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The eProcurement in Jordan: Measurements of Private Sector “eMaturity”

¹Adeeb A. Sarayrah and ²Ghassan A. Al-Utaibi

¹Arab Academy for Banking and Financial Sciences, Amman, Jordan

²New York Institute of Technology NYIT, Amman, Jordan

Abstract: Based on the eProcurement project that was initiated by the United Nations Development Program (UNDP) in Jordan in 2005, this project will set up an electronic business solution for governmental public sector institutions in Jordan. Public sector institutions would be the potential buyers capable of buying their goods and services online from the private sector seen here as the potential suppliers. The aim of this study was to propose and evaluate a model for measuring the level of eProcurement eMaturity for private sector in Jordan. The model comprised four maturity levels and twelve factors related to technological, organisational and managerial attributes related to eProcurement. To achieve the study’s aim, a questionnaire and interviews were developed including 71 selected samples from private sector firms in Jordan, representing different business sectors. The study showed that Jordan private sector focused on the basic web site, the majority of SMEs are in level one and the issues of security, ePayment, lack of legislations were the major factors that restrict the willingness to make a better use of online shopping. It was found that the model would be a useful tool for the private sector to evaluate their level of eMaturity; also due to certain requirements from public sector, the private sector should possess a high level of eMaturity.

Key words: Ematurity, eProcurement, small and medium, sized enterprises, public and private sector

INTRODUCTION

Information and Communication Technology (ICT) plays a key role in the way that public and private sector can do their business transactions online. It allows both to reach easily more buyers and suppliers and to reduce transaction costs and procurement processes. The proliferation of the Internet and its related technologies during the 90s onward, created an efficient and effective unique platform that help the world to communicate and do business globally (Turban *et al.*, 2006).

A definition of eProcurement varies from technology-focused view to a much broader business focused view. Most of eProcurement research studies place technology and applications centre stage focusing on the adoption and implementation of specific technology solutions such as integrated catalogues, reverse auctions or eMarketplace systems. Whilst such studies provide important insights into technology adoption they tend to investigate a limited range of procurement activities. Their focus is primarily on requisitioning (i.e., selection of products, authorisation, order placement etc.) and the operational/transactional aspects of eProcurement (Essig and Arnold, 2001; Osmonbekov *et al.*, 2002).

In this study the term eProcurement is used to refer to the use of electronic means in purchasing processes.

These processes include seeking information about goods and services, ordering and paying of goods (Andersen, 2004).

A number of studies have focused on the adoption of eProcurement from the perspective of public sector institutions. In Australia, for example (Couthard and Castleman, 2001) focused on the possible differences between adoption of eCommerce by businesses and public institutions. Their assumption was that public institutions pursue a wide variety of goals. These goals go beyond mere efficiency and streamlining of benefits. Andersen (2004) also focused on the public sector as the potential adopter of eProcurement. Both studies concluded that there were no obvious economic or strategic outcomes of eProcurement adoption. Regardless of whether adoption is viewed from the buyer or the supplier perspective it is apparent from the last few decades of IS-research that organisations face a plethora of challenges when implementing IS-driven innovations such as eProcurement (Larsen *et al.*, 2002).

Successful eProcurement strategy in private sector mainly is looking to find out different ways for eliminating cost and barriers in process without affecting the eProcurement efficiency, this will help small to medium enterprises (SME’s) to generate more profits and to overcome most of their problems. “Meanwhile, in the

public sector, eProcurement is seen as a way of contributing effectively to reducing corruption and increasing transparency in the government purchasing process” (Magrini, 2005).

One of the UNDP strategic tools for cooperation with Jordan for the period 2003-2008 is the government public sector eProcurement project, this project authorizes the public sector to buy their goods and services on line from private sector local or international, this project will contribute in helping the development of Private and public sector.

This study was conducted in Jordan in the period from March 2008 to April 2009. It looks at the willingness of suppliers to adopt eProcurement when dealing with public sector institutions in Jordan. A model for assessing private sector eMaturity was developed. The model is designed to embrace three aspects of eMaturity: The technological aspect organisational aspect and the managerial aspects.

The objective of this study was to outline the factors of an eMaturity model and to present the outcome of a qualitative, empirical assessment of an eMaturity model. The objective of the empirical assessment was to illustrate how organisations perceive the relative importance of technological, organisational managerial attributes related to eProcurement and how they position themselves with respect to maturity. The empirical assessment of the model was based on questionnaires and semi-structured interviews with suppliers of goods to private sector firms in Jordan.

eMaturity: In reference to the Capability Maturity Model (CMM), a number of terms are used to illustrate the benefits of applying this model in organisations. Writers such as (Paulk *et al.*, 1995) referred to issues of control, effectiveness and predictability to give more meaning to maturity. These concepts were summarized in Harmon (2004) newsletter as follows:

Control can be seen as “the consistency with which organisations meet their goals”. Effectiveness is defined as “achieving the right outcomes in an efficient manner” while Predictability is “the use of schedules, milestones and goals that are met”.

In the field of information systems/information communications technology (IS/ICT), the term maturity is familiar for example in the field of the Stages of Growth model (Galliers and Sutherland, 1991; Nolan and Gibson, 1974). This Focuses on IT and organisation stage, the readiness of suppliers to engage in eCommerce. And demonstrate the organisational stage in its development process where the organisational usage of IT is measured. So the term maturity is often used to show up the state of a given level in a continuous improvement process.

Maturity can be measured by recognizing a number of growth stages that shows the potential progression levels in an Organisation’s performance, throughout several sequential periods of time. Time or periods are presented on the horizontal dimension whereas the performance level is projected on the vertical dimension. Within the field of information systems, the Nolan model is often concedes as the origin of the maturity perspective (Nolan, 1979). With the assumption that the higher level and the higher performance is the more mature, for an organisation.

The ematurity evaluation tools

The ematurity levels model: One of the best tools that can be used to measure the private sector maturity for Jordan Organisations is called a maturity model. A maturity model is a method for measuring the progressive of an organisations processes and identifying the major business factors that are required to increase the maturity stage of these processes. Maturity models exist for a number of processes. One of the most well known is the Capability Maturity Model (CMM) for software development from the Software Engineering Institute (SEI) at Carnegie Mellon University. Each level represents a certain degree of maturity performance ranging from level one (Immature) to level four (Mature).

Ematurity levels criteria: The proposed factors used as a tool for measuring eMaturity of private sector in Jordan based on Gallier’s Stages of Growth Model (Galliers and Sutherland, 1991) which is a further development of the Nolan-model (Nolan and Gibson, 1974; Andersen *et al.*, 2000; Andersen *et al.*, 2001) Which are also a further development of variables outlined by Massetti and Zmud (1996). There are many factors that can contribute effectively in building the maturity stages to any organization, those factors are focusing on many attributes as management, organizational and technological, that needs to be proceeding on a regular basis to ensure that they reach appropriate stage. Those factors have been adjusted specifically to assess eMaturity. Each of the factors is divided into four levels of eMaturity. Each level represents a certain degree of maturity ranging from immature to mature. For statistical finding each level has it’s same point of Likert scale, the researchers suggest that eMaturity levels description for proposed factors are as shown in Table 1.

Sample: The sample contains 71 firms, the firms have been selected from different businesses sectors broken down into six main businesses namely: Services, Agriculture and food, Constructions, Groups, Industrial and Trading. All firms participated in questionnaires but 31 of them participated into interview. Table 2 shows respondents firms’ profile.

Table 1: eMaturity four levels

eMaturity levels	Likert scale (1-4) points	Levels description
Level one	1	Suppliers use basic Web site. Digital catalogue distributed via off-line means Infrequent updating. No or little integration. Printing of orders and Messages Manual handling. Skeptical No belief in the possible technological opportunities created by eCommerce. No change. Manual processes employee intensive sales process. Do not use technological opportunities, Individual Enthusiastic employees. Generally no recognition of needs
Level two	2	Suppliers use on-line transaction. Content management. Partially integrated. Conversion of e-mail to ERP-system. Few document types Manuel. Conservative. Believe that small investment and resource needed to create value. Adjusted new tasks are incorporated in the old process. Old process is still dominant. Mostly manual tasks in the sales process. Much manual typing of data. eCommerce is seen as an IT project. Lack of computer literate
Level three	3	Suppliers have formulated an eCommerce strategy and critical success factors have been outlined. More channels have been taken into use and the organisation has changed some business routines. Investments in eCommerce are seen as opportunities for cost reduction and at the same time as a way to free resources for more service oriented tasks. Integrated systems eCatalogue automatically generated. Frequent and online updating Supports different standards. Largely integrated replicating order information as a batch process between ERP and the eCommerce model. Several document types Automatic Pragmatically strategy. Result orientation eCommerce incentives must fulfill the expectation. Eliminate unnecessary operations, Processes are streamlined Reduction in process cyclic time, Tasks related to product information on customer demand education of the sales Force. In marketing eCommerce is seen as a commercial project, Information Systems literate.
Level four	4	Suppliers use several eCommerce channels. Customer support has a high priority. Manual routines are eliminated to fully automated procedures. Customized the product information based on customer demand is digitally handled. Full integration digital transaction of information to ERP systems. Visionary strategy Dramatic changes Incorporating new business opportunities. Account management the sales force support different eCommerce models CRM. Executive inter- organisational eCommerce coordination, Knowledge workers Highly trained

Table 2: Respondents firms profile

Business sectors	No. of firms participating in interview and questionnaires	No. of firms participating only in questionnaires	Total number of firms
Services	7	13	20
Agriculture and food	4	3	7
Constructions	2	1	3
Groups	2	6	8
Industrial	7	7	14
Trading	9	10	19
Total	1	40	71

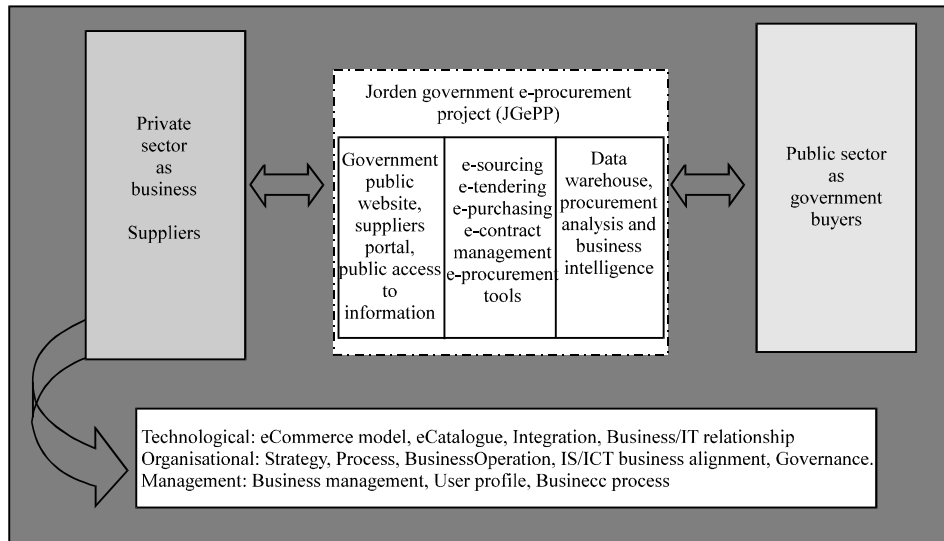


Fig. 1: eProcurement schematic representations

eProcurement framework: To establish clear concept for eProcurement framework, the researchers connected public sector and private sector with its measurement factors to GeP (within the dashed rectangle) (Fig. 1) that aimed to provide an online, efficient, effective and

transparent process between public and private sector, while allowing others to access procurement information. This will be conducted through a common web site that allows registration of suppliers and buyers, public access to eProcurement policy, guidelines, opportunities, process

stages and award (i.e., who won the contracts, cost, duration of contract). The system on the website can be accessed by both buyers and suppliers. This system allows the eProcurement process to be conducted on line. The system usually covers public tendering, goods and services. Payment can be made online, procurement system linked to a data warehouse, information and data analysis can be undertaken by both government and business to assist improved decision making.

RESEARCH METHODS

The study had adapted the descriptive, field and analytical method. A comprehensive survey utilizing questionnaires and field interviews was conducted. Data gathered was analysed using statistical methods. The developed questionnaires and interviews were adjusted to fit eProcurement implementation in the Jordanian environment.

To achieve the aims of this research, the following two questions needed to be addressed:

- What encourages and discourages the private sector to make good use of eProcurement with public sector in Jordan? This can be done by examining the influence of the following three factors on eProcurement behaviors in Jordan: ICT infrastructure and web services, expected benefits from eProcurement and obstacles to eProcurement adoption
- Does the private sector need to possess a high level of “eMaturity” as specific requirement from public sector customers to be able to make good use of eProcurement? This can be done by examining the influence of three Parameters on eProcurement behaviors in Jordan, namely, technological factors, organisational factors and managerial factors (TOM Factors)

Addressing these questions entailed a process of empirical assessment of the research model that was based on questionnaires and semi-structured interviews with suppliers of goods to private sector firms in Jordan.

Questionnaires: The primary goal of the questioners is to explore the following: (a) respondents’ ICT infrastructure capabilities needed for eProcurement transactions, (b) respondents’ views and experiences about eProcurement perceived benefits that encourage private sector to adopt eProcurement and (c) Respondents’ categorization of the obstacles that hinder eProcurement from being implemented successfully.

Interviews: To explore the perceived stages of maturity for selected Jordanian private sector supplier’s organisations (31 firm), in-depth and semi-structured interviews were carried out. The interview concludes the following main and sub- factors.

Technological factors

- **E-commerce model:** This relates to “connect suppliers to their customers. Based on the degree of innovativeness and the extent to which the applied eCommerce Model is functionally integrated” (Timmers, 2000). Four types of eCommerce Models can be identified as: “(basic Web site, on-line transaction, integrated systems and Advanced eCommerce)” (Rajkumar, 2001; Neef, 2001; Eyholzer and Hunziker, 2000)
- **ECatalogue:** This parameter contains detail information about suppliers’ digital product/services information. The development of this parameter can be divided into four stages: (digital, content management, automatically generated and customized). The eCatalogue represents goods/services that can be distributed by digital media, mainly CDs can be used
- **Integration:** Integration in its broadest meaning is a technical facility for bringing separate entities, or the extent to which back-office systems are integrated with the front office systems and operating at various levels. In eProcurement we want to bring suppliers and the government together at various points in the procurement process. Back-office systems are integrated with the front office systems, flow of information between internal and external organisational units can be measured from (No integration to full integration).
- **Business/IT relationship:** Dallas and Gomolvski, (2002) develop a model consisting of five maturity levels, their maturity model levels based on the assumption that the better the business-IT relationship, the greater the value added by the IS/ICT organisation. This concept related this assumption to the IS/ICT Return On Investment (ROI). The maturity model consists of four stages or levels as follows: Level 1. Laggard or (Uncertainty): Information focusing on the relationship between business IT and IS/ICT related to eCommerce and top management involvement is not clear. Level 2. Acceptance, this stage corresponds and characterized the improvement was made to establish the relationship between IS/ICT and business. Level 3. Trust is reached when business

units perceive that IS/ICT plays a leadership role in the business and serves as a pool of expertise available to them. Level 4 Respect, is obtained and characterized by the degree of business units that an alliance with the IS/ICT organisation, competitiveness and business leadership are strategically achieved (Table 3 shows the Technological Factors with their four levels).

Organisational factors:

- **Strategy:** This parameter refers to the Organisation’s visions and goals. Outlined and updated by managers. ECommerce strategy is the suppliers’ explicit expectations towards their electronic businesses with respect to eCommerce. “A clear strategy is essential for achieving success in connection with all projects involving major organisational changes and especially in connection with eCommerce projects” (Rajkumar, 2001; Kalakota and Robinson, 2000; Neef, 2001). Based on Kalakota and Robinson, this attitude strategy can be related to technology perspectives and can be categorized as: (skeptical, conservative, pragmatic and visionary)
- **Changes of sales processes:** This parameter includes all the different activities, routines and procedures, which occur in connection with sales activities. Indicators needed by suppliers to accommodate eCommerce - used for measuring changes of sales processes, can be categorized as (no change, adjusted, streamlined and innovative) (Ambeck and Beyer, 1999)
- **Business operation:** This measures the number of changes that occur in the organisation as a consequence of eCommerce implementation, this may in turn lead to staff changes, employee replacements. The scale business operation or organisational change maturity can range: (From Conventional task handling to account management) (Laudon and Laudon, 2002)

- **Business alignment:** Sabherwal and Chan (2001) remarked that the alignment between business strategy and IS/ICT strategy is widely believed to improve business performance. The scale of Business alignment maturity range: (from no or little alignment to fully alignment)
- **Governance:** Guldentops *et al.* (2002) set out to develop a self-assessment tool that organisations can use to measure their IS/ICT governance maturity. The maturity levels and measurement criteria listed in Guldentops *et al.* (2002) have been adopted and can be adjusted as: (Common, Standardized, Monitor and Benchmark). Table 4 shows the Organizational Factors with their four levels

Managerial factors

- **Business management:** This parameter Business management or management control can be used for measuring the degree, to which eCommerce implementation is considered to be an integrated part of the organisation by managers at all levels, the marketing department, the IT-unit, HR etc. The scale concerning management and control comprises the following four factors (individual, IT department, marketing and executive)
- **User profile:** Powers and Dickson (1973) concluded that customer satisfaction is correlated to information system utilization and systems success and that it is the most critical criterion in measuring system performance. And this includes categories from (Manual data entry, Computer literate, Information Systems literate and Knowledge workers highly trained)
- **Business process:** To analyze an organisation understands of its processes i.e., to measure its current position in becoming business process oriented, to compare (benchmark) to other organisations, to analyze changes to the process

Table 3: Technological factors

ECommerce model	L1	Basic Web site
	L2	On-line transaction
	L3	Integrated systems
	L4	Advanced eCommerce System
ECatalogue	L1	Digital catalogue Distributed via off-line means Infrequent updating
	L2	Content management Make internal product information externally available to customers Manually prepared
	L3	Automatically generated Frequent and online updating Supports different standards
	L4	Customized Contains product information based on customer demand Is digitally handled
Integration	L1	No or little integration Printing of orders and messages Manual handling
	L2	Partially integrated Conversion of e-mail to ERP-system Few documents types Manual typing of data Few entities
	L3	Largely integrated Replicating order information as a batch process between ERP and the eCommerce model No external integration Several documents types Automatic Many entities
	L4	Full integration Digital transaction of information to ERP system Buiz-talk (all document types) Real time Integration to the customer
Business/IT relationship	L1	Laggard Skepticism focused on information Policies
	L2	Acceptance competence Business savvy SLAs
	L3	Trust leadership Relationship management
	L4	Respect Innovation Knowledge based

Table 4: Organisational factors

Strategy	L1	Skeptical no belief in the possible technological opportunities created by eCommerce
	L2	Conservative Small investment and resource allocation Believe it is a way to create value
	L3	Pragmatic Result-orientation eCommerce incentives must fulfill expectations
	L4	Visionary market leader eCommerce initiatives are independent of other companies
Changes of sales processes	L1	No change Manual processes Employee intensive sales process
	L2	Adjusted New tasks are incorporated in the old process Old process is still dominant Mostly manual tasks in the sales process
	L3	Streamlined Eliminate unnecessary operations Processes are streamlined Reduction in process cycle time
	L4	Innovative Process vision Reengineering Value added re-design of the sales process to gain more value Dramatic changes Incorporating new business opportunities
Business operation	L1	Conventional order handling No use of technological opportunities
	L2	Parallel tasks Much manual typing of data Employees create externally understandable product information Transaction-based operations
	L3	Tasks related to product information on customer demand Education of the sales force Employee learn new tasks and procedures in the eCommerce process Reallocation of employees and reduction of the sales force
	L4	Account management The sales force supports different eCommerce models CRM
IS/ICT business alignment	L1	Mostly unaligned driven by efficiency
	L2	Ad hoc strategy alignment Sensitive to business strategy IS/ICT supports business
	L3	Formal alignment responsibility Joint responsibility with business units
	L4	Full alignment Large scale IS/ICT and business strategy alignment Shaping business strategy
Governance	L1	Common diagnosed ad hoc procedures Individual responsibility
	L2	Standardized Documented Formally trained
	L3	Monitor compliance Continuous improvements
	L4	Benchmark automated best practices

understanding and consequently project's success, the Business Process Orientation (BPO) maturity model developed by McCormack and Johnson (2001) can be very useful. The BPO maturity model was designed as a reference model of the evolutionary stages that organisations go through to become business process oriented. Business process categorized as (Initiate, Diagnose, Redesign and Evaluate) (Lockamy and McCormack, 2004). Table 5 shows the Managerial Factors with their four levels

Data analysis: According to the previous maturity four levels, arithmetic averages values for eMaturity levels are proposed by the researchers, thus according to (four points Likert scale) the study will be dealt with the interpretation of the data as follows:

Levels	Level 1	Levels 2	Level 3	Level 4
Arithmetic value	0 ->1	1->2	2- >3	3 - 4

If the analysis finding shows that the factor is in level 3 or 4 means that this factor has encouraging the firm to adopt eProcurement initiatives and vice versa. Whereas in the eProcurement obstacles level 3 or 4 means that this factor will hinder the eProcurement adoption. Testing factors that indicate what encourage and discouraged private sector to make a good use of eProcurement with public sector in Jordan as follows:

Degree of agreement or disagreement	Strongly disagree	Disagree	Agree	Strongly agree
Arithmetic averages	1	2	3	4

ICT infrastructure and web service: The following proposed issues represent the ICT indicators needed to set up the basic infrastructure for eProcurement adoption in any firm and this will reflect the firm's eMaturity level (Table 6) shows Jordan firms ICT and web services infrastructure as pointed out from questionnaires formats.

ICT infrastructure and web services is an important issues and they should work in a harmonic way; thus Jordan government portal interaction, beside the availability of software and hardware providers, Internet users, modem transfer high speeds, afford ability of internet access Cost and maintenance are encouraging private sector firms for eProcurement adoption. In other hand Jordan has facing some deficiencies in training programs of ICT and Computer Literature ICDL and eProcurement skills among Organisation. According to the Maturity four Levels, the ICT infrastructure maturity level for Jordan private sector firms are at level three, Mean 2.85, SD 0.37. Thus, the infrastructure and web services encourage private sector for eProcurement adoption.

Expected benefits from eProcurement finding: The following perceived benefit indicators in this research are shown in Table 7 which shows the most interesting perceived benefits from eProcurement which are listed in order of importance based on respondent's point of view.

Respondents from all 71 firms expected that they can benefit from the implementing of eProcurement in different functions. They consider the following first five clusters on the top of their priorities. Reduce paper-based transactions across the enterprise (Mean=3.71, SD 0.48)

Table 5: Managerial factors

Factors	Defaults
Business managing	
L1	Individual Enthusiastic employees generally no recognition of needs
L2	IT department eCommerce is seen as an IT project
L3	Marketing eCommerce is seen as a commercial project
L4	Executive Inter-organisational eCommerce Coordination
User profile	
L1	Manual data entry
L2	Computer literate Data processing Automation Efficiency
L3	Information systems literate Accept limited responsibility for technology value information
L4	Knowledge workers Highly trained Joint responsibility Strategic/effective use
Business process change	
L1	Initiate
L2	Diagnose
L3	Redesign
L4	Evaluate

Table 6: ICT infrastructure and web services questionnaires indicators

Indicators	Indicator's level				Firms level
	Level 1	Level 2	Level 3	Level 4	
Availability of software providers for Organisation	Poor	Fair	Good	Excellent	L4
Telephone line penetration (% POE) Per organisation employee	Poor	Fair	Good	Excellent	L4
Mobile phone penetration (% POE)	<10%	10-30%	30 -50%	>50%	L4
Modem transfer speeds generally available	128 Kbps	500 Kbps	1 Mbps	More	L4
Internet users (% POE)	<10%	10-30%	30 -50%	>50%	L3
Cost of internet access	V expensive	Expensive	Affordable	Low	L3
Quality of service in country	Poor	Fair	Good	Excellent	L3
Service and support to install service/fix problems	Poor	Fair	Good	Excellent	L3
Availability of hardware in organisation	Poor	Fair	Good	Excellent	L3
Training Programs of ICT and eProcurement among organisation	Annual	Quarterly	Monthly	Daily-Weekly	L2
PC penetration (% POE)	Annual	Quarterly	Monthly	Daily-Weekly	L2
Computer Literature ICDL (% POE)	<10%	10- 20%	20-30%	>40%	L1
Needs of any external support for the development of eProcurement.	Yes	Few	Little	NO	L1

ICT Infrastructure and web services mean = 2.85 = level 3, SD = 0.37. *N = 71 private sector organisation

Table 7: Perceived benefits of eProcurement

Perceived benefit indicators	Mean	SD
Reduce paper-based transactions across the enterprise	3.71	0.48
Automating the tactical processes and workflows associated with selling	3.51	0.45
Reduce the cost of generating selling orders	3.32	0.43
Reduce processes cycle time	3.21	0.41
Improve accuracy of orders	3.03	0.39
Free up the procurement team for value added work	2.87	0.37
The buyers can find purchase items quickly by eCatalogues	2.61	0.34
Improving communication between buyers and sellers	2.38	0.31
Gaining competitive advantage	2.37	0.30
Negotiate more favorable contracts	2.03	0.26

Perceived benefits of eProcurement mean = 2.90 = level 3, SD = 0.36 (Note: for eProcurement benefits and obstacles N = 71. survey participants were asked to respond to the following question: (Please provide your degree of agreement or disagreement with each of the following as perceived benefit to a successful eProcurement adoption.) and indicate your answers using a four-point Likert point scale ranging from 1: Strongly Disagree, 2 Disagree, 3 Agree and 4: Strongly Agree)

"Automating the tactical processes and workflows associated with purchasing." (Mean=3.51, SD 0.45) "Reduce the cost of generating purchase orders" (Mean=3.32, SD 0.43) "Reduce cycle time" (Mean=3.21, SD 0.41). "Improve accuracy of orders" (Mean=3.03, SD 0.39).

Respondents also expect the next five eProcurement benefits as second priorities "Free up the procurement team for value added work." (Mean=2.87, SD 0.37). "The buyers can find purchase items quickly" (Mean=2.61, SD 0.34) "Improving communication between buyers and sellers" (mean=2.38, SD 0.31). "Gaining competitive advantage" (mean=2.37, SD 0.30). And "Negotiate more favorable contracts" (Mean=2.03, SD 0.26) Kalakota and

Robinson (2000) states that adoption of eProcurement "allows procurement activities 24 h a day, 7 days a week, 365 days a year".

Thus, eProcurement benefits finding (Mean, 2.90, SD 0.36) indicated that eProcurement benefits will encourage Jordan private sector firms to adopt the eProcurement choice and by implementation experience they can enhance their work and gain more benefits, so eProcurement benefits have positive outcomes to eProcurement Maturity.

Obstacles to eProcurement adoption: The following eProcurement obstacles indicators were selected, this study represents the most interested obstacles for

eProcurement and they ranked in order of importance as respondents point of view Table 8.

Private sector eProcurement adoption has not always taken place smoothly, many obstacles, risks and inhibitors exist. Heywood *et al.* (2002) suggested that firms will struggle to realise all of the potential benefits of eProcurement. According to eProcurement obstacles for Jordan private sector the indicators shows the following facts: Obstacles (1) Lack of eProcurement knowledge/skilled personnel “mean 3.56, SD 0.46” and Obstacles (2) lack of a business relationship with buyers “mean 3.26, SD 0.42”. These Obstacles are related to the human knowledge and their skilled degree in implementing eProcurement issues, this including manager’s involvement and employees in all fields in the firm. Such as obstacles came as a result of change to new business in Jordan. Some countries such as Australia ranked these obstacles as 7 and 8 of 10 and that obviously comes from implementation experience (Hawking *et al.*, 2004). Jordan firms might rank these Barriers less effective after eProcurement implementation skills and experience.

Obstacle (3) lack of technical expertise “Mean 3.03, SD 0.39” Means that they cannot operate IT (Hawking *et al.*, 2004; Davila *et al.*, 2003). Obstacle (4) IT systems too costly “mean 2.66, SD 0.35” is that it cannot afford IT (Hawking *et al.*, 2004) and Obstacle (5) do not have the IT infrastructure “mean 2.42, SD 0.31” is that the firms do not have the technology infrastructure to carry out eProcurement (Wong and Sloan, 2004). These three obstacles to eProcurement are technical issues and are related to IT. Jordan faces Limited IT skills; there is a fundamental lack of computer literacy in Jordan that would limit the citizens’ penetration, businesses and government institutions. “Lack of technical expertise Lack of Technical standards/System Integration can hinder progress as eProcurement solutions need to interface with back office systems”.

Obstacles 6 - Security of transactions “mean 2.42, SD 0.28” Security will be major concern when working on the internet. Rankin *et al.* (2006) argues that this is one of the technical issues with eProcurement that still to be fully

overcome. Such obstacle might be the most considerable issues that hindered the ePayment system in Jordan and finally the eBusiness plan.

Obstacles 7. Firms’ culture regulatory and legal controls “mean 2.06, SD 0.26” Price Waterhouse Coopers (2002) was the first to identify this barrier while Hawking *et al.* (2004) used it as a barrier to eProcurement in their survey. In the European Union, Julia-Barcelo (1999) concludes that legal difficulties are one of the main barriers to eProcurement. E-Commerce in Jordan also is deterred by the lack of adequate legislation and implementation capacity and Lack of an enabling legal framework. Organisational culture mainly creates resistance to the new work.

Obstacle 8. Interoperability concerns “mean 1.80, SD 0.23”. Interoperability depends on the ability of eProcurement computer system to match identifiers and codes. This means that buyers and sellers should identify each others, identify the goods shipment, Documents and Lines need to be referenced in subsequent transactions in the procurement cycle. Public and private sector have a large number of transactions, ordering points, dealing with large number of sellers and buyers. The effective interoperability demands both sellers and buyers should explain all data element by the same way.

Obstacles 9. Employee resistance to change “mean 1.58, SD 0.20” from Jordan firms perspective this issue might be less importance because of the lack of eProcurement experience and lack of eProcurement implementation amongst private sector.

Thus, eProcurement obstacles (Mean 2.50, SD 0.32) still hindered Jordan private sector firms to adopt the eProcurement choice and by implementation experience they can mitigate the risk which comes from these obstacles and mitigate more barriers in their work.

Business sectors interview outline: In the following Table 9 data from each of the 31 organisations included in the study is presented as: First as main and sub parameters used for measuring private sector maturity, second as a total number of firms in each level of the semi-structured interviews is outlined.

Table 8: eProcurement obstacles indicators

eProcurement obstacles indicators	Mean	SD
Lack of eProcurement knowledge/skilled personnel	3.56	0.46
Lack of business relationship with buyers	3.26	0.42
Lack of technical expertise	3.03	0.39
IT systems too costly	2.66	0.35
Don't have the IT infrastructure	2.42	0.31
Security of transactions	2.16	0.28
Company culture regulatory and legal controls	2.06	0.26
Interoperability concerns	1.80	0.23
Employee resistance	1.58	0.20

eProcurement obstacles indicators = 2.50 = level 3, SD = 0.32

Table 9: Overview of interpreted eMaturity levels of interviews organisations (N = 31)

Parameters	Level 1	Level 2	Level 3	Level 4
eCommerce model	Basic Web site 23	On-line transaction	Integrated systems 4	Advanced system 4
eCatalogue	Digital	Content management 22	Automatically generated 2	Customized 7
Integration	little integration 9	Partially integrated 9	Largely integrated 9	Full integration 4
Business/IT relationship	Laggard	Acceptance 11	Trust 11	Respect 9
Strategy	Skeptical	Conservative 9	Pragmatic 18	Visionary 10
Changes of sales processes	No change	Adjusted 11	Streamlined 8	Innovative 12
Business operation	Conventional task handling 3	Parallel tasks manual and information 9	Tasks related to information 12	Account management 7
IS/ICT business alignment	Mostly naligned	Ad hoc alignment 9	Formal alignment 11	Fully alignment 11
Governance	Common	Standardized, 10	Monitor 11	Benchmark 10
Business managing	Individual	IT department 17	Marketing 4	Executive 10
User profile	Manual data entry	Computer literate 13	IS Literate 9	Highly trained 9
Business process change	Initiate	Diagnose 7	Redesign 10	Evaluate 14

Table 10: Perceived eMaturity factors level

	Technological Mean = 2.51 Level 3			Organisational Mean = 2.99 Level 3				Management Mean = 2.95 Level 3				
	eCommerce model	eCatalogue	Integration	Business/IT relationship	Strategy	Change of sales process	Business operation	Business alignment	Profile	Governance	Business managing	Business process user change
Level 1	M=2.05		M=2.05									
Level 2		M= 2.05		M = 2.93	M=3.03	M=3.03	M=2.74	M=3.06	M=3.13	M=2.77	M=2.87	M=3.22
Level 3												
Level 4												

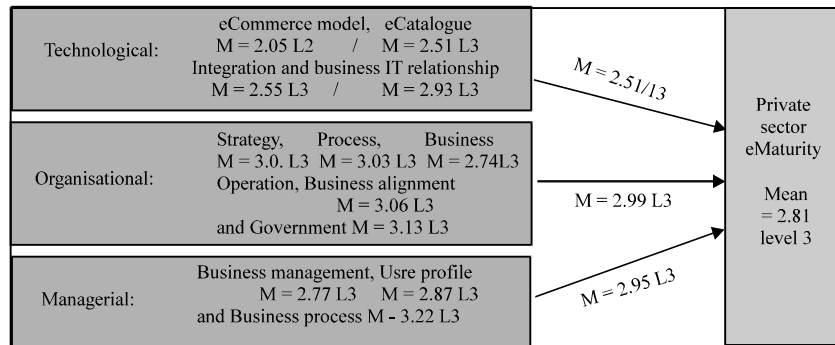


Fig. 2: Jordan private sector eProcurement

In the following Table 10 shows the final Perceived eMaturity factors Level and mean of the 31 organisations included in the study for main and sub parameters used for measuring private sector maturity.

In the following Fig. 2 Jordan private sector eProcurement “eMaturity” diagram is presented as a final result for 31 organisations included in the study which represent Jordan private sector.

Testing results

Testing factors:

- It can be seen from Table 11 that the affect of ICT infrastructure and web services on eProcurement adoption on private sector firms in Jordan is high, mean (2.85), the standard deviation (0.37), rank (2) which indicates that the impact of ICT infrastructure

and web services is encouraging the firms to make a good use of eProcurement with public sector in Jordan

- The affect of eProcurement benefits on eProcurement adoption on private sector firms in Jordan is high mean (2.90), the standard deviation (0.36) and rank (1) which indicates that the impact of eProcurement benefits is satisfied and encouraging the firms to make a good use of eProcurement with public sector in Jordan
- The affect of eProcurement obstacles on eProcurement adoption on private sector firms in Jordan is high mean (2.50), the standard deviation (0.32) and rank (3) which indicates that the impact of eProcurement obstacles will obviously hindered the firms to make a good use of eProcurement with public sector in Jordan

Table 11: Test results for data gathered from Questionnaires formats

Factors	Mean	SD	Rank	Severity
ICT infrastructure and web services	2.85	0.37	2	High
eProcurement benefits	2.90	0.36	1	High
eProcurement obstacles	2.50	0.32	3	High

*N = 71 firms

Table 12: Parameters results

Factors	Mean	SD	Rank	Severity
Technological parameters	2.51	0.30	3	High
Organisational parameters	2.99	0.39	1	High
Managerial parameters	2.95	0.38	2	High

*N = 31 Firms

Testing parameters: The interviews are closely reflected by the three main factors which are: Technological, organisational and managerial as shown in Table 12 Parameters Results with a total of twelve sub-factors on a way to assess the empirical evaluation to issues discussed during the interviews and indicate the affect severity of these factors on enhancing eProcurement adoption in private sector firms in Jordan statistically.

The above Table elucidates the following facts:

- The overall average impact of technological factor on enhancing eProcurement adoption for Jordan private sector has high (positive) effect. Mean (2.51), SD 0.32 and has rank (3) amongst the main three factors
- The overall average impact of organisational factor on enhancing eProcurement adoption for Jordan private sector has high (positive) effect. Mean (2.99), SD 0.39 and has rank (1) amongst the main three factors
- The overall average impact of management factor on enhancing eProcurement adoption for Jordan private sector has high (positive) effect. Mean (2.95), SD 0.38 and has rank (2) amongst the main three factors

Study outcomes:

- The data indicates that Jordan private sector eCommerce model has particularly focused on the basic web site which means the utilization of eCommerce, such as the use of web-sites for marketing purposes (23 firms from 31). That's why the majority of SMEs are in level 1 in eCommerce model. Some SMEs are beginning to build web-sites that offer ordering and fewer are offering on-line payment as an option. (4 firms) are exploiting the largely integration and (4 firms) are moving into advanced form of eCommerce technologies such as CRM, ERP, SCM and exploiting the full integration and innovation opportunities of ICT
- The majority of suppliers employ content management eCatalogue (22 firms); this can be a

major challenge for suppliers because the product information usually is spread among several, different systems and because the information can be difficult to understand for many customers. Meanwhile (2firms) applying automatically generated and (7 firms) are applying customized eCatalogue

- Business management measures the degree, to which eCommerce is considered to be an integrated part of the organisation by top-management/owners, the allocation of resources for eCommerce projects, the priority of eCommerce projects and whether or not the eCommerce projects have got a strategic, tactic, or only operational status within the organisation. The majority of Jordanian firm's top managers are not involved in such as this business and they think that IT department can manage that, because the lack of computer and IS literature (17 of 31) firms are initiating and managing eCommerce adoption throughout IT department, (10) firms throughout executives
- Some of firm's managers suggested that the strategy of adopting more advanced technology in Jordan depends on production lines, markets and cost. In other words one of the most business challenges affected Jordan market; is that Jordan is small country with small market and therefore it needs to adopt eProcurement practices more than others to reduce the operational costs and enhance its competitiveness extending its markets. The study shows that (9) firms are in respect stage, level four, (7) of them among large services firms
- Using electronic services help SMEs and large firms penetrate new markets and make it easier to do business. Study outcomes showed that services sector firms such as electronic media, hotels, banks and Software (SW) solutions are the most advanced among others in utilizing eCommerce capabilities because this is the ultimate method to manage their business successfully
- All of the firms use ICT in general but when it comes to web access, making online purchases and sales, the level of ICT adoption in most firms' declines to basic information. Three firms are using online transaction with ePayment solutions. ICT adoption seems to be influenced more with type of business. The managers/owners in all firms realize that ICT adoption leads to new opportunities and threats. However, in majority of the cases, the involvement in ICT is at initial stages and strategic management process is informal
- Jordan still needs more specialized solutions in eCommerce, such as ePayment and eSignatures. The government now forms a specialized steering

committee to establish ePayment system for supporting eProcurement and eBusiness in general

- Most Jordanian consumers are likely to have enough knowledge and skills in using the computer and dealing with the Internet and have reasonable access to Internet services, with a positive impression about the current presentation and promotion of companies' web sites on the Internet. In Jordan, in particular, the use of online shopping does not seem to keep up with global trends in electronic marketing and that many consumers are not making use of electronic buying. However, the issue of security of online transactions, un-trusted payment system, regulations, legislations and culture seems to be major factors that restrict the willingness to make a better use of online shopping

RECOMMENDATIONS

ICT Technology: Many efforts have been done by Jordan government to promote the adoption of ICT among SMEs. This promotion will enhance adoption of ICT promotion amongst SMEs which form the majority of businesses and one of the important growth factors within Jordan economies, many questions arouse about Jordanian private sector firms such as: how can Jordanian firms climb the DTI ladder? How many firms are playing in the eEnvironment? And the extent that SME's are engaged with ICT and eBusiness technology? Private sector firms In Jordan need to have such as supported programs that might be controlled and maintained by any qualified non-governmental department (e.g., Amman Chamber of Commerce, Amman Chamber of industries or any of Jordanian universities that can follow up and supports private sector firms by eCommerce knowledge and advice. [Jordan eCommerce Innovation Centre (JeCIC)] is suggested.

Case study No. 1: The Opportunity of European programme is funded under the European Regional

Development fund and aims to provide SMEs with advice and support in achieving the benefits of eCommerce. This support programme has involved:

- The establishment of a process of knowledge transfer from the eCommerce Innovation Centre (eCIC) Cardiff University in Wales through accredited eCommerce advisors to SMEs
- General awareness rising of eCommerce benefits to SMEs through intensive marketing campaigns
- The establishment of a contact centre to coordinate client relationship management, adviser activity and management information
- The development of a Web site to provide a 24/7 online resource on eCommerce knowledge and information
- Advisor support to encourage SMEs to introduce and enhance the use of eCommerce and to assist them to implement solutions
- Client aid for appropriate eCommerce products and services

As part of this programme, (eCIC) has conducted a large annual survey of the state of eCommerce adoption amongst SMEs in Wales (ECIC, 2006).

This survey, conducted with over 2000 companies annually has used a variant of the original DTI adoption ladder to categorise company's experience of eCommerce. This model describes the process of eCommerce adoption in terms of 7 key steps or stages represented in Table 13 DTI (2004), Business in the Information Age: International Benchmarking Study 2004. London, Department of Trade and Industry.

The eCommerce adoption ladder described in the case study can be considered a very basic attempt to cover the issue of eCommerce maturity. However, the ladder was developed as an Innovation and Engagement instrument, particularly for use as an explanatory tool with SMEs and as a tool for promoting the benefits of eCommerce to these companies. This instrument is grounded in an

Table 13: Stages of the eCommerce adoption ladder for wales (ECIC, 2006)

Ladder levels	Stage title definition	Stage title definition	Adoption (%)
0	Have not started yet	The business does not have Internet access	38
1	Use email and the Web	The business does not have a web-site but accesses information and services on the Web and uses email. This step can be further divided into businesses using email only but not surfing the Web.	30
2	Have a basic Web site	The business has its own web-site which only included very basic information about the business; for more information customers have to contact the business.	20
3	Have an on-line brochure	Customers can access more detailed information about Products/services from the web-site but cannot buy or pay online.	6
4	Have an on-line store	Customers can buy and pay for products/services from the web-site, but the web-site is not linked to internal systems and orders are processed manually.	3
5	Have integrated systems	The on-line 'store' is integrated with other business systems, e.g., order processing, fulfillment, accounts and/or marketing.	1
6	Use advanced commerce	Internet technology drives the business internally and externally, and is used to manage all processes end-to-end more effectively and efficiently.	2

assessment of eBusiness maturity and specifically linked to a vision of how we can support SMEs in the future. In other words, this work is attempting to draw up the major shape of SMEs Business for the next five years or so.

Annual survey should be done for eCommerce adoption within Jordan business sectors against this ladder to show up in which stages our business organisations are. Because many SMEs in Jordan have not started eCommerce adoption yet and even they don't have internet access and many are beginning to build web-sites that offer ordering and fewer are offering on-line payment as an option. Fewer businesses are moving into advanced forms of eCommerce technologies such as CRM and fewer still exploiting the integration and innovation opportunities of ICT. Unfortunately, the majority of SMEs in Jordan are on step 0; they do not yet have an internet connection. This sets the vision for the next level of challenge for the private sector in Jordan. This program should be supported to raise eCommerce adoption for Jordan businesses sectors to be in higher levels:

- **Electronic payment:** EProcurement is part of eGovernment, many services are provided electronically through governmental department and organisations in Jordan; to accomplish these services the government should issue non-traditional payment channels or electronic payment to be used by customers and businesses to pay their bills, tax and other public services' fees through national and international secured way of payment. With Payment Gateway Services, public and private sectors can effectively manage sales and buying transactions by collecting credit card payments directly through the Internet
- **Security and digital signature:** "Securing every network connection is becoming a real possibility" (ITJ Volume 13, Issue 2, 2009) to do an effective eProcurement processes security and digital signature will be one of the critical issues that organisations in private sector firms concern about, because the buying and selling activities control moves to many different departments and markets. These controls must be applied over technology, processes and people. Security should be access to system integration, data integrity, authentication and firewalls etc. security should be managed by will train staff to eliminate eProcurement risks, controls and provide assurance to buyers and third parties
- **EMarketplace:** The term eProcurement has become synonymous with electronic market places (Marketsites). During the height of dot.com evolution between about 1999 and 2000 electronic market places were seen as a potentially source of revenue

for aspiring dot.com companies. (Telgen, 2001), B2B eMarketplace firms allow companies to buy and sell goods and services online. Suppliers can list their products and services for selling them through online catalogs or auctions. Buyers can find, compare and procure products and (24) services from convenient suppliers, eMarketplace can help Jordanian firms and organisations benefit from eProcurement and eCommerce in general. Some eMarketplaces can offer training courses for organisations about eProcurement implementation. See case study (2)

Case study (2): Royal Jordanian RJ eProcurement system introduces eMarketplace Royal Jordanian signed an agreement 2006 with eMarketplace in Jordan, a Business-to-Business (B2B) marketplace that will allow the airline to purchase online. The system facilitates communication and procurement activities between the airline and national and international suppliers, in addition to tracing purchasing procedures electronically. The eProcurement system includes a large directory of highest-quality purchases needed by all departments and sections at the airline. It will enable employees from the various departments to select their departments' needs and goods by sending electronic purchase orders to the Purchasing and Services Department which is responsible for approving the order electronically and sending it to the supplier.

In another hand the eMarketplace can offer a good opportunity to RJ for flight and services advertisement, this will enable RJ to reach customers all over the world. The Purchasing and Services Department will hold training courses for a number of employees who will be selected to supervise the procurement process at their departments. The Royal Jordanian deemed it necessary to introduce the eProcurement system to be able to offer the same level of services as one world airline members. Joining one world made it incumbent on RJ to update its technology.

- **Top management involvement:** Most of owners/managers have no formal training in management and lack of computer literature, in most cases IT department undertake this responsibilities, But the past-experience of owners/managers is very important factor regarding the involvement in strategic management. No ICT expert employed amongst some sample studies conducted because their website is empowered by third party firms

Top management can be involved throughout the following strategic activities: strategic vision, objectives, policies and procedures that reflect a commitment to the

business opportunity, Establishing needed resources and structures to support full implementation of management system, training schedule for all business levels, Easy use of system for customer satisfaction; Communicating and assigning qualified people for doing business

- **Knowledge management:** SMEs mainly are lacking of eProcurement knowledge or they already aware of their existing use and management of knowledge. And undertaking initiatives to promote learning and knowledge sharing that will impact their likely positioning in the maturity model. Core knowledge is required to stay at business, whereas advanced knowledge makes the firm competitively available and innovative knowledge allows the firm to lead its entire industry. The nature of such knowledge requirements will also depend on its internal/external focus and the firm's requirements for becoming a leader in their industry
- **Change management:** Some eProcurement implementations require significant change management to fully realize all potential benefits. Others may require only minimal change. Regardless of the size of the project the eProcurement implementation should be managed as an integrated project

FUTURE WORK (E-FUTURE)

The future development of eProcurement in Jordan tends to focus on the following:

- The most appropriate use of Information and Communication Technology (ICT), not only to reduce the cost of the procurement process but also to provide a platform for further innovation and development
- eProcurement tools have great potential to improve the efficiency, effectiveness and economy of the procurement process these tools are:
- Planning tools: e.g., Request for Quote (RFQs), Request for Purchase (RFPs), Contract and Supplier Management and Electronic Auctions
- Transactional procurement tools: e.g., Catalogues and Electronic Purchase Orders (EPOs)
- Payment tools: ePayment e.g., Credit or Purchasing-Cards (P-Cards), Expense Management Systems (EMS) and Evaluated Receipt Settlement (ERS)
- Security issues as eSignatures and others

- Legal framework and adequate legislation for implementation capacity
- E-commerce mobility: The role of mobile communications in digital commerce in many developing economies is important, many businesses continue to have a long and innovative relationship with mobile commerce and now mCommerce service sites are becoming more integrated with much online activity

CONCLUSIONS

This study was presented the eProcurement Framework Research Model and Private Sector eMaturity Measurement model that contributes to the research questions and interview by using technological, organisational and managerial parameters, each one of them decomposed into sub parameters, to provide an empirical evaluation for measuring private sector eMaturity.

The study depicts that ICT infrastructure in Jordan is providing a good environment for implementing eProcurement for both private and public sectors but the willing to adopt eProcurement in private sector needs to be enhanced in most business sectors except services sector that implementing eProcurement in satisfied manner.

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