limited size of the study population, the authors applied the study on the entire population and distributed five questionnaires to each bank, including: CFOs and their deputies, internal audit managers, information systems managers and heads of departments at Jordanian commercial banks. For the purposes of this study, the researchers constructed a questionnaire and ensured its validity and reliability. The instrument was distributed to all individuals of the study population (n= 65). Fifty-nine questionnaires were retrieved, of which 3 were disqualified from analysis due to their bad condition. Therefore, the number of questionnaires used in statistical analysis was 56, or about 86% of the total.

4.2. Study Instrument

The questionnaire consisted of three aspects for measuring the study variables as follows:

– *First aspect*: Six paragraphs to measure the independent variable (information technology) based on Al-Ali (2013), Shahin (2012) and Abdullah and Qatanani (2007) set out below: The bank's management seeks to use the latest technologies (networks) to ensure the speed and ease of obtaining information accurately. Technologies used by the bank (hardware and software) impact the nature and quality of services rendered. The bank seeks to facilitate the acceleration of accounting data and information exchange through the Internet between its departments. Control links, embedded in the technology used, contribute to providing adequate protection of material and software components in applied systems at high levels of confidence. Controls included in the technologies used by the bank contribute to the accuracy and safety of electronic operation of data.

– *Second aspect*: Eight paragraphs to measure the mediator variable (effectiveness of accounting information systems) based on Jill (2010) as set out below:

The bank's accounting information system helps maintain alignment between decisions made by the management and changes in the bank's environment. The accounting information system provides financial reports to accounting data users on a periodic and regular basis. Managers make decisions mainly based on information made available by the accounting information system, away from personal preferences. The bank's accounting information systems generate economic information used by management to forecast variables in decision-making models. The bank's accounting information system provides decision makers with information that correspond to the decisions nature in terms of quality, time and cost. The bank's accounting information system caters to the different decision making models in terms of the nature of information required by such models in decision making. The bank's accounting information system helps the upper management in taking decisions in a manner that considers the long-term impacts of such decision. The bank's accounting information system provides feedback to ensure reconsideration of decisions made and improve effectiveness.

– *Third aspect*: Five paragraphs to measure the dependent variable (competitive advantage) based on Al-Houri and Abdulsattar (2013), Sulaimani (2012), Al-Shbiel (2012), Anbar *et. al* (2011), Al-Dhufairi (2008) and Al-Saed and Harim (2004) set out as follows:

The bank's management seeks to achieve the objectives set out in the bank's plan for the targeted pricing of banking services. The bank's management is keen on providing high-quality services to its customers compared with other banks. The bank's management seeks to reduce the cost of banking services rendered to its clients. The bank's management is keen on providing speedy banking services to its clients. The bank's management seeks to boost its market share compared with other competitors.

Likert scale was used to answer the questionnaire's items based on the following values: Strongly agree (5 points); agree (4 points); mildly agree (3 points); disagree (2 points); strongly disagree (1 point).

4.3. Reliability of the Study Instrument

The reliability of the questionnaire's results was verified using Cronbach's Alpha test, which amounted to 88% as shown in Table (1).

Table 1. Cronbach's Alpha coefficients for the research areas

Variables	Cronbach's Alpha coefficient
Information technology	89%
Effectiveness of accounting information systems	90%
Competitive advantage	86%
All variables	88%

4.4. Data analysis and hypotheses testing

Data were analyzed using the software SPSS, as statistical inference was used through simple regression analysis to test the first, second, and third hypotheses. The fourth hypothesis was tested through path analysis as follows:

Test of first hypothesis:

H01: There is no statistically significant impact for information technology on achieving competitive advantage for Jordanian commercial banks.

Simple regression analysis was used to test this hypothesis in order to identify the possible impact of information technology on achieving competitive advantage for Jordanian commercial banks. Table 2 shows the results:

Table 2. Results of simple regression analysis for information technology's impact on achieving competitive advantage

Variables	R	R ²	β	F	Sig.	Decision
Information Technology and Competitive Advantage	.291	.336	.499	26.083	0.000	Reject

The impact is statistically significant at (0.05).

As set out in Table 2, results of the statistical analysis showed that there is a statistically significant impact for information technology on achieving competitive advantage for Jordanian commercial banks, whereas the correlation coefficient $R = 0.291$ between information technology and competitive advantage, and $R^2 = 0.336$ of change in achieving competitive advantage for Jordanian commercial banks as a result of change in information technology. The above table also shows that $B = 0.499$, which means that achieving competitive advantage for Jordanian commercial banks increases by 0.499 whenever there's an increase of one degree in information technology. Calculated $F = 26.083$, which is significant at (0.05), which affirms the rejection of the first null hypothesis and the acceptance of the alternative hypothesis which states that "There is a statistically significant impact for information technology on achieving competitive advantage for Jordanian commercial banks".

Test of second hypothesis:

H02: There is no statistically significant impact for information technology on the effectiveness of accounting information systems at Jordanian commercial banks.

Simple regression analysis was used to test this hypothesis in order to identify the possible impact of information technology on the effectiveness of accounting information systems at Jordanian commercial banks. Table 3 shows the results:

Table 3. Results of simple regression analysis of information technology's impact on the effectiveness of accounting information systems at Jordanian commercial banks

Variables	R	R ²	β	F	Sig.	Decision
Information Technology and Accounting Information System Effectiveness	.698	.424	.572	43.015	0.000	Reject

The impact is statistically significant at (0.05).

As set out in Table (3), results of the statistical analysis showed that there is a statistically significant impact for information technology on the effectiveness of accounting information systems at Jordanian commercial banks, whereas the correlation coefficient $R = 0.698$ between information technology and the effectiveness of accounting information systems, and $R^2 = 0.424$ of change in the effectiveness of accounting information systems at Jordanian commercial banks as a result of change in information technology. The above table also shows that $B = 0.572$, which means that achieving competitive advantage

for Jordanian commercial banks increases by 0.698 whenever there's an increase of one degree in information technology. Calculated $F = 43.015$, which is significant at (0.05), which affirms the rejection of the second null hypothesis and the acceptance of the alternative hypothesis which states that "There is a statistically significant impact for information technology on the effectiveness of accounting information systems at Jordanian commercial banks".

Test of third hypothesis:

H03: There is no statistically significant impact for the effectiveness of accounting information systems on achieving competitive advantage for Jordanian commercial banks.

Simple regression analysis was used to test this hypothesis in order to identify the possible impact of the effectiveness of accounting information systems on achieving competitive advantage for Jordanian commercial banks. Table 4 shows the results:

Table 4. Results of simple regression analysis for the effectiveness of accounting information systems' impact on achieving competitive advantage

Variables	R	R ²	β	F	Sig.	Decision
Accounting Information System Effectiveness and Competitive Advantage	.734	.582	.735	46.867	0.000	Reject

The impact is statistically significant at (0.05).

As set out in Table (4), results of the statistical analysis showed that there is a statistically significant impact for the effectiveness of accounting information systems on achieving competitive advantage for Jordanian commercial banks, whereas the correlation coefficient $R = 0.734$ between the effectiveness of accounting information systems and competitive advantage, and $R^2 = 0.582$ of change in achieving competitive advantage for Jordanian commercial banks as a result of change in the effectiveness of accounting information systems. The above table also shows that $B = 0.735$, which means that achieving competitive advantage for Jordanian commercial banks increases by 0.499 whenever there's an increase of one degree in the effectiveness of accounting information systems. Calculated $F = 46.867$, which is significant at (0.05), which affirms the rejection of the third null hypothesis and the acceptance of the alternative hypothesis which states that "There is a statistically significant impact for the effectiveness of accounting information systems on achieving competitive advantage for Jordanian commercial banks".

Test of fourth hypothesis:

H04: There is no statistically significant impact for the technological factor in achieving competitive advantage for Jordanian commercial banks alongside an effective accounting information system.

Path analysis was used to examine the possible impact of information technology in achieving the competitive advantage for Jordanian commercial banks alongside an effective accounting system as a mediator factor. Results are shown in Table 5 below.

Table 5 shows the results of the path analysis for the fourth hypothesis in order to examine the possible effect of information technology on the competitive advantage of Jordanian commercial banks alongside an effective accounting information system, whereas GFI, CFI and RMSEA values were 0.924, 0.903 and 0.087, respectively, which all approximate 1. The results also showed that there is a statistically significant impact for the effectiveness of the accounting information system as a mediator factor in the relationship between information technology and the competitive advantage of Jordanian commercial banks. The value of calculated Chi was 16.41, which is statistically significant at (0.05). The direct impact of information technology on the effectiveness of the accounting information system at commercial banks was 0.592. The direct impact of the effectiveness of accounting information systems on achieving competitive advantage for Jordanian commercial banks was 0.803, whereas the indirect impact of information technology on achieving competitive advantage was 0.476.

Table 5. Results of the path analysis undertaken to examine the possible impact of information technology on the competitive advantage of Jordanian commercial banks alongside an effective accounting system

	Chi	GFI	CFI	RMSEA	Sig*	Direct Effect	Indirect Effect	Path	Sig*	Decision
The Impact of Accounting Information System Effectiveness as a Mediator Variable between Information Technology and Competitive Advantage	16.41	.924	.903	.087	0.000	Information Technology on Accounting Information System Effectiveness	.476	IT→AISE	0.000	Reject
						Accounting Information System Effectiveness on Competitive Advantages		AISE→CA	0.000	

RMSEA: Root Mean Square Error

GFI: Goodness of Fit Index must Proximity to one

CFI: Comparative Fit Index must Proximity to one

5. Conclusions

The testing of the research hypotheses revealed that there is an impact for the effectiveness of accounting information systems between information technology and the competitive advantage of Jordanian commercial banks; i.e. the study results affirmed that there is a positive impact for information technology on competitive advantage. Alongside accounting information systems at the bank, this has further reinforced the achievement of competitive advantage sought by Jordanian banks. Accordingly, cutting-edge technologies used by Jordanian commercial banks facilitate the acquisition of information at high accuracy levels, and the speed and precision of information obtained will inevitably impact the nature, quality and cost of services provided by the bank to its clients. The results of this study are in agreement with the results of Al-Sabbagh (2001), Al-Shishani (2004), Ismail (2008), Sulaimani (2012) and Al-Houri and Abdulsattar (2013). Furthermore, the study shows that hardware and software used in Jordanian commercial banks, as well as Internet networks and controls in place, contribute to ensuring the accuracy and safety of the electronic operation of data, leading to increasing the speed, accuracy and effectiveness of accounting information systems at banks. Many studies have established that there is a positive correlation between modern information technology, technical means and the effectiveness of accounting information systems in terms of processing and outcomes, so the more modern is the technology used at the bank, the more accurate and effective is the accounting information system. This result is in agreement with Al-Ali (2013), Al-Matarneh and Al-Sharairi (2010), Fadhel (2004), Abdullah and Qatanani (2007), Al-Qatawneh (2005) and Midah (2009). The more effective the system, the better competitive advantage is achieved for Jordanian commercial banks as it helps decision makers by providing relevant information for quality, cost and time, which leads to cutting costs, boosting revenue, attracting more clients, thus increasing its market share. This result is in agreement with Al-Shbiel (2011), Al-Shehadeh and Al-Assi (2008), and Al-Shbiel and Al-Dalabeeh (2012).

6. Future studies

This study has addressed the essential topic of the effectiveness of accounting information systems as a mediator variable between information technology and competitive advantage for Jordanian commercial banks. Since this study was conducted in the Jordanian context, the researchers recommend the implementation of the study in another context (Arab or foreign) to be compared with the results of the current study. Also, other studies can be conducted to explore other mediator variables such as

knowledge management instead of accounting information systems, or the same study could be conducted on another sector such as public shareholding industrial companies.

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