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REVIEW ARTICLE

CAN ACCOUNTING INFORMATION SYSTEM BENEFIT FROM CLOUD COMPUTING: THE CASE OF SAUDI ARABIA

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ABSTRACT

In today's changing world and business turmoil, chief financial officers need to understand the financial risks and rewards of new technologies. One of these technologies is cloud computing with its delivery models in which computational resources are offered as a service. It became an opportunity for companies albeit some obstacles. Companies should be prepared for the impact of the change on their accounting and financial systems. The cost structure is going to be reformulated together with pricing policies which will impact profitability. Traditional IT model is different from cloud computing and consequently operating and capital expenditure requirements are different. Accounting as information system with its crucial characteristic of the need to provide information in the right time can find its life jacket in cloud computing. Cloud offerings will provide new ways for consumers and suppliers to purchase and offer IT services. This paper is trying to clarify and analyze the pros and cons of cloud computing on accounting information system with a reference to Saudi Arabia.

INTRODUCTION

The business environment has changed completely in the twenty-one century as we are entering the era of knowledge based society, in which the basic resources are no longer capital, natural resources, or labor but information. Knowledge economy is characterized by a quest towards high demand for information, excessive use of internet, more globalized world with a worldwide network. These trends are all intangible in nature. Traditionally, the financial system relied on accountants to provide internal and external decision makers who are part of the stakeholders with the necessary information with a specific quality to take decisions. Information and technology needed to process it were expensive. In order to prepare financial statements to represent the financial performance and position of companies, a highly expertise and well educated accountants were needed. There are some features that determine the quality of accounting information system. It must be relevant, reliable, verifiable, and understandable and presented in the right time. Albrecht and Sack (2000) presented the view of multiple participants in their study as technology has been an enabler, allowing accountant to do accounting more efficiently, but what is driving change is the whole global competition and the demand by customers for more responsiveness information.

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Financial statements which are coming 60 or 90 days after year-end as it loses a lot of its importance because investors no longer care what happened 60 or 90 days ago. Investors are looking for something to affect the operations of the business today and in the future. Another participant explained the need for a more timely information system needed from accountants or investors are going to look for another source of information. In today competitive environment, companies strive to respond and offer its service faster to the market. The market of information technology is huge and expanding. Traditional information technology model is different from cloud computing. Cloud computing infrastructure enables companies to achieve more efficient use of their information technology investments. It increases resource utilization. Cloud computing is changing the way organization activities are performed including finance and accounting.

This study is going to address the state of information technology in Saudi Arabia. The Kingdom shares the world trend to build a development-oriented information society. It is a large country with an area of 2.4 million km2. Over the last few years, Saudi Arabia is trying to make progress in different information and communications technology fields including connectivity and access, national IT initiatives and e-government services (Khursani *et al*., 2011). Despite some progress, some problems exist which are highlighted by Alsereihy *et al*. (2012, p.231) using Hussain (2012):

Barriers to knowledge management are the challenges that are faced by firms in developing and deploying knowledge management solutions, identifying knowledge and making people participate in the initiative …. Other barriers were outdated information where extensive obsolete and outdated information existed and archiving resources where insufficient technological resources were used to archive knowledge.

This paper is trying to clarify and analyze the pros and cons of cloud computing on accounting information system with a special reference to Saudi Arabia market. The first section is going to explain the capabilities of accounting in the new economy. Secondly, the cloud computing model is going to be highlighted versus traditional computing model. Thirdly, challenges and opportunities for Saudi Arabia market in utilizing the benefits of cloud computing for accounting information systems are going to be explained. Finally, conclusion and direction for future research.

The Capabilities of Accounting Information System in the New Economy

The accounting information system is a computer-based method for tracking financial transactions based on information technology resources. The system is responsible for processing financial data that can be used for internal and external decision making. The success of accounting in the last five centuries and its prominent position during and after industrial revolution is in the last decade and afterwards being tested and became a controversial issue among academics, accountants and users who are the customers of accounting information. Customers of accounting information are no longer satisfied and are looking for other sources of information which are comprehensive and solid (Belfo and Trigo, 2013). The traditional accounting model was designed in harmony with stable environment, certain transactions and tangible assets representing drivers of success. The very popular statement accounting is a language of business seems with the changing environment that the language lost its relevance and hindering usefulness of information. Lev (2000, p.3) states:

Managers too are increasingly realizing the diminishing usefulness of accounting-based information, voting with their feet for various alternatives, such as Economic Value Added and various Balanced Scorecards. The increasing reference to non-GAAP measures in financial reports, such as AT & T's extended discussion of EBIT and EBITDA in its 1998 MD & A section, though sometimes aimed at masking poor earnings, is another manifestation of managers' search for complements or alternatives to GAAP performance measures. Biondi (2011) contrasted the traditional accounting model and the fair value accounting. The traditional model is based on financial economics. Accounting is then assumed to be a part of the information required by capital market participants to predict future performance based on current results part of it is historical which then to provide this information as a basis for financial decision-making. Financial economics does not take into consideration the context in which organizations operate nor the dynamic environment surrounding them. On the contrary, it views the firm as being located in a world of complete and perfect markets in equilibrium. On the other hand, the fair value accounting is based on the current market price system to reflect the value of the company. However, market prices may not be the right indication. Therefore, when the fair value approach is applied to the enterprise context the use of current values and mark-to-market values; the accounting system is then required to recognize profits earlier. Recognizing profits early can lead to misleading financial statements. The traditional accounting and financial system are suitable when companies are striving for cost efficiency in a stable market. By providing information related to elements of production with variance analysis reports, mangers were able to take operational decisions in the age of industrial economy (Radneantu *et al*., 2010). The value of companies depends on events that occurred daily and the lag and gap in reporting it is increasingly making accounting reports less useful. According to Lev (2000, p.15), "This event-transaction delay and the biased treatment of intangibles (immediate expensing) are the major reasons for the low decision-relevance of GAAP accounting to both managers and investors".

Lindsey (2001) pointed to the role of the new economy and the shift in the way business is done. Technology, globalization, intangible assets, and communication are impacting and shaping our world. The ability to produce quality information and accessing it will become crucial aspect in the new world. The lagging of information will cause more volatility in stock markets. Technology will help to control the business and companies will mange better their relation with stakeholders. The new economy will impose the need for assurance from auditors. He states (p.116):

Auditors need to realize that new technology brings new business risks and, ultimately, new financial reporting risks. The biggest potential impacts on the financial statements are in the areas of asset impairment and the appropriateness of the going concern assumption. This is an issue not just for dot.com start-ups with uncertain funding. Technology allows new competitors to enter established markets and to do things faster, better and cheaper. Companies can be stranded with an obsolete business model. As the CEO of Intel is reputed to have said, 'anyone that's not an e-business won't be a business at all'. Technology makes it increasingly difficult for any company to assume that it is a going concern. The market turbulence of the past years may have led to a new phase of globalization, one in which volatility is likely to remain a constant factor. To be competitive, companies must respond quickly to the changing environment. In today's knowledge age, the ability to transform information into insight in response to market movements is core to sustainability. Companies must think of ways to make their processes more flexible. Brinkley (2006), pointed to the characteristics of knowledge economy and knowledge organization, it is an economy where knowledge is diffused in all sectors not just some industries. There is a focus on information and communication technology usage by well educated knowledge workers. A substantial share of growth domestic production is acquired by intangibles instead of tangible assets. Organizations are innovative and using new technologies. Work in organizations is organized to store and share information through knowledge management practices.

An organization that manages for stakeholders allocates more resources to satisfy the needs and demands of its legitimate stakeholders than would be necessary to simply retain their participation in the organization's productive activities. Organizations that manage for stakeholders develop trusting relationships with them. Under these conditions, stakeholders are more likely to share information regarding their utility functions, thereby increasing the ability of the firm to allocate its resources to areas that will best satisfy them. Grande *et al*. (2011) pointed to the use of Accounting Information Systems by Small and medium sized enterprises in Spain and its impact in improving productivity.

Sacer and Oluic (2013) argued that accounting information system is important in preparing quality accounting information. The application of information technology impacts the operations of organizations. Organizations need to fully understand the role of technology on organizational process. Accounting information system backed by suitable information technology is cornerstone in new knowledge economy. They pointed to a survey in which 73% of British managerial accountants ranked information technology as the most significant feature of the changes in managerial accountant's role. They state (p.118):

Electronic accounting arises from the electronic and internet business concepts. In that sense, accounting can be recognized as accounting through virtual office and as paperless accounting. Accounting through virtual office can speed up the business-conducting process and does not depend on the geographical location of business partners and company. Paperless accounting implies electronic input and output and there is no need for documents and reports printouts. Although today many business transactions processed and reported paperless, still paperless accounting has not been put in live on a global level.

Accounting in the new environment is not going to be the same. Financial accounting needs to be more responsive to stakeholder's needs of information while management accounting need to be more integrated in management process. Accountants are trying to amalgam financial and non-financial information to satisfy various needs. Management accounting moved from cost determination and financial control to create value by participating more on organization's decision making process and strategy formulation. It is in this environment where accountants act as advisors with multidisciplinary skills. He must be knowledgeable, ethically responsible and equipped with highly professional skills (Radneantu *et al*., 2010). Stede and Malone (2010) pointed to the changing role of accountants and financial professional. Accountants are more likely to add value and support management in their companies instead of the traditional accounting responsibilities and to be more involved in its future direction. They must be highly professional and equipped with information related to risk management, financial instruments and cash flow. They state (p.1):

Entering into the 21st Century, financial professionals saw the emphasis of their responsibilities shift from recording various aspects of a corporation's financial health to joining top executives in a broad based partnership, a trend accelerated by the 2008 financial crisis. New global research by CIMA, in co-operation with the UK's University of Bath, shows that momentum towards positions of greater responsibility is likely to continue for accountants the world over, although the extent of change may differ by geography.

Efkirin (2014) stress the need for more decentralizing management accounting process where management accountant's role will change to be more like internal consultants. They will motivate others and manage change surrounding organizations. There will be a need for more use of management accounting but less management accountants. In the same vein, Raj and Seetharaman (2012, p.9314) state:

The role of finance and the accounting profession has changed dramatically because of the rapid evolution of technology, the inadequacy of financial instruments, the globalisation of the economy and the emergence of the knowledge economy. To keep pace with these changes, the accounting profession is expected to provide accurate and timely financial information that can be accessed and analyzed quickly and easily. Furthermore, financial professionals are leaving transaction processing and data input behind and are becoming more involved in tactical management at the middle management level and strategic management at the senior and board level. The next section is going to explore the benefits of cloud computing to accounting by contrasting cloud computing versus traditional IT models.

Cloud Computing versus Traditional IT Model:

Cloud computing has become a trend that gained popularity in recent years. It changed the traditional computer business schemes from static, centralized and closed systems to a more comprehensive, timely and dynamic model. Accounting information system is a tool that helps companies in running its business model (Agundez *et al*., 2011). It is used daily to provide information for decision making in various organization activities such as production, human resources, finance and supply chain management. Kinkela (2013) argued that cloud computing technology allows software and data to be managed offsite. It causes a huge cost benefits and efficiencies. She used (p.2) the definition presented by the Committee of Sponsoring Organization of the Treadway Commission and states:

Cloud computing is a computing resource deployment and procurement model that enables an organization to obtain its computing resources and applications from any location via an Internet connection. Depending on the cloud solution model an organization adopts, all or parts of the organization's hardware, software, and data might no longer reside on its own technology infrastructure. Instead, all of these resources may reside in a technology center shared with other organizations and managed by a third-party vendor.

Marand *et al*. (2013) contrasted three models of accounting software in which organizations can select between traditional or cloud or combined model. In the traditional model, companies buy software and install it to their hard disks. This

creates a problem for sharing data and license for employees how are responsible for working on the data required. In contrast, cloud accounting is characterized by accounting software performed on servers offering online service and users can have access anywhere anytime. An internet connection can secure access to software companies pay for the employees who need the service. In this case companies benefit from the infrastructure of the service provided while it has to use it to get the work done. The combined model is characterized by a general cloud for non-critical information and a private cloud for critical service and data.

Belfo and Trigo (2013) pointed to Chartered Institute of Management Accountants (CIMA) study which highlighted the strategic role of management accountants. They state (p.538, emphasis added):

Accountants need to be able to produce reports in real time and interactively (allowing them to choose what to put in the reports, perform analysis and scenario creation) without the intervention of the Information technology team. Furthermore, with the recent international financial crisis, the usage of AIS by external stakeholders (external reporting) is becoming more important and specially, much more critical. The possible benefits of off-premises and multi-tendency system are cost saving and shared resources. The cloud grants SMEs access to enterprise-class technology. It also allows smaller businesses to act faster than big to recover from disasters. According to Pham (2011), used Aberdeen Group survey comparing cloud vs non cloud downtime and reported disaster events, the average length of downtime per disaster recovery event was 8 hours for non-cloud users, and 2.1 hours by cloud user standards (nearly four times faster). In case of time disparity non-cloud users may depend on traditional and time-consuming tape backup methods with complex recovery paths for their disaster recovery plan. Companies that use cloud computing for disaster recovery benefit from the elimination of tape backup, offsite tape backup, making for faster online backup and recovery times. Cloud users also experienced an improvement in number of downtime events.

To be able in today business environment to compete and to be efficient, companies need objective information on timely bases. Accounting information system is supposed to provide this role. The support of information technology like cloud computing can make this role applicable. In the following table Christauskas and Miseviciene (2012) presented a comparison between buying a license and cloud based solution (Saas):

Table 1. Buying a license versus purchasing cloud based solution

	License only	Cloud based solution (Saas)
Accounting software license	Company's own	Company rent it
System location	Where company want it	In the cloud
Hardware	Provided by company	Included
Windows &SQL Server	Provided by company	Included
Maintenance fees	Purchased	Included
IT Resources	Company team or a provider	None required
Support and number of users	Purchased from a provider and limited by license	Purchased from a Service provider and unlimited.

(source: Christauskas and Miseviciene (2012))

As argued by Maraston *et al*. (2011) that cloud computing has benefits such as low cost model, economies of scale, lower IT challenges to innovation, service scalability and service innovation. The cloud computing is a low cost model because it reduces the capital expenditure of IT resources and lower the entry challenges for companies that want to invest in IT related businesses. Saving in capital expenditure can help companies to use scare resources more efficiently. Al-Muharfi (2014) in his analysis of implementing ERP-AIS in SABIC States (p.337, original emphasis):

Participation in ERP-AIS has gained accountants new skills, duties and responsibilities that set through understanding accounting and business processes, ability to be selected and worked in teams and act as team leaders, better and more effective communication, less book keeping and more analysis ability. SABIC starts hiring highly qualified accountants with higher degrees in business and in accounting. Therefore, SABIC affiliates intend to hire accountant with more knowledge in information technology and ERP-AIS in particular and with more skills in accounting review, analysis and decision making support…… AIS will transform traditional accountants to become more "hybrid accountants".

The Cloud model can enhance the capabilities not only to SME's but to large firms who need IT resource for relatively short amount of time. The economies of scale become feasible through multiple organizations sharing the infrastructure and cost. Also, it lowers IT challenges for innovation as the tendency of sharing common resources can lead to better possibilities of innovation. It is in this climate that synergetic effect can be fruitful. Alharbi (2012) in his study about users acceptance of cloud computing in Saudi Arabia found a high level of acceptance of cloud computing with no difference in the attitude toward the adoption of cloud computing between male and female employees. In the same vein IISS report (2013,p.8). It is estimated that Saudi Arabia alone will increase its spending on cloud computing by 50% between 2012 and 2016. Commercial sector studies have been conducted on cloud services in the UAE, concluding that e-mail, web, and email security solutions were commonly the most popular workloads deployed in the cloud environment, while sensitive workloads such as enterprise resource planning (ERP) and human resource management (HRM) were kept out of the cloud.

The question now is how Saudi Arabia can benefit from cloud computing by integrating it to accounting information systems not only for big companies but also for small and medium size enterprises and this is the concern for next section.

Saudi Arabia and Cloud Accounting Information System

Saudi Arabia is an oil-based economy with the largest proven crude oil reserves in the world at 266.7 billion barrels, representing 57% of the GCC reserves, and almost 20% of the world total reserves (Gauri, 2012). It ranks as the largest producer as well as exporter of petroleum. The size of the Saudi economy has quadrupled during the last 10 years to rank first among countries of the region and 19th at the global level. Saudi Arabia's membership to the G20, which consists of the

world's most powerful economies, has played a pivotal role in further boosting the world economy. With the world's second largest oil reserves and the world's sixth largest natural gas reserves, the Kingdom is categorized as a high income economy with 19th highest GDP in the world. In the Gulf Area in which Saudi Arabia is the prominent and major player Information and communication technologies market is expected to grow to reach $318 billion by 2015 due to the increasing demand for public institutions, healthcare, construction, oil and gas and telecommunications (IISS, 2013).

Although most of the economy of the kingdom is dependent on oil, in today turbulent and chaos energy market it is believed there is a need to change this composition and to respond to the changing environment. In the IISS report (2013, p.4): Gulf policy making characteristics are less reminiscent of Western information societies. For instance, Gulf States tend to prefer strong sovereign and territorial control of their own information space and ICT infrastructure. Regulatory approaches to cyber security are still emerging, and GCC countries are yet to develop a strong culture of regional and international cooperation and collaboration. Against this backdrop, building a cloud computing market in the Gulf Region represents a political and regulatory challenge that can be only partially met utilizing models and examples from other regions and States.

In a study by Al Ruwaili *et al*. (2013) for 18 banks in Riyadh Saudi Arabia, pointed to the increasing importance of talent management in Saudi Arabia banks and the eagerness to knowledge. They state (p.13) "we find that Saudi organizations are paying more attention to talent management through providing training and enhancing employees' skills through acquiring new knowledge". Khursani *et al*., (2011, p. 2) state:
To respond to this urgency, Saudi Aramco's CEO mandated that the company immediately start to develop a competitive advantage. Keeping in mind that Saudi Aramco's past wealth came from oil, plans are being formed so that the Kingdom's future wealth comes from oil and also from effective management of the nation's intellectual capital (IC), such as knowledge. From the national perspective, the Economy Minister stated that >50% of the Kingdom's development plan is aimed at achieving an increase in human development, such as training and education. The Kingdom is investing around $385 billion to transform itself into a knowledge-based economy.

Abu Mussa (2006) conducted an empirical survey to investigate the perceived threats of computerized accounting information systems using a self-administered questionnaire. They were 400 questionnaires have been randomly distributed to different types of Saudi organizations including manufacturing companies; banks; insurance companies; oil and gas companies; heath care; and government units in the seven Saudi cities. The received were 208 questionnaires representing 52% initial response rate. The results revealed that almost half of the respondent Saudi organizations have suffered financial losses due to internal and external CAIS security breaches. The statistical results also revealed that accidental and intentional entry of bad data; accidental destruction of data by employees; employees' sharing of passwords; introduction of computer viruses to CAIS; suppression and destruction of output; unauthorized document visibility; and directing prints and distributed information to people who are not allowed to receive are the most significant perceived security threats to CAI in Saudi organizations. He states (p.7):

In addition, the following CAIS security threats are included in the proposed security list to be empirically examined for the first time in Saudi Arabia: human-made disasters such as fire, loss of power; suppression or destruction of output; creation of fictitious/incorrect output; theft of data/information; unauthorized copying of output; unauthorized visibility of documents; unauthorized printing and distribution of information; directing prints and distributing information to people who are not entitled to receive it; and handling sensitive documents to non-security cleared personnel for shredding. Those security threats are mainly related to the CAIS output security. Al-Muharfi (2014) pointed to the relation between accounting information system and enterprise resources planning using interpretative approach and semi-structured interviews between 2010-2013. The Study focused on SABIC which is the Saudi Basic Industrial Corporation. SABIC was a leading company in the region to implement ERP. When the company started using ERP-AIS the situation was expressed in the following words (p.329). Many of the existing accounting legacy systems were fragmented and no integration existed among them. The work in AIS was tedious and redundant using old technological systems based on double entries with vast amount of paper work without value-added processes and procedures. The legacy accounting system also needed huge number of accountants' workforce and work time and effort. Many of SABIC affiliates expressed great concerns because of technical support and maintenance shortage needed for their legacy accounting systems.

However, when the company started implementation one of SABIC affiliate reported overall lose while the sales of such affiliate was in its highest. SABIC affiliate expenses were recorded as usual but sales revenue was not recorded. This occurred over six months which made SABIC to stop ERP-AIS system and to go back working with the old system. The final investigation revealed that Sales module was not integrated with the ERP-AIS module. Thus, integration with other departments module such as purchasing and human resources allows ERP-AIS record expenses and not integrating the sales module did allow the affiliate ERP-AIS record the sales revenue which ended up with reporting the overall lose result. The problem was with the implementation team who fail to integrate systems together and the accounting department was blamed. Also the use of Arabic decimal comma instead of an English decimal to separate the numbers causes a huge inflation in expense. Mattison and Raj (2009) identify three factors as a determination of the fit of cloud computing with ERP. They are the size of company's revenue, the geographical area of its operations, and the industry sector in which business operates. Cloud-based ERP offers smaller and mid-sized enterprises significant greater benefits in terms of cost. Jia (2009, p.2) states:

Integrating conventional ERP system with cloud services is an emerging topic nowadays as IT technologies are developing very fast To bring the benefits and avoid weakness, integrating conventional ERP system with cloud services is a compromise solution that takes advantage of cloud services with lower investment, especially for the enterprises that have been running ERP systems for years. According to CCH (2013) survey accountants who delayed entering cloud world will put their business at risk. Their online survey of SMEs in Australia showed around two third of companies are considered replacing some services performed by accountants to cloud based software. The CEO of Wolters Kluwer Asia Pacific, Russell Evans (p.2) states:

Accountants aged 18 to 34 in particular, are even more likely to consider adopting a cloud-based system in this timeframe (66% compared to 58% of those aged 35 to 49 and 53% of those aged 50 or more. Our survey tells us that 60% of the 77% of accountants who are not using cloud systems today will probably do so within the next two to three years. We are rapidly approaching a point where the use of cloud software to perform accounting services is ubiquitous - that's a big shift in a few years.

Thomas (2012) highlighted the benefits of cloud computing to contractors. Those benefits include mobile accessibility, scalability, and reduce the need for in house IT. Cloud-based applications and files can enable that information to be created once and then shared across organizations. In addition, subcontractors, suppliers, and other stakeholders can more easily collaborate in updating and reviewing financial information while work is underway. Cloud computing can also assist in documenting expense activity on a timely basis, thus providing project managers with updated job cost reports which are an important tool in monitoring project progress. He states (p.1)

At any given time, a typical contractor has multiple projects underway, with each job incurring its own set of income and expense items. The ease with which cloud-based services may be accessed enables field staff to enter income and expense items as they're incurred into a common bookkeeping application, which bypasses the need to fax or e-mail information to the home office. In fact, it's increasingly common for field staff to place orders and receive inventory through smartphone or tablets. The Kingdom of Saudi Arabia is the biggest building and construction market in the Gulf Area and the Middle East, due to continuous increase in government spending as well as huge private sector investments. The Saudi construction industry witnessed huge boom in the last 10 years in line with government plans for economic development and diversification. According to Kuwait Finance Office (2014, p.4) about construction industry in Saudi Arabia: 2013 was a bumper year for contract awards in Saudi Arabia. According to the NCB Construction Contracts Index, the value of awarded contracts during 2013 climbed to an all-time high of SAR293.4bln, growing 25% compared to 2012. This was after we anticipated that the value of contract awarded would accelerate in 2H2013. Heavy investments were made in transportation, power and the petrochemicals sectors. Urban development and residential real estate sectors also performed well.

The success of the kingdom to apply new technologies with the help of talented workforce can have a tremendous help in transferring the kingdom to a knowledge based economy. The will and financial resources to build a solid infrastructure can support the shift from oil based economy to a more diversified economy.

Conclusion

One of the infrastructures for knowledge based economy is accounting information system integrated to the cloud. Accounting information system will be more valuable, responsive and more productive and efficient with the help of cloud computing. The lack of a clear regulatory framework by most Middle Eastern nations on issues of privacy and security in the cloud is an obstacle for wide implementation. As KSA is in a stage where oil prices are decreasing, it is time to diversify its activities and information technology market is an opportunity to be captured. The commitment of the government to transfer to knowledge economy must be supported by an infrastructure that facilitates this transfer.

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