THE IMPACT OF ACCOUNTING INFORMATION SYSTEMS (AIS) DEVELOPMENT LIFE CYCLE ON ITS EFFECTIVENESS AND CRITICAL SUCCESS FACTORS

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Abstract

The objective of this research is to investigate the impact of information accounting system development lifecycle on its effectiveness and critical success factors. Balanced scorecard was used to evaluate the accounting information system effectiveness. The card included all the necessary requirements for the accounting information system. The dimensions included tangibility, reliability, responsiveness and empathy. The results indicated that the accounting information system should be based on satisfaction and usage measures as supportive for decision making.

Keywords: Accounting information system, lifecycle, Success factors

1. Introduction

Many previous studies did not consider the phases of Accounting Information System's life cycle in examining the relationships among the accounting information system's effectiveness and critical success factors. They tried to identify critical factors which could influence the Accounting Information Systems Effectiveness without considering each phase and its own critical success factors. These studies ignore theimportance of identifying the influencing factor for each phases' success and its impact on the Accounting Information Systems effectiveness.

Min-Choe (1996) examined the direct relationships between influence factors and performance of accounting information systems and he identified the moderating effect of the evolution level of information system on the relationships.

Min-Choe study depends on Nolan's (1979) and Drury's (1983) proposal for grouping evolution stages into two categories, prior stage and posterior stage.

In the prior stage, for the adopting and expansion of accounting information system (AIS), organizational slack in (AIS) activities should be permitted; sufficient funds support, lack of control, early training, education and documentation of (AIS) are more important in the prior stage. The (AIS) documentation is necessary for the learning and knowledge acquisition in the early stage of (AIS) Development (Min Choe, 1996).

In the posterior stage, the roles of a steering committee, independent of the IS department, and users involvement are more critical for the successful implementation of accounting information systems (Min Choe, 1996).

This study is based on Oracle Applications Implementation Methodology (AIM) for identifying the Accounting Information System Life Cycle Phases, to examine the relationships among the Accounting Information Systems effectiveness and critical success factors that belong to the wide spread of Oracle applications' usage by the Jordanian firms, and the reputation of Oracle corporation as one of the leading suppliers for software solutions all over the world.

By using the Oracle Applications Implementation Methodology (AIM), more accurate results are expected to be gained because of the detailed definitions of the Accounting Information Systems life cycle phases, and the detailed definitions of the critical success factors in each phase.

It is worth mentioning that this study (unlike other studies) adopts Oracle Methodology (AIM) in defining the phases of systems life cycle rather than System Development Life Cycle mentioned by Joseph S. Valacich (2001) andby Moscove (2001), due to Oracle's experience in software solutions, and the detailed definition of the phases and critical success factors mentioned by Oracle.

On the other hand, Kristi & Martha (1995) reviewed (in their study entitled An Experimental evaluation of measurements of information system effectiveness) the measures used to evaluate the effectiveness of information systems, they investigated whether usage and satisfaction measures are appropriate surrogates for decisions performance. According to their study, decision performance is the most direct of the three measures (usage, satisfaction, decisions performance) because it is often difficult to measure decision performance. System usage and user satisfaction are often used as substitute measures for decision performance in research and practice (Kristiyuthas, 1995).

Kristi & Martha (1995) study confirms that conclusions about (AIS) effectiveness based on satisfaction and usage measures as substitutes for decisions performance should be interpreted with caution.

This study will also attach importance to measure the Accounting Information Systems Effectiveness referring to the role of the AIS in decision-making support, control and operations among all the firms activities.

This subject will be covered by reviewing the measures used by some previous studies, to be evaluated by this study. This evaluation justifies the study proposal to use a balanced scorecard to evaluate the Accounting Information Systems as a comprehensive measure to cover all the Accounting Information Systems aspects previously mentioned.

The Balanced Scorecard (BSC) was developed to communicate the multiple, linked objectives that companies must achieve to compete on the basis of capabilities and innovation, not just tangible physical assets. The Balanced Scorecard translates mission and strategy into objectives and measures, organized into four perspectives (Athinkson et al., 2001).

This study proposed a balanced scorecard to measure (AIS) effectiveness within the manufactories field, the proposed balanced scorecard include the general aspects and features could be submitted by the accounting information systems (AIS) used by manufacturing field.

2. Objectives

The study aims to achieve the followings:

1. Define the accounting information systems effectiveness, and identify the importance of evaluating it.
2. Review the measurements used by the previous studies in evaluating the accounting information systems effectiveness.
3. Trying to find a reliable measurement system that could be used to evaluate the accounting information systems effectiveness, and review the methodology for implementing this system.
4. Identify the impact of the Accounting Information System Life Cycle Phases on the Relationships among the Accounting Information Systems effectiveness and critical Success Factors.
5. Identify (in general) the critical success factors that could influence the accounting information systems effectiveness.
6. Identify the critical success factors should be used in each accounting information systems life cycle' phase

3. Problem

Many previous studies did not consider the phases of Accounting Information System's life cycle in examining the relationships between the accounting information system's effectiveness and critical success factors. They tried to identify critical factors which could influence the accounting information systems (AIS) effectiveness without considering each phase and its own critical success factors. These studies ignore the importance of identifying the influence factors influencing each phase success and its impact on the (AIS) effectiveness.

It is expected that the (AIS) life cycle phases influencing the relationships between the accounting information system's effectiveness and critical success factors, through the different materiality of each factor according to the phase in which they will be used.

In addition, it is expected that not all critical success factors should be used in all (AIS) phases, this assumption is based on Oracle's application implementation methodology which depend on classifying the critical success factors according to each accounting information systems' phase.

Further more, the previous studies used different measurements to evaluate the information systems' effectiveness.

Users' satisfactions and system use were widely used by many of them.

Other studies suggests that conclusions about information systems effectiveness based on satisfaction and usage measures as substitutes for decision performance should be interpreted with caution.

It's worth mentioning that the measurements used by the previous studies were accompany with a questions about if they covered all the aspects of accounting information systems effectiveness, like the accounting information systems roles in achieving the firms' long term and short term targets.

Finally, it can be argued that the previous studies related to the accounting information systems lacked in implementing there tests according to the methodologies used by the main solutions suppliers, such as Oracle corporation. By implementing such tests according to the methodologies used by the leader solutions suppliers, the results expected to be more reliable and practical.

4. Importance of the study

This study is based on Oracle Applications Implementation Methodology (AIM) for identifying the Accounting Information System Life Cycle Phases, to examine the relationships among the Accounting Information Systems effectiveness and critical success factors that belong to the wide spread of Oracle applications' usage by the Jordanian firms, and the reputation of Oracle corporation as one of the most famous suppliers for the software solutions all over the world.

By using the Oracle Applications Implementation Methodology (AIM), more accurate results are expected to be gained because of the detailed definitions of the Accounting Information Systems life cycle phases, and the detailed definitions of the critical success factors in each phase.

It is expected that this study will be one of few studies in the Middle East that based on Oracle's corporation methodology in identifying the accounting information system life cycle phases and the critical success factors.

The Balanced Scorecard chosen by this study as a tool to evaluate the accounting information systems effectiveness, in this regards a balanced scorecard designed by this study to include a measurements for general features desired by accounting information systems' users in manufacturing field, this methodology expected to be rarely implemented in the middle east to evaluate the accounting information systems effectiveness.

The balanced scorecards usually designed to be implemented for specific firms or entities, this study aimed to design a Balanced Scorecard to be used for more than one firm within a same field as general tool, taking to consideration each firm strategy and targets, by giving a facility to weight each perspective and measurement included in the balanced scorecard according to each firm's perspective.

5. Literatures review

Yuthas and Eining (1995) investigates whether usage and satisfactions measures are appropriate surrogates for decision performance. The results suggest that although the usage and satisfaction are closely related to decision performance, the relationships are not sufficiently strong to warrant their use as surrogates. They suggested that conclusions about information systems effectiveness based on satisfaction and usage measures as substitutes for decision performance should be interpreted with caution. MinChoe (1996) studied the relationships among performance of accounting information systems, influence factors and

evolution level of information systems. The objectives of the study were to examine the direct relationships between influence factors and performance of accounting information systems (AIS), and to identify the moderating effect of evolution level of information system on the relationships. User satisfaction and system use are considered surrogate measures for the performance of Accounting Information Systems. The measure of user satisfaction was based on a set of ten questionnaire item, and measured on a seven point Likert-type scale. System use was measured by consideration of booth the frequency and the willingness of use, each was measured on a single item seven point Likert-type scale. The influence factors tested by Choe's study were the followings: 1- Top management support, 2- Technical capability of information systems personnel, 3- Users' involvement, 4- Users training and educations, 5- Steering committees, 6- Location of Information system department, 7- Formalization of system development and 8- Organization size.

Choe's study depends on Nolan's (1979) and Drury's (1983) proposal for grouping evolution stages into two categories, prior stage and posterior stage. One hundred Koreans organizations were randomly selected by Choe's study (1996), from a population of about 417 firms with a mainframe computer. Among these 78 responded to the request for information and were finally included in the study. The study covered 450 users of accounting information systems in 107 subunits, such as departments of general accounting, finance, tax and cost accounting, which mainly use the accounting information systems. Data were gathered by the interviews based on structured questionnaires. Two kinds of questionnaires were prepared for the study, one for measuring the overall environment of organizational information systems, another for measuring users' perception with relation to both the influence factor and the accounting information systems. The results of the empirical test suggested that there are significant positive correlations between the performance of accounting information systems and the influence factors. It was also proved that the relationships between performance of accounting information systems and influence factors are significantly influenced by the evolution level of the accounting information systems. Hence, for the success of (AIS), each influence factor should be considered differently in the degree of importance according to the level of information system evolution.

Palanisamy (2001) studied the user involvement in information systems planning and its effect on strategic success. This paper presents empirical findings for relationship between user involvement in Information Systems (IS) planning and strategic success of Information Systems (IS). For strategic success of Information Systems (IS), Information Systems (IS) enabled organizational change, Information Systems (IS) enabled competitive advantage, and

Information Systems (IS) enabled organizational learning are considered. The dimensions of Information Systems success (flexibility) according to this study were evolved in a workshop on information systems planning. A group of twenty participants in the workshop gave their feedback for dimensions of Information Systems success. The participants were all senior level managers with more than ten years of information systems usage experience. The prioritized dimensions among the evolved ones are organizational enhancement, decision effectiveness, improved productivity, and cost reduction. The weights for the dimensions of information systems success were obtained from twenty respondents who participated in a workshop on "Information Systems Planning." The respondents were senior level information systems executives from Industry. A significant positive relationship has been found between user involvement and system success. The respondents for the survey were chosen from IS users and planners population. The sectors included in the survey are: service, information consultancy, engineering, automobile, consumer goods, consumer durable, high technology and government. From these sectors forty two public and private organizations were selected at random. To diminish the skewness on data collection from the same geographical region and to get views from widely scattered population, the survey was conducted in three major Indian cities: New Delhi, Chennai, and Bangalore. The twenty items questionnaire instrument was personally administered to 296 respondents from 42 organizations.

Hagood& Friedman (2002) Used the balanced scorecard to measure the performance of your HR information system. This study reviewed the methodology used by the Central Intelligence Agency (CIA) to develop and implement a balanced scorecard-based performance measurement system for its human resources information system (HRIS) to justify costs and highlight the effectiveness of the system. The study suggests that this methodology and the tools (the Balanced Scorecard) are generic enough that they could be used to measure the performance of any organization or system.

Jiang (2002) measured information system service quality: Servqual from the other side. As what mentioned in this study, "traditionally, the role of information systems (IS) within an organization has been to design, construct, and implement systems to improve organizational performance. The evaluation of the system-builder role focused on system effectiveness measures, such as system usage, cost/ benefit analysis, user satisfaction, information economics, and system quality (DeLone and McLean 1992). However, the information systems (IS) function now includes a significant service component (Pitt et al. 1995). The IS department provides assistance to users on hardware and software selection,

acquisition and installation, trouble-shooting, connecting to networks, training, and maintenance. Furthermore, IS professionals assist users in collecting, analyzing, and retrieving data and producing information in a form that is meaningful for decision makers. These services require a customized, personal interaction with a user". In recognition of the expanding service role of the IS function, researchers suggested service quality be included as a measure of IS success (Kettinger and Lee 1994; Pitt et al. 1995; Watson et al. 1998). One popular measure of service quality is SERVQUAL, which captures service quality as the gap between consumer expectations and perceived delivery (Parasuraman et al. 1985). Recognizing the IS service role and the lack of research on the measurement of IS service quality, several leading researchers have proposed the use of a modified SERVQUAL for measuring IS service quality (Kettinger and Lee 1994; Pitt et al. 1995; Watson et al. 1998). The SERVQUAL instrument was originally developed by marketing researchers to assess service quality in general. SERVQUAL instrument are five dimensions used by customers when evaluating service quality regardless of the type of customer service, The dimensions include:

a. **Tangibles:** The appearance of physical facilities, equipment, and personnel.

b. **Reliability:** The ability to perform the promised service dependably and accurately**.**

c. **Responsiveness:** The willingness to help customers and provide prompt service.

d. **Assurance:** The knowledge and courtesy of employees and their ability to inspire trust and confidence.

e. **Empathy:** Providing caring and individualized attention to customers.

- Service quality for each dimension is captured by a gap score (G), where G is the difference between corresponding perception of delivered service (P) and expectation of service (E) for each item (G = P . E).
- This study re-examine SERVQUAL issues from the Information System professional side: (1) the dimensionality of the instrument, (2) the convergent validity, and (3) the reliability measures of the difference scores.
- Then the study examines the expectation gap between the Information System user and Information System professional according to the same criteria.
- The study conclude that SERVQUAL can be a useful tool in IS service evaluation systems. It also may have the potential to serve as a measure of expectation differences to help analyze expectation gaps.

Sharma & Price (2003) studied the contingent effects of management support and task interdependence on successful information systems implementation. According to what

mentioned in this study, the key managerial challenges faced in the implementation stage are overcoming various forms of end user resistance. Motivating end users to adopt, and developing new behaviors among end users, given this challenges use and user satisfaction represent the success of various managerial interventions designed to promote end user adoption. Hence, these variables are accepted by this study as the most appropriate proxies for implementation success. The key proposition of this research is that the institutional context affects end-users' ability and motivation to successfully adopt and use IS innovations. Further, it proposes that the institutional context can be shaped in ways that facilitate successful implementation. The study extends this stream of research in two ways. First, it identified the role of management support in shaping the institutional context. Second, it identified the role of an important situational contingency, task interdependence, in shaping the institutional context and, consequently, the successful implementation of IS innovations. The study hypotheses are tested using meta-analysis, which is a set of statistical techniques to integrate findings across multiple studies addressing the same research question. Abstracts of over 500 articles were examined to locate studies that could provide data for inclusion in the meta-analysis. The study suggests that the effect of management support on implementation success is a positive function of task interdependence.

Serafeimidis& Smithson (2003) evaluated the information systems as an organizational institution. The study assumed information systems (IS) evaluation is embedded in many social and organizational processes, and thus is a particularly complex decision-making process. Evaluation happens in many ways (e.g. formally, informally), uses diverse criteria (e.g. financial, technical, social). The study mentioned that there are formal evaluation practices promoted by organizational rules and structures, and informal practices implemented by stakeholders involved, and finally academic recommendations which in many cases recognize the delicate nature of evaluation but are not 'used' in practice. The (better) theories tend to emphasize the complexity and richness of the evaluation problem situation (or context) while the available methodologies tend to over-simplify the process through 'cook-books' that focus on the more measurable aspects of the outcome of Information Systems investment. The study offers an alternative, interpretive approach to understanding information systems evaluation based on the notion of stakeholders. This is illustrated through a case study of an insurance company in the UK. This company attempted to break away from the traditional approaches to evaluation and to adopt tools, techniques and concepts that have a more business and organizational flavour. The study proposed four possible orientations for information systems evaluation, the classification defines four

evaluation sub contexts based on two dimensions, *(The operational level has beenomitted in this paper in order to simplify the analysis and because its scope in terms of organizational impact is inherently limited),* this dimensions further depends on the nature of information systems and its perceived contributions, the identification of objectives leads to the determination of relevant evaluation criteria. All these are subject to contextual factors. Each orientation does not exclude any other but complements it.

6. Results and Discussion

This study agreed with Choe's study (1996) in the following perspectives:

- The objectives, which include examine the direct relationships between critical success factors and the accounting information systems (AIS) effectiveness, and to identify the moderating effect of (AIS) life cycle on the relationships.

This study disagreed with Choe's (1996) study in the following perspectives:

- In Choe's study (1996), user satisfaction and system use are considered surrogate measures for the performance of Accounting Information Systems, while this study depends on the Balanced Scorecard to measure the accounting information systems effectiveness.
- The influence factors tested by Choe's study were eight factors while this study tests twelve factors, six factors matched in both studies, three factors tested by Choe's study (1996) ignored by this study, because they were not included as critical success factors by Oracle's applications implementation methodology (AIM), and six factors added by this study were not included in Coe's study.
- It is worth mentioning that this study distinguished between the planed training and Just on time training, that’s due to the effect for each kind expected to be different according to the accounting information system life cycle phases. This assumption ignored by Choe's Study.

Table (1) Critical Success Factors

Choe's Study Critical Success Factors	This Study Critical Success Factors
Top -1 management support.	Gains the top management support, to avoid the expected behavioral problems by motivates the employees (users) to assist and cooperate with systems development.
Technical -2 capability of information systems personnel.	A productive team with appropriate skills.
Users' -3 involvement.	Active participation by key management and knowledgeable users and technical representatives from the areas of the business affected by the project's objectives.
Users training -4 and educations.	A User Learning Plan that takes into consideration the user's learning needs.
	Just-in-time learning events that are tailored to the learning and performance needs of all impacted roles.
Steering -5 committees.	Make sure that the study team works closely with the steering committee in all phases of the work.
Location of -6 Information system department.	No matches.
Formalization -7 of system development.	No matches.
Organization -8 size.	No matches.
No matches.	Clear definition of the business objectives.

Choe's Study Critical Success Factors	This Study Critical Success Factors
No matches.	Classifying the outputs according to which functional area uses them, and how frequently they must be produced, or to other useful criteria.
No matches.	Using the prototype in designing the outputs and input forms.
No matches.	Appropriate involvement of the selected hardware vendors in the configuration of the hardware environment.
No matches.	Follow (the study team) a suitable behavior to avoid the expected behavioral problems and to gain the full cooperation and support of the employees (users).
No matches.	Active listening and timely response to all concerns and opinions about the new systems.

- This study adopts Oracle Applications Implementation Methodology (AIM) for identifying the Accounting Information System Life Cycle Phases, unlike Choe's study which depends on NOLAN's (1979) and DRURY's (1983) proposal for grouping evolution stages into two categories, prior stage and posterior stage, by using the Oracle Applications Implementation Methodology (AIM), more accurate results are expected to be gained because of the followings:

1- (AIM) Break down the (AIS) life cycle to six phases. And the detailed description for each phase.

2- The detailed definitions of the critical success factors in each phase according to Oracle Applications Implementation Methodology (AIM).

3- This study agreed with Yuthas's study (1995), in assuming the conclusions about information systems effectiveness based on satisfaction and usage measures as substitutes for decision performance should be interpreted with caution.

4- This study agreed with Sharma's study (2003) in assuming management support has an effect on successful information systems implementation through its role in

shaping the institutional context which can affects end-users' ability and motivation to successfully adopt and use IS innovations.

5- According to Sharma's study (2003) user satisfaction represent the success of various managerial interventions designed to promote end user adoption. Hence, these variables are accepted by Sharma's study (2003) as the most appropriate proxies for implementation success, unlike this study which depend on the Balanced Scorecard as the adopted measurement.

6- Palanisamy's study (2001), assumed that At strategic level, Information Systems success can be considered by Information Systems enablement for organizational change, Information Systems enablement for competitive advantage, and Information Systems enablement for organizational learning", these measurements included in the Balanced Scorecard which adopted by this study.

7- Palanisamy's study (2001) found a significant positive relationship between user involvement and system success, these results considered in this study by treating user involvement as critical success factor.

8- This study agreed with Hagood's paper (2002) which suggests that the Balanced Scorecard are generic enough that they could be used to measure the performance of any organization or system.

9- This study adopt the methodology mentioned by Hagood's paper (2002), for using the Balanced Scorecard as a measurement tool for evaluating the human resources information system (HRIS) effectiveness, a Balanced Scorecard oriented to manufacturing field designed by this study to include a measurements for general features desired by accounting information systems' users in manufacturing field, this methodology expected to be implemented for the first time in the middle east to evaluate the accounting information systems.

10- The balanced scorecard mentioned by Hagood's paper (2002) designed to be implemented for specific firm or entity, this study aimed to design a Balanced Scorecard could be implemented for one field as general tool, taking to consideration each firm strategy and targets, by giving a facility to weight each perspective and measurement included in the balanced scorecard according to each firm's perspective.

References

Atkinson & Banker & Kaplan & Young, Management Accounting, Third Edition, (2001), P. 368.

James J. Jiang, Measuring information system service quality: Servqual from the other side, MIS Quarterly Vol. 26 No.

JONG-MIN CHOE, The Relationships Among Performance of Accounting Information Systems, Influence Factors and Evolution Level of Information Systems, Jornal Of Management Information Systems, (1996), P.218.

Kristi yuthas, Martha M. eining, An Experimental evaluation of measurements of information system effectiveness, Journal Of Information Systems, (1995), P.69.

Rajeev Sharma & Michael F. Price, The contingent effects of management support and task interdependence on successful information systems implementation, (MIS Quarterly Vol. 27 No. 4, 2003).p542.

VassilisSerafeimidis& Steve Smithson, Information systems evaluation as an organizational institution – experience from a case study, Information Systems Journal (2003)13, p.251.

Wesley O. Hagood& Dr. Lee Friedman, Using The Balanced Scorecard to Measure the Performance of your HR Information System, Public Personnel Management, Volume 31 No. 4 2002.P. 543.