Exploring Electronic Cheque Clearing Systems Acceptance by Jordanian Commercial Banks:
A Theoretical Integration of Technology Acceptance Model, User Satisfaction and Delone and Mclean Model

Yahya A. Alsoof, Hani H. Al-Dmour and Haitham H. Al-Shibly

ABSTRACT

This study provides a structure for understanding ECCS success. The study argues that using user satisfaction as surrogate indicator for measuring the success of ECCS has some theoretical difficulties. In similar vein, using the technology acceptance model (TAM) alone may not be sufficient to adequately capture the full meaning of effectiveness or the success of these. It posits that ECCS success is a joint function of system and information characteristics and acceptance.

The study population consists of ECCS users from the central bank of Jordan and 24 commercial banks in Jordan. A convenience sample was drawn from ECCS users from the central bank of Jordan and 11 commercial banks, whereas 304 valid questionnaires were collected out of 420 distributed questionnaires. Collected data were statistically analyzed using SPSS package to investigate the relationship between dependent variable ECCS users satisfaction and independent variables: ECC system quality, ECCS information quality, ECCS perceived ease of use and ECCS perceived usefulness. On the other hand, the relationship significance between the dependent variable ECC system success and using ECCS users satisfaction as an independent variable was investigated.

The main study conclusions were that ECCS success is positively associated with ECCS users satisfaction which is positively associated with the independent variables mentioned earlier. The major study recommendation is that the business sector should pay attention to the major role of users attitudes in determining the success of information systems application. The importance of future investigation on the perceived value of ECCS by banks customers is also emphasized.

Keywords: Electronic cheque clearing systems, TAM, User satisfaction, Delone and Mclean Model, Jordanian commercial banks.

INTRODUCTION

The demands of new payment and clearing methods coupled with regulatory changes in banking are forcing clearing operations to move away from the traditional paper clearing stream to electronic data based and even electronic image exchange based route for quicker clearing and resultant accelerated deposits and returns (Calisir and Gumussoy, 2008; Agarwal et al., 2009).

Motivated by this development, the central bank of Jordan has adopted ECCS as the main tool for clearing cheques between commercial banks. Accordingly, in 2007, all commercial banks in Jordan started applying ECCS, and the diffusion of these technologies by financial institutions is expected to result in a more efficient banking system (Akinci et al., 2004;

Cavalluzzo, 2002).

An ECCS offers institutions alternative or non-traditional clearing methods through which banking services can be delivered more conveniently and economically to clients without diminishing the existing service levels (Cavalluzzo, 2002; Jresat, 2007). ECCS is a flexible payment method which deserves special attention from financial institutions, policy-makers, researchers and academicians owing to its enormous potential from the viewpoint of banks, businesses and banks clients (Jresat, 2007).

ECCS are being used with increasing frequency in many countries (Khiaonarong, 2000; Jresat, 2007), including Jordan. However, there is relatively little research on developing models which enable an understanding of these systems' success. This study provides a structure for understanding ECCS success and explores the impacts of ECCS system quality, ECCS information quality, ECCS usefulness and ECCS ease of use on ECCS satisfaction.

In focusing on models related to ECCS success, this study reviews literature related to the research problem. It argues that using user satisfaction as a surrogate indicator for measuring the success of ECCS has some theoretical difficulties. In similar vein, using the technology acceptance model (TAM) alone may not be sufficient to adequately capture the full meaning of effectiveness or success of ECCS. ECCS success is a joint function of system and information characteristics and acceptance. By integrating these two powerful theories, this study suggests that the technology acceptance literature and the parallel user satisfaction stream are not competing approaches to understanding information systems (IS) usage and value. That is, user satisfaction and TAM represent complementary steps in a causal chain of key characteristics of system design as well as beliefs and expectations about outcomes that ultimately determine usage. The key consequents of ECCS success are user-related, recognizing the user's important role in determining the success of business endeavors.

The detailed framework is the first rigorous research step towards understanding the important confluence of two powerful streams of IS success models on ECCS. The framework built in this study from theory and empirical research provides a foundation for future research.

The paper is organized as follows: we review relevant literature on ECCS, then we describe the theoretical foundations of ECCS success model. Then come the integrated research framework and hypotheses, followed by the research design of the empirical study and an introduction to the survey sample. Then we present the analyses on ECCS success. Discussion, conclusions and directions for future research are outlined in the last section.

Electronic Cheque Clearing Systems

There are several issues regarding how we should analyze the implementation of information systems generally, and electronic cheque clearing systems (ECCS) specifically. It is hard, in the field of information systems, to determine the effectiveness of a system without a clear description of what the system under study is (Delone and Mclean, 1992). ECCS form a relatively new type of information system, and different terms have been interchangeably used in literature to discuss the concept. In particular, there is a confusion about the concepts of cheque, clearing and cheque clearing systems (Hancock and Humphrey, 1997; Pasupathinathan et al., 2005). This section clarifies these concepts and explains where these systems fit within them.

Cheques are written orders from account holders instructing their banks to pay specified sums of money to named beneficiaries (Hancock and Humphrey,1997). Bank cheques are probably the most widespread type of document, with nearly one hundred billion cheques circulating all over the world every year (Hancock and

Humphrey, 1997; Madasu and Lovell, 2005). The cheque evolved over many years, but cheque transactions are still increasing throughout the world in spite of the overall rapid emergence of electronic payment by credit cards (Madasu and Lovell, 2005; Pasupathinathan et al., 2005). Accordingly, the banking industry is committed to maintaining the quality and integrity of cheque clearing to ensure a high level of customer service and transparency.

Clearing is about passing instructions to another participant with a view to obtaining finality of payment (Clacher, 2006). This typically occurs at a clearing house under established rules and procedures which include not only the operational requirements on those clearing institutions but also how settlement for the underlying values is to be obtained.

The automatic clearing of a bank cheque involves extraction and recognition of handwritten or user entered information from different data fields on the cheque such as courtesy amount, legal amount and date.

An electronic cheque clearing system (ECCS) is defined as the process of inter-bank cheque settlement by using both cheque electronic records and scanned copy of the cheque (Pasupathinathan et al., 2005). Once the teller in the bank of first deposit (BFD) receives the cheque item, the scanned copy is sent to the paying bank through the central bank to be technically and financially cleared through high speed secure connection lines. The reply for that action to pay or reject the cheque is generated from the paying bank to the central bank and then sent to (BFD) (Jresat, 2007). On the contrary to the traditional cheque clearing process, this occurs at the central bank clearing center with the physical attendance of all banks' representatives.

Cheque imaging by ECCS involves the scanning of a cheque to create a digital image which can be transferred through a data link, CD-ROM or cartridge (Madasu and

Lovell, 2005; Pasupathinathan et al., 2005; Clacher, 2006). Cheque truncation is the electronic presentation of the essential details of a cheque without the cheque itself having to be physically presented. With cheque imaging and truncation, physical cheques remain with the collecting bank or with the central bank if the collecting bank has commissioned the central bank to do the imaging on its behalf (CBJ website, 2009).

The center of the cheques clearing process is the clearing house, central bank, monetary agency or federal reserve. The roles of all these governmental institutions is to verify the cheque clearing process and enforce financial procedures, regulations and laws, as well as to monitor and follow up their implementation (CBJ Website, 2009).

The adoption of ECCS yields a variety of advantages (Madasu and Lovell, 2005; Clacher, 2006). First, the electronic processing and storage of cheque images is expected to result in improved efficiency of cheque clearing and in cost savings. Secondly, imaged cheques are easy to process, transfer and retrieve. Remote access to the image database through PC workstations allows instantaneous information retrieval to facilitate checking and investigation of cheque images. A study by electronic cheque clearing house organization (ECCHO) found that banks with (10) billion dollar assets will save (7) million dollars as a result of clearing the cheques electronically, and banks with (1000) billion dollars will save (260) million dollars per year (Clacher, 2006; Jersat, 2007).

Although ECCS become the corner stone in conducting cheque clearing services in many countries, it is observed that there is a limited number of studies that have been conducted on understanding ECCS users' adoption or usage intention. In this context, studies are found limited for many countries, including Jordan (Jersat, 2007).

Due to limited research on ECCS in Jordan, information on factors influencing ECCS success is

limited. The current study addresses this shortcoming. The findings of this study will help the banking industry in developing strategies, which propose opportunities for individuals and organizations to uncover unseen problems, thereby improving the use and acceptance of ECCS.

Theoretical Foundations of ECCS Success Model

The primary objective of this study is to identify the key factors that influence the acceptance of ECCS by Jordanian commercial banks. Given our focus on a specific type of information technology (ECCS) in developing our theoretical model, we drew inspiration from three significant streams of IS success: (a) The technology acceptance model (TAM) (Davis, 1989), (b) User satisfaction and (c) Delone and Mclean information success model (Delone and Mclean, 1992, 2003), to explain the success of ECCS. The integrated research model is presented in Figure (3).

(a) Technology Acceptance Model

The first theoretical base of this study is Davis (1989) Technology Acceptance Model (TAM), Figure (1). TAM is widely applied to investigate user acceptance of technology. Davis (1989) claimed that all else being equal, an application that the end-user perceives as being easier to use than another is more likely to be accepted. According to TAM, perceived usefulness and perceived ease of use both influence one's attitude toward system usage, which influences one's behavioral intention to use a system, which, in turn, determines the actual system usage.

The measures presented in Davis (1989) study target user acceptance of computers, but TAM measures have been tested and validated for a variety of types of systems, users… etc. (Wixom and Todd, 2005).

Obviously, the models of technology acceptance which were originally developed and surveyed could concentrate either on behavioral intention or usage behavior or both behavioral intention and usage behavior depending on the time horizon of their studies (a cross-sectional study *versus* a longitudinal study) (Wixom and Todd, 2005). If the technology had never been introduced before or had just been introduced recently and individuals had no experience about the technology or were in the early stage of experience with very few users of the technology at that time, usually only behavioral intention was measured. In contrast, if the technology had been introduced for quite a period of time, the actual usage behavior was usually measured, more specifically in the cross-sectional study. In the case of longitudinal study in association with a new technology, behavioral intention to use was captured before actual usage behavior was measured.

Originally, Davis (1989) found a weak link between perceived usefulness and attitude, but a strong link between perceived usefulness and behavioral intention; therefore, he dropped attitude from the final model. The revised model of TAM has two versions: pre-and post-implementation. Davis et al. (1989) expressed that in both phases of implementation, individuals would depend more on perceived usefulness and perceived ease of use to form intention which predicts acceptance behavior.

In fact, TAM has proven to be among the most effective models in the IS literature for predicting user acceptance and usage behavior. Yet, few of TAM studies have investigated the impact of system characteristics as antecedents to ease of use or perceived usefulness (Wixom and Todd, 2005). In their integration of the technology acceptance literature, Venkatesh et al. (2003) stressed the need to extend this literature by explicitly considering system and information characteristics and the way in which they might influence the core beliefs in TAM and might indirectly shape system usage. Recent studies that have used TAM as a theoretical framework have suggested to exclude attitude construct from the

TAM model since it does not mediate fully the effect of perceived usefulness and perceived ease of use on

behavioral intention as originally anticipated (Venkatesh, 2003).
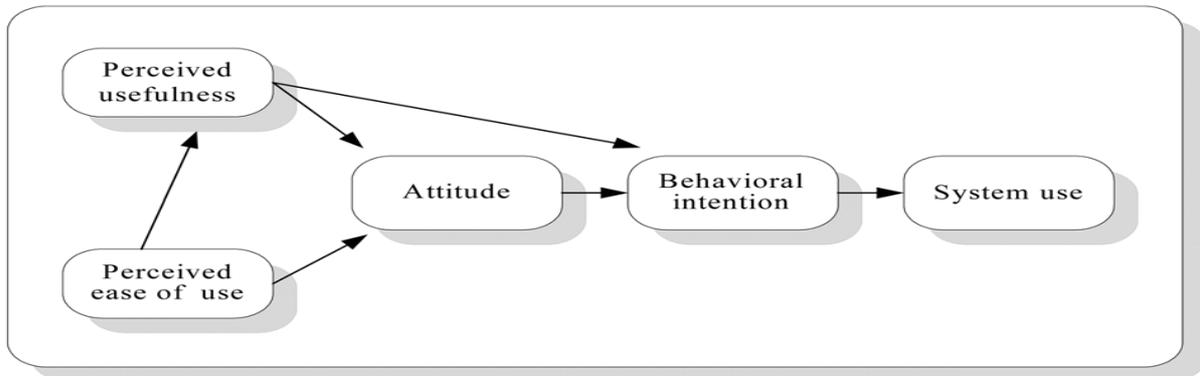

Figure (1): Technology Acceptance Model (TAM).

Source: Rotchanakitumuai and Speece (2003).

(b) User Satisfaction as Surrogate Indicator of IS Success

A surrogate indicator of IS success often suggested is user satisfaction. Many IS empirical researchers have regarded user satisfaction as the most important proxy of IS success, and it is the most employed measure of IS success due to its applicability and ease of use (Mahmood et al., 2000; Au et al., 2002; Delone and Mclean, 2003; Zviran and Erlich, 2003).

In the classification done by Grover et al. (1996), 50% of IS success assessments were user satisfaction ones. Delone and Mclean (1992) also cited 33 journal articles out of 100 for the period 1981 to 1987 in which information system success assessments employed user satisfaction. Delone and Mclean explained this reliance on user satisfaction measures as follows: *"[Not only does] satisfaction have a high degree of face validity due to reliable instruments having been developed by past researchers. It is hard to deny the success of a system, which its users say that they like. But also most other measures are either conceptually weak or empirically difficult to validate"* (Delone and Mclean, 1992:69).

In the information systems (IS) literature, user satisfaction has been defined and described by linking attitudes $\rightarrow$ behaviour. For example, Baroudi et al. (1986:785) defined it as the *"extent to which users believe that the information systems available to them meet their information requirements"*. Baroudi et al. highlighted that user satisfaction is an attitude toward the IS. Etaezadi – Amoli and Farhoomand (1991:1) described satisfaction as "*the amount of affect that one feels for or against some object or behaviour",* and linked user attitude to success. Melone (1990) suggested that relating satisfaction (attitude) to intention to use or use of the system (success) has some similarity to the downstream research domain in the assumed influence (attitude$\rightarrow$ behaviour).

In contrast to the technology acceptance literature, system and information characteristics have been core elements in literature on user satisfaction (Delone and Mclean, 1992). Within this literature, user satisfaction is typically viewed as the attitude that a user has toward an information system. Doll and Torkzadeh (1991:6) argued that user satisfaction is an important theoretical construct because of its potential to determine both upstream and

downstream links in this value chain (Figure 2). Upstream activities refer to factors that cause satisfaction, where user satisfaction is treated as a dependent variable, and downstream activities refer to behaviours affected by satisfaction, where user satisfaction is treated as an independent or antecedent factor (Doll and Torkzadeh, 1991; Delone and Mclean, 1992).
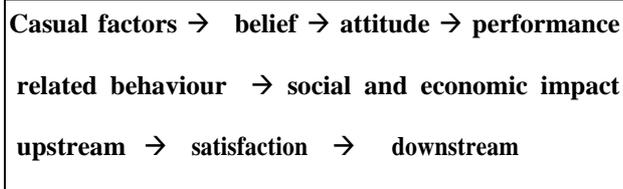

Casual factors → belief → attitude → performance related behaviour → social and economic impact upstream → satisfaction → downstream

---

Figure (2): Systems to Value Chain.

Source: Doll and Torkzadeh (1991).

In a recent review of user satisfaction research, Al-Shibly showed that user satisfaction research has focused on the upstream activities and that studies on the downstream chain have been relatively narrow (Al-Shibly, 2006). In similar vein, a review of antecedents of IS success showed that research concerning performance related behaviour has been light but regular since the late 1970s containing only a few concepts (Al-Shibly, 2006), with measures such as the one identified as "individual impact" by Delone and Mclean (1992).

A key problem with user satisfaction research is the range of factors influencing user satisfaction. Such factors are often difficult to isolate due to their complex interrelationships (Al-Shibly, 2006) and the fundamental similarity of user satisfaction and user attitude noted by Melone (1990) and Mathieson (1991). Initially, the measurement scope of user satisfaction was mainly limited to system characteristics for end-users (e.g., Doll and Torkzadeh, 1988; Miller and Doyle, 1987) or information features received from the system (e.g., the user information satisfaction instruments). Information

features and service quality were not always explicitly separated as dimensions of user satisfaction until Delone and Mclean (1992).

One of the implicit suppositions made by researchers employing user satisfaction measurements for IS effectiveness evaluation is that there will be a correlation between user satisfaction and IS effectiveness. However, as noted by Gatian (1994) as well as Melone (1990), there is an evidence that this is an inaccurate assumption. Such an argument was developed by Melone (1990) in a review of a range of literature. Firstly, user satisfaction as a measure of effectiveness implies a particular view of the organisation and its management; namely a focus upon support rather than output. Secondly, Melone argued that it possible to have an effective IS system without satisfied users. Melone also criticized user satisfaction research that fails to realize that attitudes of end users change over time, and recommended using a longitudinal design that tracks user attitudes and behaviours. However, this is difficult to conduct in practice when technology is changing rapidly and the employee turnover is high (Gatian, 1994).

Al-Shibly's review of user satisfaction concluded that user satisfaction alone is not sufficient to adequately capture the full meaning of IS effectiveness, since it does not link user satisfaction with measures of user behaviour, with the possible exception of research attempting to link satisfaction with system usage (Gatian, 1994:119). The relation between usage and performance was not significant in some studies (e.g. Gelderman, 1998) and does not necessarily translate into effectiveness. In particular, Doll and Torkzadeh (1991:6) pointed out that to define "*performance related behaviours that link user satisfaction with social and economic impact*" was a problem for IS researchers. They argued that too often such performance related indicators might be specific to individual systems and

hence have no broad use.

(c) Delone and Mclean Information Success Model

Although user satisfaction has for a long time been recognized as an indicator of IS success (Bailey and Pearson, 1983; Ives et al., 1983; Seddon, 1997), the mechanisms by which it was measured were not clear. Information and system features have not always been explicitly separated as dimensions of user satisfaction until Delone and Mclean (1992) distinguished information quality and system quality. This structure was retained and extended in the model of Pitt et al. (1995) who added a new dimension: service quality. This structure was retained in the models of Molla and Licker (2001) and Delone and Mclean (2003).

Delone and Mclean (1992) conceptually developed, but did not empirically test, a model of IS success that included six aspects: system quality, information quality, use, user satisfaction, individual impact and organizational impact. System quality refers to the characteristics of the information system as well as the "processing" of the system, the flexibility offered by the system, the amount of information/resources it accesses… etc. Delone and Mclean (2003:25) refer to information quality as a "content issue."

Seddon (1997) modified Delone and Mclean's model based on theoretical considerations. Seddon integrated additional construct of perceived usefulness from TAM (Davis, 1989) and developed a modified model which included three types of variables: measures of information and system quality, system use as a behaviour and general measures of net benefits from system use. Rai et al. (2002) further built on Delone and Mclean and Seddon. They viewed the usefulness as being related to individual impacts and noted that it was based on several constructs Delone and Mclean had linked to individual impacts, such as improved

individual productivity. Rai et al. (2002) focused on five constructs: system quality, information quality, perceived usefulness, user satisfaction and system use, and represented system quality in terms of ease of use and system use in terms of system dependence. They conducted a survey on 274 users of an integrated student information system, and tested Delone and Mclean's and Seddon's models. Based on the empirical results, they also tested an amended Seddon model, including a correlation path between perceived usefulness and system use, and found this model to have the best performance.

In 2003, Delone and Mclean presented a reformulated version of their classic model, taking into account both the changing nature of IS and some of the criticisms directed at their 1992 model. The criticisms that they took into consideration concerned elements included in the quality dimension and the nature of the impacts. Delone and Mclean refined their model by merging all impacts (including organizational and individual) in one generalised component: net benefits. They also added a return loop from net benefits to intention of use and user satisfaction. Net benefits generalize the notion of benefits since many researchers suggested that the impacts of IS could be expanded to include diverse entities.

Integrated Research Framework and Hypotheses

Drawing upon the literature, this study suggests that using user satisfaction as a surrogate indicator for measuring the success of ECCS has some theoretical difficulties. In similar vein, using TAM alone may not be sufficient to adequately capture the full meaning of the success of ECCS. ECCS success is a joint function of system and information characteristics and acceptance. By integrating these theories, this study suggests that the technology acceptance literature and the parallel user satisfaction stream are not competing

approaches to understanding IT usage and value. Rather, they represent complementary steps in a causal chain from key characteristics of system design to beliefs and expectations about outcomes that ultimately determine usage noted by Al-Shibly (2006). The incorporation of quality into the ECCS success model must describe the dependency of user satisfaction on system quality and information quality. This supports the underlying belief in Delone and McLean's 2003 model that user involvement should lead to increased positive outcomes for the user.

In attempting to understand the antecedents to ECCS success, perceived system and information quality constructs from Delone and Mclean and Rai et al.'s modified Seddon models are posited as two key drivers of perceived usefulness and perceived ease of use, albeit with one modification. Perceived ease of use is separated from system quality, which is consistent with Al-Shibly et al.(2004) who suggested the effort which users believe is involved in using an IS considered as an important factor in building user satisfaction. Given this, the emphasis on ease of use as a dimension of IS is argued to be increasing. Now, ease of use is part of the system quality, but the system level contributes only part of the factors determining ease of use. In our study, user satisfaction refers to the extent to which the user is satisfied with his/her interaction with the system.

Delone and Mclean (1992:69) describe individual impact as "*an indication that an information system has given a user a better understanding of the decision context, has improved his or her decision-making productivity, has produced a change in user activity, or has changed the decision maker's perception of the importance or usefulness of the information system*" (p. 69). Seddon (1997) believes that individual impact means benefits accruing to individuals from using the IS.

We claim that perceived usefulness covers some aspects of individual impact. Perceived usefulness essentially covers the impact on decision-making productivity. Nevertheless, in this study, perceived usefulness refers to the degree to which a user believes that using ECCS would enhance his or her job performance" (Davis 1989: 320) .

Delone and Mclean (2003) argued that the "net benefits" variable must be defined within the context of the system under study and within the frame of reference of those assessing the system impact, as these variables substantially influence what constitutes net benefits and hence IS success. Accordingly, in this study, the success construct refers to the actual benefits adopters receive from using the ECCS and includes a myriad of sub-constructs covering the impacts of ECCS on banks performance in cheque clearing services and the actual benefits which banks receive from utilizing ECCS. These cover direct benefits. Benefits are mostly operational savings related to the internal efficiency of the bank such as: cost-cutting and bank performance.

The proposed constructs and hypotheses are fully supported by prior studies in the IS literature. Drawing upon literature and based on the present research context, we hypothesize the following:

H 1: ECCS user satisfaction is positively associated with ECC system quality.

H 2: ECCS user satisfaction is positively associated with ECCS information quality.

H3: ECCS user satisfaction is positively associated with ECCS perceived ease of use.

H 4: ECCS user satisfaction is positively associated with ECCS perceived usefulness.

H5: ECCS success is positively associated with ECCS users satisfaction.
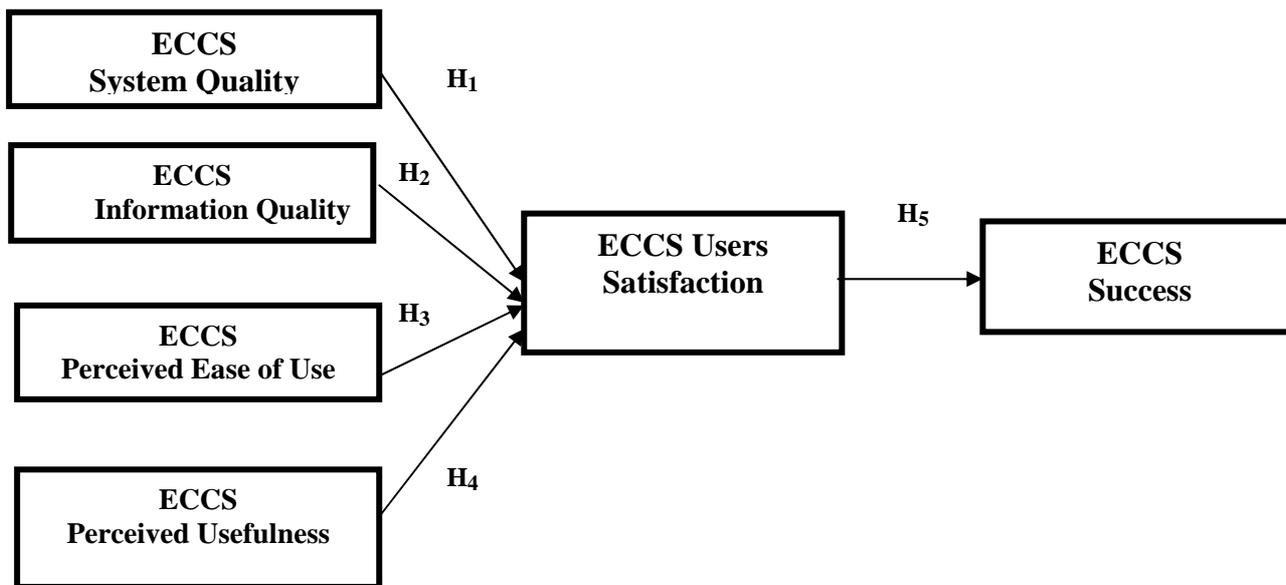
Figure (3): The Integrated ECCS Success Research Model.

Methodology

Population and Sample

The population of the study consisted of employees of the central bank of Jordan and all commercial banks licensed and working in Jordan, and these comprise 24 banks. As this research linked success of ECCS with the reaction of users (specifically to their sense of ECCS impact), knowledge of ECCS is assumed and expected in the target population. Accordingly, subjects for this study were then chosen using a stratified random sampling based on their knowledge of ECCS. Only employees using ECCS in their work were included in the samples. From the sampling frames of the 24 banks and the central bank of Jordan, a total of 420 subjects were chosen as samples. The sample size was acquired from the table of Sekran (2006) that simplified the sample size decision to ensure a good decision model.

Measures

The study used perceptual measures to capture data on IS success. Perceptual measures are acceptable measures in most survey research. In most of the questions, a four-point Likert-scale was used to represent the responses of the subjects. The four-point scale was adopted in the study to overcome the problem of "not sure" or "don't know" responses (Straub et al., 2005). The four-point scale was also used to overcome the problem of too many neutral responses, which are common among Jordanian people when given the option to choose.

Where possible, Delone and McLean (2003) supported the use of validated measures for IS success. Thus, the study adapted measurement items from related studies on IS success.

A 7–item scale was adopted and refined from instruments used by Wixom and Todd (2005), and Seddon and Yip (1992) instruments were used to operationalize ECC system quality.

12 items from Bailey and Person (1983) and Seddon and Yip (1992), with modifications to fit the specific context of ECCS, were used to operationalize ECCS information quality. Bailey and Pearson's instrument is widely accepted, has been tested for reliability and validity by several researchers and has become a standard instrument in the IS field.

8 items from Davis (1989) were used to

operationalize ECCS perceived usefulness, and 4 items from Sun and Zhang (2006) were used to operationalize ECCS perceived ease of use. 4 items from Seddon and Yip (1992) were used to operationalize overall satisfaction towards the system. 7 items were developed to operationalize the ECCS success.

This research linked success of ECCS with the reaction of users, specifically to their sense of ECCS benefits. Knowledge of ECCS technology was assumed and expected in the respondents, not only in the sense of web technology specialists, but also in the sense of users using an ECCS. For that reason, it was necessary to establish a picture of the characteristics of the respondents in the sample to ensure that these meet the criteria established earlier. Accordingly, besides the above items, demographic factors (age, gender, educational level, years of banking experience, years of cheque clearing experience and years of using banking information systems) were also measured.

Data Collection

The study used a self-administered questionnaire to measure the study variables. The questionnaire was pre-tested and distributed to members of postgraduate studies and academics who are in the information systems area of specialization. The respondents were asked to critically evaluate the questionnaire with regards to its objective, contents, clarity and ease of completion, and they also assisted in translation and validating the Arabic version of the survey distributed to ECCS users.

After the pre-testing stage, a modified questionnaire was developed for the purpose of conducting a pilot study. The questionnaire was also translated into Arabic to cater for banks' staff.

The pilot study was carried out on three banks .Ten questionnaire forms weredistributed into each bank with high volume of check clearing. About 20 questionnaire

forms were collected and found reliable. Prior to the actual fieldwork, the questionnaire forms were refined and rephrased accordingly. The modified questionnaire forms were then distributed to employees of the selected banks. A total of 420 questionnaire forms were distributed, and 304 were returned giving a 74 percent response rate which represents a fair rate according to Sekran (2006).

Respondents' Profile

Table 1 provides a summary of the respondents' profile.

Male respondents represented a slightly higher percentage of the completed sample (68.4%) compared to female respondents (31.6%). The majority of the respondents (approximately 65%) were aged less than 35 years.

The sample was composed of well educated individuals, as illustrated in Table (1). Only 7.6% out of the total respondents hold post-graduate degrees. The majority of respondents hold bachelor degree with a percentage of 62.8% out of the total respondents, and 26.6% out of the total respondents hold community college degree. And only 3% out of the total respondents had secondary education.

As shown in Table (1), 44.1% out of the respondents have banking experience less than five years, and 55.9% out of the respondents have banking experience five years and more. As for respondents experience in check clearing, 69.9% out of the total respondents have less than five years experience, and 30.1% out of the total respondents have experience five years and more.

The respondents were mostly experienced banking information systems users. 53.3% of the respondents had more than 5 years experience in using banking information systems. 34.8% of the respondents spend approximately 6 hrs to lees than 8 hrs per day working with ECCS, and 27.7% of respondents spend approximately more than 80% up to 100% of there daily work using ECCS.

Table (1): Respondents' Profile.

Characteristic	Item	Frequency	Percentage %
Gender	Male	203	68.4
	Female	94	31.6
Age	Less than 25 Y	72	23.9
	25 Y-less than 35 Y	125	41.5
	35 Y-less than 45 Y	81	26.9
	45 Y-less than 55 Y	21	7.0
	55 Y and more	2	0.7
User's Education Level	Secondary	9	3.0
	Community College	81	26.6
	Bachelor	191	62.8
	Master	19	6.3
	PhD	4	1.3
Banking Experience	Less than 1 Y	34	11.2
	1 Y-less than 5 Y	100	32.9
	5 Y-less than 10 Y	38	12.5
	10 Y-less than 15 Y	64	21.1
	More than 15 Y	68	22.4
Cheque's Clearing Experience	Less than 1 Y	93	30.8
	1 Y-less than 5 Y	118	39.1
	5 Y-less than 10 Y	45	14.9
	10 Y-less than 15 Y	33	10.9
	More than 15 Y	13	4.3
Banking Information Systems' Experience	Less than 1 Y	40	13.2
	1 Y-less than 5 Y	101	33.4
	5 Y-less than 10 Y	46	15.2
	10 Y-less than 15 Y	73	24.2
	More than 15 Y	42	13.9
ECCS Usage by hour	Less than 2 hrs	36	11.9
	2 hrs-less than 4 hrs	50	16.6
	4 hrs-less than 6 hrs	71	23.5
	6 hrs -less than 8 hrs	105	34.8
	8 hrs and more	40	13.2
On average, I spend	From 0 % to 20 %	39	13.0

Characteristic	Item	Frequency	Percentage %
approximately … hours/day working with ECCS.	More than 20% to 40 %	56	18.7
	More than 40 % to 60 %	56	18.7
	More than 60% to 80 %	66	22.0
	More than 80% to 100%	83	27.7

Factor Analysis and Reliability

Since the scales were translated into Arabic and used with a new sample, the scales were separately submitted to exploratory factor analysis. The best fit of the data was obtained with a principal component analysis with a varimax rotation. Thus, principal factors with varimax rotation of ECC system quality, ECC information quality and ECCS perceived usefulness items confirmed the structure proposed at the study research model (Figure 3). As can be seen in Table (2), all items converged neatly onto their corresponding constructs with relatively high factor loadings. For example, the 7 items measuring the ECC system quality showed clean loadings in the factor structure and demonstrated discriminate validity. According to Hair et al. (2006), the appropriate cut-off significant loading points based on 200 samples is 0.4. Thus, based on the results of the factor analysis, the study accepted all the items that represent the constructs. Hence, it can be concluded that the instrument has construct validity. The factor loadings of the items are displayed in Table 2.

We used Cronbach's Alpha to estimate reliability for scales. The alpha reliabilities of these factors were: 0.70, 0.89, 0.90, 0.88 and 0.84, respectively. Thus, the scales met the generally accepted reliability of 0.70 (Hair et al., 2006).

Table (2): Factor Loadings of Interdependent Variables.

Item	Factor 1 ECC system quality	Factor 2 ECC information quality	Factor 2 ECCS perceived ease of use	Factor 3 ECCS perceived usefulness
1.	**0.82**	0.11	0.03	0.17
2.	**0.74**	0.11	0.09	0.12
3.	**0.73**	0.02	0.02	0.17
4.	**0.59**	0.08	0.03	0.18
5.	**0.80**	0.12	0.01	0.2
6.	**0.75**	0.01	0.15	0.25
7.	**0.68**	0.03	0.08	0.25
8.	0.07	**0.80**	0.15	0.18
9.	0.14	**0.79**	0.17	0.1
10.	0.23	**0.75**	0.22	0.2
11.	0.03	**0.70**	0.02	0.22
12.	0.09	**0.40**	0.03	0.19

Item	Factor 1 ECC system quality	Factor 2 ECC information quality	Factor 2 ECCS perceived ease of use	Factor 3 ECCS perceived usefulness
13.	0.06	**0.78**	0.02	0.15
14.	0.08	**0.77**	0.07	0.15
15.	0.17	**0.73**	0.18	0.17
16.	0.09	**0.80**	0.02	0.2
17.	0.15	**0.80**	0.04	0.25
18.	0.05	**0.56**	0.14	0.03
19.	0.07	**0.60**	0.12	0.22
20.	0.14	0.04	**0.77**	0.05
21.	0.15	0.06	**0.73**	0.12
22.	0.09	0.09	**0.77**	0.08
23.	0.2	0.05	**0.80**	0.02
24.	0.12	0.06	0.01	**0.85**
25.	0.16	0.02	0.06	**0.84**
26.	0.07	0.01	0.05	**0.83**
27.	0.12	0.01	0.02	**0.81**
28.	0.08	0.13	0.1	**0.80**
29.	0.11	0.09	0.07	**0.69**
30.	0.08	0.04	0.05	**0.65**
31.	0.16	0.09	0.19	**0.69**

We calculated means and standard deviations for each variable and created a correlation matrix of all variables used in hypotheses testing. Means, standard deviations, reliabilities and correlations among all scales used in the analysis are shown in Table 3. The means and standard deviations are within the expected ranges.

Table (3): Descriptive Correlations and Alpha Reliabilities of the Measures.

	Variables	Mean	S.D.	Alpha	1	2	3	4	5	6
1	ECC system quality	4.75	0.87	0.70	-					
2	ECCS information quality	4.61	0.77	0.89	0.428	-				
3	ECCS perceived ease of use	4.68	0.72	0.83	0.412	0.456	-			
4	ECCS perceived usefulness	4.73	0.79	0.90	0.398	0.384	0.365	-		

	Variables	Mean	S.D.	Alpha	1	2	3	4	5	6
5	ECCS overall satisfaction	4.68	0.91	0.84	0.546	0.442	0.527	0.512	-	
6	ECCS success	4.93	0.842	0.91	0.486	0.510	0.425	0.428	0.452	-

Results of correlation analysis revealed that ECC system quality, ECCS information quality, ECCS perceived ease of use, ECCS perceived usefulness, and ECCS users satisfaction are positively related to ECCS success, and the correlation coefficients between ECCS success and each of ECC system quality, ECCS information quality, ECCS perceived usefulness and ECCS users satisfaction are each statistically significant with r = 0.486, 0.510, 0.425, 0.428 and 0.428, respectively at 0.05 level of significance (see Table 3).

Hypotheses Testing Results

In order to test the hypotheses formulated previously, a series of simple linear regression analyses was conducted to calculate direct and indirect path coefficients (beta coefficients). Simple linear regression is a useful statistical method for exploring the relationship between dependent and independent variables. In social and natural science research, linear regression is widely used mainly for its simplicity and ability for producing output quickly. Hypotheses are considered supported when path coefficients (Beta) are significant at the 0.05 level. The SPSS 11.5 package for Windows was used for all statistical computations. The path coefficients were calculated using simple linear regression technique for the following:

1- Independent variables (ECC system quality, ECCS information quality, ECCS perceived usefulness, ECCS ease of use) separately regressed with the dependent variable (ECCS overall satisfaction). Those represent (H1, H2, H3 and H4).

2- Using (ECCS overall satisfaction) as an independent variable and regression was run for the dependent variable (ECC system success) that represents (H5).

In order to identify the most important independent variable that explains the behaviour of dependent variable, stepwise regression analysis was carried out. First, a regression model was developed to examine the effects of ECC system quality, ECCS information quality, ECCS perceived ease of use and ECCS perceived usefulness on ECCS satisfaction. Table 4 presents the standard regression weight (B), standard error of estimate, beta, T-ratio and the level of significance for each of the independent variables. This is with a view to further determining the relative power of each of the four independent variables to predict ECCS user satisfaction. The four independent variables have values that are significant at 0.05 level, thus implying that the variable contribute largely to the prediction of the dependent variable (ECCS user satisfaction).

The regression analysis shows that about 71 percent of the variance in ECCS satisfaction is explained by the four factors (adjusted R^2 =0.712). The regression model is significant in explaining satisfaction; the F-ratio of 174 is highly significant (p <0 .001).

The t-test of each factor in explaining satisfaction is significant (p<0.05). ECC system quality ((t (276) = 3.83), ECCS information quality (t (276) = 4.50), ECCS perceived ease of use (t (276) = 3.31) and ECCS perceived usefulness (t (276) = 9.08)); therefore, the four factors are making significant contributions in the model. The standardized Beta values for ECC system quality (0.17), for ECCS information quality (0.25), for

ECCS perceived usefulness (0.16) and for ECCS perceived ease of use (0.41) also indicate that ECCS perceived ease of use has more impact than ECC system quality, ECCS information quality or ECCS perceived usefulness. Overall results indicate support for the hypotheses H1, H2, H3 and H4.

Table (4): Multiple Regression Analysis Results for Hypotheses H1, H2, H3 and H4.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
ECC system quality	0.233	0.061	0.174	3.829	0.000	0.499	2.006
ECCS information quality	0.296	0.066	0.249	4.502	0.000	0.336	2.980
ECCS perceived ease of use	0.512	0.056	0.412	9.085	0.000	0.501	1.996
ECCS perceived usefulness	0.179	0.054	0.160	3.313	0.001	0.443	2.257
Model Summary			**ANOVA**				
R		0.846	**F**		173.666		
Adjusted R Square		0.712	**Sig.**		0.000		
Durbin-Watson		1.744	**df**		303		

In the next regression, the independent variable was ECCS user's satisfaction, and the dependent variable was ECCS success. Table 5 shows that 65 percent of the variance in ECCS success is explained by satisfaction (adjusted R^2=0.65), the F-ratio of 513 is highly significant (p < 0.001), the t-test is significant (p < 0.05), (t (277) = 22.65), and the standardized Beta value is about 0.80. So, satisfaction makes a significant contribution to explaining ECCS success. Overall results indicate support for hypothesis H5. Thus, the findings of the regression models are illustrated in Exhibit 1.

Table (5): Simple Regression Analysis Results for Hypothesis 5.

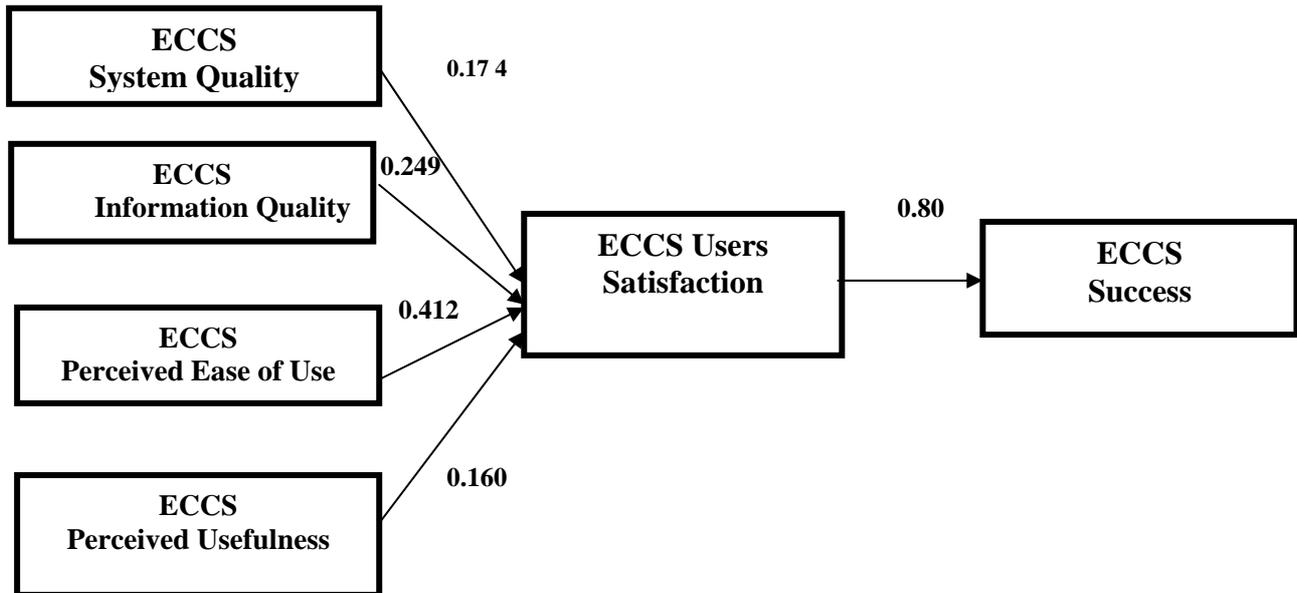| Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	0.040	0.126		0.317	0.751
Satisfaction	0.923	0.041	0.805	22.654	0.000
Model Summary			**ANOVA**		
R	0.805		**F**	513.19	
Adjusted R square	0.647		**Sig.**	0.000	
Durbin-Watson	1.686		**df**	303	

Exhibit (1) :Empirical Research Model.

Discussion, Conclusions and Implications for Further Research

This research tested the thesis that ECCS success is a joint function of system and information characteristics and acceptance. The data tentatively support this proposition, showing that ECCS information quality, ECC system quality, ECCS perceived usefulness, ECCS perceived ease of use and user satisfaction benefit are valid measures of ECCS success. The hypothesized relationships among the success variables were significantly supported.

It was hypothesized that TAM which assesses user acceptance and the user satisfaction stream are not competing approaches to understanding IS usage and value. Placed in this context, the results support this proposition and may help clarify an important issue in TAM and user satisfaction studies. They represent harmonizing steps in a causal chain from key characteristics of system design to beliefs and expectations about outcomes that ultimately determine usage.

Researchers in the area of conventional IS generally regard system quality a highly important characteristic of all interactive computer systems (Rai et al., 2002), independent of the specific application the system was designed to support. In turn, the findings of this research suggest that the greater the perceived system quality of a ECCS, the higher is the ECCS success, agreeing with (Rai et al., 2002). However, there has been little empirical research about the impact of system quality of ECCS on user satisfaction. Therefore, this research contributes to some extent to the current knowledge about the impact of system quality on user satisfaction.

The generic literature about the association between information quality and satisfaction is fairly consistent and suggests that high levels of information quality lead to high levels of satisfaction. Many studies have found that information quality is important for the success of general IS. Delone and Mclean (2003) put forward information quality and user satisfaction as two major dimensions for evaluating the success of IS. Our research confirms the previous research and found that there is a high association between information quality and users satisfaction. It also

adds to the literature by identifying that level of ECCS information quality is significantly associated with satisfaction in the ECCS context.

The third conclusion of the research relates to the impact of perceived ease of use on satisfaction. While use is not a new concept in IS research, our literature review shows that the use of ECCS is still an under-researched construct in the ECCS context. Delone and Mclean (2003) identified perceived ease of use as a determinant for the success of web sites in the context of e-commerce but did not test this. This research presents an empirical evidence suggesting that satisfaction with ECCS is positively associated to perceived ease of use, as previously speculated.

Implications for Theory and Academic Literature

The first and central contribution of the study is the development of a simple model that illustrates the importance of ECCS quality and TAM variables as criteria for ECCS success. The model appears to provide a useful and pioneering insight into ECCS success. The role of the two IS quality components (system quality and information quality) is not new. However, the developed understanding of the dimensions of each of the two components in the context of ECCS, and in the presence of TAM variables, through theoretical integration, provides new material.

In addition, the framework of this ECCS success model enabled the construction of a new instrument which measures quality of the ECCS and of different TAM components. This ECCS success instrument is simple, easy to administer and can be used with users of a variety of ECCS. This has several benefits for ECCS success researchers. At the level of a single study, this instrument can help a researcher select measures of ECCS success that will enable him/her to improve explanations of ECCS success in his/her theoretical model. At the level of the entire community of researchers who study ECCS success, the approach illustrates a disciplined way of creating ECCS success measures.

Limitations of this Research

Related to the research methods, there are several limitations of the research methods used in this study.

First, the current study was conducted at one point in time (cross-sectional design). While it provided a useful snapshot and helped understand the phenomenon under study, it could not explain possible changes in users' satisfaction over time (Starub et al., 2005).

Second, there were limitations arising from the sample used in this study. First, the sample size was relatively small. Given the relatively small size, more versatile and powerful statistical techniques such as structural equation modelling (SEM) which is optimized for large samples of 400 responses (Starub et al., 2005), could not be run. Instead, this study used conventional regression methods to analyze data gathered from the experiment.

In brief, this study provided a structure for understanding ECCS success and explored the impacts of ECCS quality on ECCS satisfaction, ECCS usefulness and ECCS ease of use. The detailed framework is the first rigorous research step toward understanding the important confluence of two powerful streams of IS success models on ECCS. The framework built from theory and empirical research provides a foundation for future research.

REFERENCES

Agarwal, R., Rastogi, S. and Mehrotra, A. 2009. Customers' Perspectives Regarding E-Banking in an Emerging Economy**, Journal of Retailing and Consumer Services**, In Press, Corrected Proof, Available online, 29 April 2009.

Akinci, S., Afak, S., Aksoy and Atilgan, E. 2004. Adoption of Internet Banking among Sophisticated Consumer Segments in an Advanced Developing Country, **The International Journal of Bank Marketing**, 22(3): 212-232.

Al-Shibly, H. 2006. Customer Satisfaction and Empowerment as the Prerequisite for Web-Based Electronic Commerce Systems Success, Unpublished PhD Thesis, School of Design, Communication and Information Technology, University of Newcastle, Newcastle, Australia.

Au, N., Ngai, E. and Cheng, E. 2002. A Critical Review of End-User Information System Satisfaction Research and A New Research Framework, **Omega: The International Journal of Management Science**, 30 (6): 451- 478.

Bailey, J. and Pearson, S. 1983. Development of a Tool for Measuring and Analyzing Computer User Satisfaction, **Management Science**, 5 (12):519-529.

Baroudi, J. J., Olson, M. H. and Ives, B. 1986. An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction, **Communications of the ACM**, 29 (March):232-238.

Calisir, F. and Gumussoy, C. 2008. Internet Banking *versus* Other Banking Channels: Young Consumers' View, **International Journal of Information Management**, 28(3):215-221.

Cavalluzzo, K. 2002. Competition, Fee-for-service Requirements and Government Performance: Evidence on the Federal Reserve, **Journal of Accounting and Public Policy**, 21(4-5): 315-356.

Clacher, I. 2006. Challenges Facing Banking in Emerging Markets. A Case Study on the Tanzanian National Payments Systems, **Journal of Financial Regulation and Compliance**, 14: 112-118.

Davis, F. D. 1989. Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology, **MIS Quarterly**, 13(3): 319-340.

Delone, W. H. and Mclean, E. R. 1992. Information Systems Success: The Quest for the Dependent Variable, **Information Systems Research**, 3(1): 60-93.

Delone, W. H. and Mclean, E. R. 2003. The Delone and Mclean Model of Information Systems Success: A Ten-Year Update, **Journal of Management Information Systems**, 19(4):9-30.

Doll, W. J. and Torkzadeh, G. 1988. The Measurement of End User Computing Satisfaction, **MIS Quarterly**, 12(2):259-274.

Doll, W. J. and Torkzadeh, G. 1991. The Measurement of End-User Computing Satisfaction: Theoretical and Methodological Issues, **MIS Quarterly**, 17(2):5-10.

Etezadi-Amoli, J. and Farhoomand, A. F. 1991. On End-User Computing Satisfaction, **MIS Quarterly**, 15(1): 1-4.

Gatian, A. W. 1994. Is User Satisfaction a Valid Measure of System Effectiveness? **Information and Management**, 26:119-131.

Gelderman, M. 1998. The Relation between User Satisfaction, Usage of Information Systems and Performance, **Information and Management**, 34:11-18.

Grover, V., Jeong, S. R. and Segars, A. H. 1996. Information Systems Effectiveness: The Construct Space and Patterns of Application, **Information and Management**, 31: 177-191.

Hair, J. F., Black, W. C., J.Babin, B., Rolph, E. Anderson, and Tatham, R. L. 2006. Multivariate Data Analysis (6 Ed.). Upper Saddle River- New Jersey: Pearson Educational International -Prentice Hall.

Hancock, D. and Humphrey, D. 1997. Payment Transactions, Instruments and Systems: A Survey,

Journal of Banking and Finance, 21(11-12): 1573-1624.

Ives, B. H., Olsoh, H. E. and Baroudi, J. 1983. The Measurement of User Information Satisfaction, **Communications of the ACM**, 26 (10): 785-793.

Jresat, N.F.2007. Economic Impact of Applying Electronic Cheque Clearing Solution: A Case Study-State of Qatar (2001-2005). Unpublished Master Thesis, University of Jordan, Amman, Jordan.

Khiaonarong, T. 2000. Electronic Payment Systems Development in Thailand, **International Journal of Information Management**, 20(1): 59-72.

Madasu, V. K. and Lovell, B. C. 2005. Automatic Segmentation and Recognition of Bank Cheque Fields. Proceedings of the Digital Imaging Computing: Techniques and Applications, IEEE Computer Society.

Mahmood, M. A., Burn, J. M., Gemoets, L. A. and Jacquez, C. 2000. Variables Affecting Information Technology End-User Satisfaction: A Meta-Analysis of the Empirical Literature, **International Journal of Human-Computer Studies**, 52(5):751-771.

Mathieson, K. 1991. Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior, **Information Systems Research**, 2 (3):173–191.

Melone, N. P. 1990. A Theoretical Assessment of the User Satisfaction Construct in Information Systems Research, **Management Science**, 36(1):76-91.

Miller, J. and Doyle, B. 1987. Measuring Effectiveness of Computer Based Information Systems in the Financial Services Sector, **MIS Quarterly**, 11 (1):107-124.

Molla, A. and Licker, P. S. 2001. E-Commerce Systems Success: An Attempt to Extend and Respecify the Delone and Mclean Model of IS Success, **Journal of Electronic Commerce Research**, 2 (4):131-141.

Pasupathinathan, V., Pieprzyk, J. and Wang, H. 2005. Privacy Enhanced Electronic Cheque System. Proceedings of the Seventh IEEE International Conference on E-Commerce Technology.

Rai, A., Lang, S. and Welker, R. 2002. Assessing the Validity of IS Success Models: An Empirical Test and Theoretical Analysis, **Information Systems Research**, 13(1):50-69.

Rotchanakitumuai, S. and Speece, M. 2003. Barriers to Internet Banking Adoption: A Qualitative Study among Corporate Customers in Thailand. **International Journal of Bank Marketing**, 21: 312-323.

Seddon, P. and Yip, S. K. 1992. An Empirical Evaluation of User Information Satisfaction (UIS) Measures for Use with General Ledger Account Software, **Journal of Information Systems**, 6(Spring):75-92.

Seddon, P. B. 1997. A Respecification and Extension of the Delone and Mclean Model of IS Success, **Information Systems Research**, 8 (3): 240-253.

Sekran, U. 2006. Research Methods for Business. Fourth Edition, India, John Wiley and Sons, Inc.

Straub, D. W., Gefen, D. and Boudreau, M.-C. 2005. Quantitative Research, In: Research in Information Systems: A Handbook for Research Supervisors and Their Students. Elsevier, Amsterdam: D. Avison and J. Pries-Heje (Ed.).

Sun, H. and Zhang, P. 2006. Causal Relationships between Perceived Enjoyment and Perceived Ease of Use: An Alternative Approach, **Journal of the Association for Information Systems**, 7(9): 618-645.

Venkatesh, V., Morris, M., Davis, G. and Davis, F.D. 2003. User Acceptance of Information Technology: Toward A Unified View, **MIS Quarterly**, 27 (3): 425-478.

Wixom, Barbara H. and Todd, Peter A.2005. A Theoretical Integration of User Satisfaction and Technology Acceptance, **Information Systems Research**, 16(1): 85–102.

Zviran, M. and Erlich, Z. 2003. Measuring IS User Satisfaction: Review and Implications, **Communications of the Association for Information Systems**, (12): 81-103.

( )

**   *   *

.

.(TAM)

.

2008   420   304   .

SPSS   )

(   )   (

.

)

.(

.

.

:   .

*
**

* The University of Jordan.
** Al-Balqa Applied University, Salt, Jordan.