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Performance evaluation of e-government services using balanced scorecard

An empirical study in Jordan

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Abstract

Purpose – The purpose of this paper is to emphasise on a balance between quantitative and qualitative measures, and examine the use of Balanced Scorecard to evaluate and estimate the performance of information and communication technologies (ICT) in delivering valuable e-government services through the internet.

Design/methodology/approach – This study tests the hypotheses of e-government effectiveness using Balanced Scorecard technique by incorporating qualitative measures within a quantitative research methodology with data collected by means of a survey questionnaire. The survey sample of 383 stakeholders includes common customers, employees of e-government, and employees from the IT sector. The survey data were analysed to test the hypothesis in measuring e-government effectiveness from Balanced Scorecard's four dimensions: customer perspective, financial perspective, internal business process perspective, and innovation and learning perspective.

Findings – The results show that the Balanced Scorecard factors fit very well with monitoring and measuring the performance of e-government in Jordan, and also in evaluating their success in IT project investments.

Originality/value – This study attempts to address this gap in the literature and would benefit future studies in applying Balanced Scorecard for performance evaluation of various IT projects that are gaining huge investments from governments and organisations.

Keywords E-government, Balanced scorecard, Performance management systems, Jordan, Developing countries, E-government performance evaluation, Performance measurement system

Paper type Research paper

Introduction

Governments should respond to the changes in different innovative mechanisms and continuous improvements that are warranted in the world today. Performance measurement mechanisms have evolved with dynamic changes that have led governments to search for new ways to measure the return on investment to maximize stockholder wealth, and at the same time to measure their performance in engaging customers (citizens) to support e-government (UN Report, 2006; Castelnovo and Simonetta, 2007; Ying, 2010).

The launch of the e-government project in Jordan at the end of the year 2006 has recently included the provision of e-government services in a number of departments and various government institutions to address the needs of various sectors, including citizens, business, and the government, most of the organizations in public sector are not aware of the importance of performance measurements, in terms of how they could be employed for organizational and systems measurements in reviewing budget items and expenses, and also to measure the return on investment. Reinventing government trend recommends that public organizations should be more mission-driven, customer-focused, result-oriented, and decentralized to meet the needs of citizens or clients (Ellingson and Wambsganss, 2001).

The concept of e-government is complex and covers fields, which differ a lot from each other. This heterogeneity can be a problem in the definition of a model for the evaluation of the impact that e-government projects can have (Castelnovo and Simonetta, 2007). Electronic government is no longer just an option but a necessity for countries aiming for better governance (Gupta and Jana, 2003). Many governmental units across the world have embraced the digital revolution and placed a wide range of materials on the web, from publications to databases to actual government services online for the use of citizens (Srinivasan and Iyappan, 2009).

Evaluation is generally regarded from one of two perspectives. In the *ex ante* perspective, candidate systems or technologies are evaluated before they are chosen and acquired or implemented. In the *ex post* perspective, a chosen system or technology is evaluated after it is acquired or implemented (Klecun and Cornford, 2005) and is also regarded from process evaluation context (Kaplan, 2010).

Conducting e-government evaluation would lead to monitoring changes in e-government environment and also to assess the efficiency of implementing e-government program in order to improve the procedure of service delivery. Evaluation of e-government efforts is sought by management to provide strategic guidance for the government organizations (Gupta and Jana, 2003). E-government evaluation refers to assessing and examining the activities to understand the process and result of e-government programs, and it has two types: e-government achievement level (current state) and e-government program evaluation.

Applying performance measures is essential to evaluate whether e-government is cost efficient, is serving stakeholders, and is being used effectively by government agencies, staff, citizens, and businesses (Fountain, 2001). Agencies can use various quantitative and qualitative output measures to evaluate their e-government programs, including the number of hits on a site, user contact sessions, number of downloads, amount of time spent on site, information accessed most frequently, and number of times forms are completed (Stowers, 2004). There are many performance measures including Balanced Scorecard (BSC) reported in literature (Gunasekaran and Kobu, 2007;

Werner and Xu, 2011). BSC could provide an objective benchmarking indicator for evaluating the achievement of the strategic goals of an organisation (Punniyamoorthy and Murali, 2008). However, there is a lack of literature reporting on its application in e-government performance evaluation.

In this paper, we examine the BSC as a technique to evaluate and estimate the performance of Jordan E-government. The empirical study to test the effectiveness of e-government using BSC is conducted by analyzing the survey data obtained from a sample of 383 stakeholders that includes common customers, employees of e-government, and employees from IT sector. This paper demonstrates the application of BSC framework to evaluate performance of e-government services in Jordan and the insights gained will contribute towards further research in developing new approaches to performance measurement and evaluation (Gunasekaran and Kobu, 2007).

This paper is organized as follows. Second section describes performance measurement systems found in literature, and third section gives background work done in e-government performance evaluation. The BSC theory is provided in fourth section and in fifth section, the research model and hypotheses used to apply BSC approach to evaluate Jordan's e-government services are presented. Sixth section discusses the results and findings, and seventh section presents the conclusion of this paper.

Theoretical foundation

Performance measurement systems

Definitions. Performance measurement system can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions (Neely *et al.*, 1996a, b). Also, performance measurement refers to the use of a multi-dimensional set of performance measures that includes both financial and non-financial measures, it includes both internal and external measures of performance and it often includes both measures which quantify what has been achieved as well as measures which are used to help predict the future (Neely, 1998). The purpose of performance measurement system is to ensure that standards and objectives are set clearly, that performance is regularly and objectively assessed for accomplishments, and that actions are taken to improve and enhance performance potential in the future (Ababneh, 2008).

In this paper, we define performance measurement system as the processes developed by organization to assess, estimate and measure performance of organization in using its resources and its investments to enable organizations to perform better and improve their performance. A good performance measurement system should be able to provide to all stockholders where they are, how the organization is doing, and where the organization is going.

Performance measurement models

Performance measurement has its roots in early accounting systems (Johnson, 1981), and many traditional measurement and evaluation methods such as return on investment (ROI), economic value added (EVA), net present value (NPV), internal rate of return (IRR), return on capital employed (ROCE), have failed to yield an appropriate estimate of the "pay back" from these complex systems (Sedera *et al.*, 2001). The reason for this problem is that firms have many systems to operate and have many stockholders' interest such as government, unions, and also consumers and other agencies. However, the main concern to serve consumers' needs has focused attention on the effectiveness in measurement performance.

A growing number of companies have begun searching for new ways to measure the return on investment from their IT projects, in particular emphasis on performance measures (Cameron and Whetten, 1983; Thorp, 1999; Kaplan, 2010). Performance measurement is a comprehensive measure, which is determined by collecting all the factors affecting the progress towards the target, and by measuring outcome. It should be comprehensive enough to accommodate even factors pertaining to social, personal, media and other intangible business aspects as well.

There are two popular models, according to literature review, that relate to performance measurement system, namely activity based management (ABM), and BSC that have built into the system the following main performance measurement design processes (Bourne *et al.*, 2003):

- *Putting the BSC to work.* This is achieved by describing how an external customer view was introduced into the scorecard development process (Kaplan, 1994). This process helps to get new customer perspective and allow the company to segment its market and to develop strategies, actions and measures that underpin the development of its chosen niche or specific segment.
- *The performance model.* The processes for creating a business performance model involve facilitating the senior management team through a review of their business strategy by determining the objectives and the way to achieve those (Jeanes, 1996).
- *Getting the measure of business.* This process involves identifying groups of products or services, developing business objectives from customer and stakeholder needs, designing individual performance measures, reviewing the measures developed and providing advice on implementation and performance reviews (Neely *et al.*, 1996a, b).
- *The performance measurement questionnaire (PMQ).* The approach of adopting a PMQ for evaluating and developing the measures for organizations is already in use (Dixon *et al.*, 1990).

The implementation of a performance measurement system faces obstacles and barriers such that the vision and strategy become not actionable. This could occur when top management failed to translate organization vision into formulating strategies or the strategies were not linked to department, team and individual goals. In some cases, following the old traditional performance criteria could thwart the introduction of the new strategy or the new strategy was not linked to resource allocation or little time was reserved for the review of indicators of strategy implementation (Bourne *et al.*, 2003). These issues should be taken into account while designing the performance measurement system and the questionnaire for evaluation.

To achieve the true purpose of performance measurement system, individual measures should be easy to understand, purposeful and cost effective. In addition, performance measurement system should be integrated over business functions and hierarchy of operations, should provide information for planning future performance, should reinforce the firm's strategies, and show the results as functions of determinates. More importantly, performance measurement system and environment should match with the firm's culture and provide data for external comparison and benchmarking (Neely *et al.*, 1995).

E-government performance evaluation

Since 2001 e-government has been one of the main application domains for information and communications technology (ICT). Moreover, it represents a test bed – not just in Europe and in the USA, but worldwide (Castelnovo and Simonetta, 2007; Corradini *et al.*, 2008; Ying, 2010). The emergence of e-government is witnessed due to the developments in ICTs that are harnessed to deliver the operations of government services (Alkhaleefah *et al.*, 2010). The goals of e-government include facilitating service delivery, to promote responsiveness, equity, effectiveness and efficiency, accountability, transparency, the rule of law, openness and knowledge sharing (UN Report, 2006). E-government refers to the use of technology, especially internet applications based on networks of web sites to support and promote access to government information and delivery, serve the citizens and the business sector, employees and departments, other government efficiency and effectiveness (West, 2000). Also, it is defined as the totality of the information, services and products that is provided electronically by the government (Greunz *et al.*, 2001).

After the initial investment and growth in e-government, all the governments are confronted with the question of how to evaluate e-government performance. Financial accounting measurements are extensively employed to evaluate government performance, but they do not indicate the reasons for those outcomes and how to improve them (Wright *et al.*, 1999). Therefore, many lead governments are seeking for an appropriate performance measurement tool to evaluate and improve their e-government services.

Walsham (1999) and many researchers report that a well-documented and formal approach to investment evaluation is required to understand the implications of any ICT investment on the organization. Ying (2010) described the mainly problems facing e-government performance evaluation: first, focusing on technical indicator, and not much on governance indicators; second, bad measurement methods; third, weak management system of e-government performance evaluation. Also, the work has established that targeting on government web sites is the main way to evaluate e-government performance, as it boosts the government web site's construction, information openness, and service improvement. But some e-government performance evaluation focuses on outputs. Such as the number of clicks on the web sites, the number of services and the interaction with the public, instead of outcomes such as the utilization rate and customer satisfaction. Moreover, such work emphasizes on the result and not the process, and this discourages the participation from public managers as it gives incentives to them to address the results only.

The resulting problems are the unilateralism of evaluation and over-investment in government web site's construction without careful consideration and design. Based on these observations made, it is important for e-government evaluation to take all aspects that affect in improving and modernizing the overall performance of e-government. Also, when performance measures for customer, internal process and learning and innovation perspectives are added to the financial metrics, the result is not only gives a broader perspective on the company's health and activities, it is also a powerful organizing framework (Kaplan and Norton, 1996). While statistical based approaches such as Six Sigma and process-based approaches such as ISO9001 are also being attempted in many industries, BSC has been adopted for Jordan E-Government as it has the advantage of implementing and measuring the drivers for creating long-term shareholder value. Such a balanced performance measure is warranted in developing countries such as Jordan, since financial measurement models that are predominantly short-term measurement models may not lead to a successful adoption of e-government services by their citizens

as well as employees (Yu *et al.*, 2008; Werner and Xu, 2011). Hence, this paper has investigated on the effect of applying BSC concepts as it also contributes towards increasing the understanding and knowledge of e-government evaluation.

The Balanced Scorecard

The BSC framework developed by Kaplan and Norton (1992) is based on their research conducted on different firms. The BSC has received a great deal of attention as a strategy that integrates financial and non-financial performance measures to help organizations in the learning and improvement of their internal and external processes (Ababneh, 2008). The BSC has gained a clear prominence among researchers as an approach of integrating financial and non-financial performance measures. Responsive organization should utilize the BSC as a tool to measure its performance health (Brown, 2007).

Hornigren *et al.* (2000) have defined BSC as the way to convert or translate mission of firm and strategies into performance measurements, which means BSC allows the comparison of actual performance with planned performance. Jyoti and Deshmukh (2008) define BSC as a strategic measurement system including both non-financial and financial measures adopted to measure the performance of a business organization. Also Maiga and Jacobs (2003) argued that the BSC could be considered as a main tool in evaluating organizations comprehensively when dealing with highly changeable environment and as a response to the new global competition.

There are two features that distinguish the BSC from more traditional performance measurement system:

- (1) the development of performance measures by translating mission, objectives and corresponding strategies of the organization; and
- (2) linking together of the measurements under the perspectives (Yu *et al.*, 2008).

Hence, in this paper, we have considered BSC as a multi-dimensional set of performance measures that not only includes both financial and non-financial measures but are related to four main dimensions or perspectives that are linked together such measures from financial perspective, customer perspective, internal business process, and innovation and learning perspective (Figure 1). According to Kaplan and Norton (1993), through the various BSC perspectives, vision of organization and strategy of business units could get translated into objectives and measures as shown in Figure 1.

Each perspective must consider and linking with the following items:

- strategic objectives (growth, profitability, customer satisfaction, process excellence);
- measures (revenue growth, return on equity, number of complaints, yield);
- targets; and
- initiatives.

Most measurement systems serve a narrow regulatory, clinical, or diagnostic function. They are not constructed to tell the story of organization strategy and guide the implementation (Inamdar *et al.*, 2002) and other measurement systems do to timelines not offered. The importance of BSC is in the ability to portray the complexity relationship of the strategy.

Figure 1.
BSC perspectives

Source: Adapted from Kaplan and Norton (1993)

In customer perspective, performance must be measured throughout to match the needs of customers, create the demand for a new process or technology and provide value to the customer so as to improve customer satisfaction (Jyoti and Deshmukh, 2008). Also, it must consider evaluating how quick the response to customers' complements, complaints and satisfaction is. The major measurement for this perspective is the average and percent of customer complaints as well as the percent of employees who serve the customers. Items that could be easily measured are, number of customers profiled, number of customers with financial plans, number of targeted customer using online channel for transactions, and customer survey responses on questions related to appreciation and ease of working with the financial aspects (Kaplan, 2010). Customers as stockholder have interests in the firm based on previous measurements and will contribute to the firm in setting its strategies in order to succeed.

In internal business process perspective, top management of the firm determine the critical business processes that are related in activities, which achieve competitive advantage such as operation processes and innovation as well as fulfillment processes (Kaplan and Anthony, 1998; Kaplan and Norton, 1992). The main initiative for this perspective from customers is that the business processes are implemented towards delivering value to customers.

In financial perspective, as defined by Kaplan and Norton (1996) "the readily measurable economic consequences of actions already taken". This means, the rerun

on investment, level of operation income, and cash flow measure the financial status of firm. It is also important to inform consumers how the firm is doing year after year and actions taken as a way of reflecting financial performance of organizations. Such factors closely related an organization's production or service type could be used for evaluating the financial dimension of any organization.

In innovation and learning perspective, the focus is on measuring the investment in human resources, and the main measurements for this perspective are, expenditures of research and development and cost of training (Judeh, 2008). So in this perspective, determining firm infrastructure, such as used technology and the efficiency of systems will help in achieving firm goals and objectives. Evaluation of learning and growth dimensions should consider the employee performance and business innovation (Kaplan, 2010; Ying, 2010). Some of the learning and growth dimensions of evaluation indicators could be: the sustainable development ability, staff training, research and development investment and acquisition of information.

When adopting the BSC approach, top management team embraces a "vision for change" and nurtures a sense of team-spirit and collaboration. According to performance management experts (Rohm, 2002) the process is more "about changing hearts and minds and sustaining new directions, than it is about selecting performance measures".

Research method

This research study investigates the adoption of BSC that follows nine sequential processes or steps (Sharma, 2009) as shown in Figure 2.

Assessment of the organization's mission, vision, challenges and values: this refers to the situation that the organization seeks to achieve in the long-term (Niven, 2003). The organization's mission has the primary purpose of providing justification and reason for organization existence and continuity.

Figure 2.
Process or steps of
applying BSC

Elements of the organization's strategy, including strategic results, strategic themes and perspectives, are developed to focus attention on customer needs and the organization's value proposition. The organization translates its vision and mission through the development of strategic objectives aimed at achieving them.

The strategic elements developed in steps one and two are decomposed into strategic objectives, which are the basic building blocks of the strategy. Organization must determine the critical success factors that are compatible with the strategic goals and that the measurements are appropriate to measure the goals.

The cause and effect linkages between the enterprise-wide strategic objectives are formalized in an enterprise-wide strategy map. This is to clarify the causal relationships between different measurements and goals, so that there is coordination and a clear understanding of senior management vision.

Performance measures are developed for each of the enterprise-wide strategic objectives. Leading and lagging measures are identified, expected targets and thresholds are established and baseline and benchmarking data is developed. Designing BSC involves capturing the necessary information which are required for applying it for the system, and it includes objectives, targets and initiatives for all perspectives. Strategic initiatives are developed that support the strategic objectives.

The implementation process begins by applying performance measurement software to get the right performance information to the right people at the right time.

Cascading the scorecard level down into business and support unit scorecards is required. This means that the organizational level scorecard (the first tier) is translated into business unit or support unit scorecards (the second tier) and then later to team and individual scorecards (the third tier). This way, an evaluation of the completed scorecard is done.

Applying BSC at Jordan E-Government

The prime objective of the project on e-government in Jordan and the launch of e-government portal at the end of the year 2006 were to include the provision of e-government services in a number of departments and various government institutions to meet the needs of various sectors: citizens, business, and government. Typically, e-governments providing services to customers or users have several models, depending on the type of the dealings involved and these are categorised (Basu, 2004) as follows:

- government dealings with citizens (G2C);
- government dealings with the business sector and investors (G2B);
- business dealings with the government and investors (B2G);
- government transactions government (G2G); and
- dealings with government employees (G2E).

The main electronic services provided by Jordan E-Government include Services for Government Tenders, Services as prime minister, Income Tax Department, Customs Services, Services and the Ministry of Industry and Trade, National Information Technology Center, Lands and Survey, General Organization for Housing and Urban Development and Services of Greater Amman Municipality.

This research study investigates the BSC model we have developed for Jordan E-Government (Table I). This model has been adopted with an emphasis towards

E-government vision	To be a major contributor to Jordan's economic and social development by providing access to government e-services and information for everyone in the Kingdom irrespective of location, economic status, ICT ability and education		
	To move the Jordanian government towards a "client-focused" approach in the delivery of services, by means of appropriate technology, knowledge management and skilled staff to implement e-government initiatives and programs that are relevant and affordable to the citizens of Jordan. The e-government program is a major contributor to the government of Jordan's administrative reform		
Customer perspective	<i>Perspective</i>	<i>Initiatives</i>	<i>Targets</i>
	Measurement		
Internal processes perspective	Number of users and classification	Increase in number of users	The number of user accesses to at least 55% of the population
	User Satisfaction Index	Users satisfaction level	Deliver value-added services for users
	Number of complaints classified according to each service	Degree of attention and care of users	Continuous improvement
	Average length of user relationship	Degree of technical support to user services by the department (e-care users)	Development of extension programs and support
	Index to the opinion of users		
	Users loyalty		
	Usability expenses/total revenues	Effective control	Commitment to total quality principles
	Standard time allocated for data collection (hours)	The time specified for the completion of standard time (data collection and inspection, packing and collection)	The permanent development of the flow of information systems
	Standard time allocated for testing (in hours)	PERT network models for operations and projects	Discrimination in the provision of electronic services
	Standard time allocated for the consideration of complaints (in hours)	The rate of efficiency in the implementation	Reduce service time to the minimum
	Number of hours of notification to the standard time	Efficiency index of the output	Improving levels of automation of data and representations
	Average time spent in taking decisions to support and testing desktop (in hours)	performance	
	Capacity of information technology (bandwidth)	The degree of delegation of authority and powers of the director and the rules of responsibility accounting	
	Information technology expenditures/capital expenditure allocated to administration		

(continued)

Table I.

Innovation and learning perspective	Expenses related to research and development of electronic service to total expenditure	Index of satisfaction of employees Degree of loyalty among staff Rates of confidence in the provision of electronic services required quality	Increase the number of advanced electronic services annually Promotion of a culture of permanent electronic service
	Cost of training programs for e-service Cost of training programs to apply electronic software package Product support investment in new services such as providing advice through the internet and hotline and training Cost of uses for the development and acquisition of staff for negotiation skills Employee satisfaction index Loyalty of workers and management – promotions and bonuses index Percentage of new electronic services to the services provided	Rates of spending on training programs and continuing education Degree of commitment to ethics and behaviors Financial incentives and their relation to the monthly rates of achievement	Promotion of a culture of permanent electronic service Creativity and innovation in the creation of value for the users Create a permanent atmosphere provides an environment suitable for technological training contribute to the development of performance The development of electronic service in a way that meets the requirements and users needs
Financial perspective	E-services revenue to total revenue of tax administration E-services revenue to total fixed assets of computers Income from software products Revenue from new electronic products (electronic software package) Cost of e-signature services to the total cost of uses Cost of renovation and replacement and development of electronic equipment to the total costs of uses Return on investment in the costs of infrastructure, equipment and software The number of transactions submitted online to the total returns Return on investment associated with information service	Increasing growth in income due to provide packages of e-services Reduce the cost of form collection as a result of the new services through electronic media Reduce the cost of data collection Reduce the cost in delivering services to the users	Growth of at least 15% per year in revenue Reduction of 10% per annum of the sunk cost Create a culture of voluntary compliance with the user Improving the level of service provided to the user Upgrading the performance of access to achieve comprehensive quality standards

incorporating a suitable measurement system based on the insights gained from the literature review. We have allocated a total of 28 measurements and have distributed them among the four perspectives of BSC by incorporating the mission and vision developed by Jordan E-Government.

Research structure and hypothesis

Based on the reviewed literature, we have formulated the hypotheses of the model. Figure 3 shows an overview of the research model. The main hypothesis is divided into four sub-hypotheses to determine the effect of applying BSC in evaluating the e-government performance of Jordan, and these are given below:

Main hypothesis. There is no effect of applying BSC in evaluating the performance of e-government to maximize the return (the financial perspective, user perspective, internal processes perspective, and innovation and learning perspective).

We divide the main hypothesis into four sub-hypotheses as follows:

Sub-hypotheses (HO1). There is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase the return on e-government services.

Sub-hypotheses (HO2). There is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase user satisfaction.

Sub-hypotheses (HO3). There is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase efficiency and effectiveness.

Sub-hypotheses (HO4). There is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase skills of employees.

The design of the survey questionnaire used for testing the above hypotheses is described next.

Figure 3.
Research model for BSC

Questionnaire design

The questionnaire consists of two main parts. Part I contains the user background and demographic information (e.g. gender, age, computing experience, interests in e-government/e-services). This was collected to conduct a demographic analysis in order to validate the authenticity and integrity of the data collected in Part II about effect of BSC in Jordan E-Government. Part II comprised of four main sections, each section comprising of questions involving BSC application in Jordan E-Government grouped under the financial perspective, customer perspective, internal process perspective and innovation and learning perspective. These form a one-to-one map with the four sub-hypothesis stated in the research model (Figure 3). The questions designed correspond to all the evaluation measures indicated in the Jordan E-Government BSC model shown in Table I. The items evaluated and measured through the questionnaire are also provided in Tables IV, VI, VIII and X. Apart from having a five-point Likert scale (1 – strongly agree down to 5 – strongly disagree) responses, additional comments were also collected from the participants. More details on the sampling and testing method used are explained next.

Sampling and testing method

The population for the study consists of employees in the e-government Unit at Ministry of Communications and Information Technology in Jordan, and group of customers (users) of e-government services. In addition to this, a group of employees from information technology and telecommunications sector in Jordan and researchers related to the field of e-government were included in the study population. The following Table II and Figure 4 show these details.

We have adopted survey research methodology as it is one of the main measurement methods widely accepted in social research. The survey method of data collection consists of two parts. The first part contains general information about the respondents such as, job title, interest, educational qualification, specialization, years of experience. The second part contains data of the study, and was divided into four lists of a questionnaire. Each list contains the terms provide a scale indicating the extent to which the viewpoint of respondents measure the contribution of each of the perspectives of BSC while assessing and evaluating the performance of e-government services. The data collected were analyzed using Statistical Package for Social Sciences (SPSS) software package to test the hypotheses.

To determine the impact of independent variables on dependent variables, we have adopted a quantitative research methodology in this study. We have used the Likert

Table II.
Groups of the study
population

Groups Description	Questionnaires distributed		Questionnaires received No.	Questionnaires excluded No.	Questionnaires were subject to analysis	
	No.	%			No.	%
Employees at e-government	100	21	82	11	71	18
Customers (users)	280	60	264	16	248	65
Employees at IT sector	50	11	34	3	31	8
Researchers	40	8	33	0	33	9
Total	470	100	413	30	383	100

Figure 4.
Percentage of groups of
the study population

five-scale for responses in the questionnaire, and the scale points are: 1 – strongly agree, 2 – agree, 3 – neutral, 4 – disagree, and, lastly, 5 – strongly disagree. We have followed the systematic sampling procedure given by Tabachnick and Fidell (2001) to arrive at a total of 383 participants for the survey and distributed the questionnaire to the study population. Part II was a questionnaire consisting of seven measurements designed with descriptive paragraphs and we distributed 71 questionnaires to the employees of e-government Unit at Ministry of Communications and Information Technology in Jordan.

The researchers used the SPSS software to conduct statistical analysis to prove or disprove hypotheses of this study. The testing was conducted with the objectives as follows:

- (1) The descriptive statistics of the percentages, averages and standard deviations were used with respect to the study sample analysis, and the variables and dimensions of the study to determine the degree of importance of the measurements adopted.
- (2) Ranking and level of assessment of the measurements are determined. A level of high is assigned if the value of the mean is 3.5 and above, Medium, if it lies in the range 3.0-3.49, and low less than 2.99. These are useful to understand the items of importance. Those that are at low or medium level require attention.
- (3) One sample *t*-test: this test compares the calculated average with the standard of measure average of the Likert five-scale (null hypothesis at value 3) for testing the main hypothesis.

Demographic analysis

We had collected the general characteristics of the research sample, namely, educational qualification, years of experience; gender, job title, level using computer, specialization, interest, and the Table III shows the results.

We have noted from Table III, and Figure 5, that qualifications were mostly in the bachelor's degree and this is attributed to the fact that the tasks in e-government require a good level of education and learning to perform the job, while diploma holders and secondary education is limited to mainly data-entry task levels. In most sample cases, the number of years of experience is less than three years due to the recent launch of e-government services in Jordan, confirming the number of years of experience from

Variable	Groups of the variable	Employees at e-gov.		Customers (users)		Employees at IT sector		Researchers	
		No.	%	No.	%	No.	%	No.	%
Educational qualification	High School	14	19.72	59	23.79	1	3.23	0	0.00
	Diploma	12	16.90	57	22.98	7	22.58	2	6.06
	Bachelors	35	49.30	118	47.58	16	51.61	16	48.48
	Master	8	11.27	8	3.23	6	19.35	9	27.27
	PHD	2	2.82	6	2.42	1	3.23	6	18.18
Years of experience	Less than three years	25	35.21	149	60.08	11	35.48	25	75.76
	From three to six years	17	23.94	25	10.08	9	29.03	6	18.18
	From eight to ten years	15	21.13	40	16.13	7	22.58	1	3.03
	More than en years	14	19.72	34	13.71	4	12.90	1	3.03
Gender	Male	45	63.38	125	50.40	23	74.19	23	69.70
	Female	26	36.62	123	49.60	8	25.81	10	30.30
Job title	Technical support	63	88.73	—	—	—	—	—	—
	Administrative	8	11.27	—	—	—	—	—	—
Level using computer	Professional	—	—	91	36.69	—	—	—	—
	Very good	—	—	96	38.71	—	—	—	—
	Good	—	—	61	24.60	—	—	—	—
Specialization	Computer Science	—	—	—	—	11	35.48	—	—
	Network	—	—	—	—	4	12.90	—	—
	Software and hardware	—	—	—	—	16	51.61	—	—
Interest	E-government	—	—	—	—	—	—	29	87.88
	E-services	—	—	—	—	—	—	4	12.12
Total		71		248		31		33	

Table III.
 The characteristics of the research sample (groups of the study population)

Figure 5.
 The characteristics of the research sample

Note: Employees in the e-government unit at ministry of communications and information technology – Jordan

most members of the study sample being their first job. Also, most of the job title for the study sample was technical support, as this was assigned target in the study sample. These general characteristics form means of validating the integrity of the data collected from the study sample.

With descriptive paragraphs at the customers perspective (users of e-government services in Jordan). The researchers were distributed to 248 Table III and Figure 6 show the general characteristics of the research sample (educational qualification, years of experience, gender, level of using computer) and the statistical results obtained.

We observe from Table III that the gender of population study indicates male as 50.4 percent and female as 49.6 percent. This refers to the gender equality of members of the research sample that serves one of the objectives of the study, namely, to know the views of both genders. Also, 60.08 percent of the population indicates less than three experiences dealing with e-government services and this attributes to the recent awareness of the importance of using e-government services. In terms of level of using computers, we observe that the population was being in very good level of computer literacy, as 96 respondents have indicated very good level of using computer, and also the population being educated, possessing the ability to use computers for e-service provided by Jordan E-Government.

Also we observe from Table III similar characteristics of the population sample as in previous cases at the group of employees in information technology and telecommunications sector, in additional to that we observe that the population study had specialization in several majors in information and telecommunication technology. We have aimed to target these specializations to serve the objective of the study, namely to measure the efficiency and effectiveness from internal processes perspective, and Figure 7 shows the result.

In additional to the group of researchers related to the field of e-government we observe that the population study has interest in e-government field. We aimed to target this characteristic in the population sample to serve the objective of the study, namely to measure the increasing skills of employees, and Figure 8 shows the result.

Note: Group of customers of e-government services – Jordan

Figure 6.
The characteristics of the
research sample

Figure 7.
The characteristics of the research sample

Note: Group of employees in information technology and telecommunications sector

Figure 8.
The characteristics of the research sample

Note: Group of researchers related to the field of e-government

Hypotheses testing results and analysis

We had collected data of the survey questionnaire to test the first sub-hypothesis (there is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase the return on e-government services) based on (finance perspective) that was designed with inputs from literature and it comprised of two parts. Part I was dedicated to gathering general data on the study sample.

The calculated averages and standard deviations were reached for the study and based on the established standards that, if the value of the mean of the parameter in each paragraph of the questionnaire was more than 3.5 the level of assessment of the measurements is considered as high, if the value of the mean lies in the range 3.0-3.49, the level of assessment of subjects is considered as medium, and if the averages is less than 2.99, the level of assessment of subjects is considered as low. Table IV shows these statistical results.

No.	Measurements	Avg.	SD	Level	Ranks
1	E-services revenue to total revenue of tax administration	2.99	0.88	Low	8
2	E-services revenue to total fixed assets of computers	3.25	0.95	Medium	4
3	Income from software products	3.19	0.89	Medium	6
4	Revenue from new electronic products (electronic software package)	2.92	1.04	Low	9
5	Cost of e-signature services to the total cost of uses	3.10	0.65	Medium	7
6	Cost of renovation and replacement and development of electronic equipment to the total costs of uses	3.24	0.90	Medium	5
7	Return on investment in the costs of infrastructure, equipment and software	3.43	0.93	Medium	1
8	The number of transactions submitted online to the total returns	3.34	1.08	Medium	3
9	Return on investment associated with information service	3.35	0.91	Medium	2
Total degree of effect applying the BSC in evaluating the performance of e-government to increase the return on investment related to e-government services		3.20	0.52	Medium	

Table IV.
Statistical results for
financial perspective

From Table IV, it is observed that there is significant effect of applying the BSC in evaluating the performance of e-government to increase the return on e-government services as the overall measure is medium (3.20). The paragraphs 2, 3, 5, 6, 7, 8, and 9 show medium effect, while the paragraph 1 and 4 indicates low effect. The table also points out the importance of measurements, where the seventh measurement (return on investment in the costs of infrastructure, equipment and software) is the highest value with average of 3.43, which refers to the degree of importance given to this measure. Also, the revenue from new electronic products (electronic software package) is observed to be of lowest rank or low degree of importance measure, with average of 2.92. We have ranked all the measurements according to the degree of importance conceived by the respondents.

To test the validity of first sub-hypotheses (*H01*), we have employed *t*-test on the sample and we observe from the Table V that the value of *t* is equal to 6.11, and the value of probability (0.00) is less than the significance level ($\alpha = 0.05$), indicating the rejection of the hypothesis. This means that there is statistical significant effect of applying the BSC in evaluating the performance of e-government to increase the return on e-government services.

Next, we had collected data by means of a survey questionnaire to test the second sub-hypothesis: there is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase user satisfaction. A questionnaire consisting of six measurements (based on customers' or users' perspective) was designed.

Similar to the first hypothesis, we have calculated averages and standard deviations for the second hypothesis, Table VI provides the statistical results obtained.

Test value = 3			
Mean	df.	<i>t</i>	Sig.
3.20	70	6.11	0.00

Note: *Statistically significant at the level of significance ($\alpha = 0.05$)

Table V.
Results of test first
hypothesis (*t*-test sample)

We observe from Table VII that there is significant effect of applying the BSC in evaluating the performance of e-government to increase users' satisfaction, where the total degree is observed to be medium (3.11). The paragraphs 1, 2, and 3 shows high effect for these measurements, while the paragraphs 4 and 5 indicate medium effect, and last paragraph exhibits low effect. The table also points out the importance of measurements, where the first measurement (number of users and classification) has high average (3.54) which refers to degree of importance of this measure. Also, Users Satisfaction Index has high average or degree of importance measure with an average of 3.52. We have ranked all the measurements according to the degree of importance conceived by the respondents.

To test the validity of second sub-hypotheses (*H02*), we have employed *t*-test on the sample and we observe from the Table VII that the value of *t* is equal to 5.29, and the value of probability (0.00) is less than the significance level ($\alpha = 0.05$), indicating the rejection of the hypothesis. That means that there is statistically significant effect of applying the BSC in evaluating the performance of e-government to increase user's satisfaction.

Next, we had collected data by means of a survey questionnaire to test the third sub-hypothesis: there is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase efficiency and effectiveness. A questionnaire consisting of eight measurements (based on Internal processes perspective) was designed with descriptive paragraphs and was distributed to 31 employees in information technology and telecommunications sector in Jordan. Table VIII provides the statistical results obtained (Table IX).

We observe from Table X that there is significant effect of applying the BSC in evaluating the performance of e-government to increase the efficiency and effectiveness, with the total degree calculated as high (3.92). The paragraphs 2-8 shows high effect for these measurements, while the first paragraph indicates medium effect. The table also points out the importance of these measurements, where the third measurement (standard time allocated for testing) has a high average of 4.28, which refers to the degree

Table VI.
Statistical results for
customer perspective

No.	Measurements	Avg.	SD	Level	Ranks
1	Number of users and classification	3.54	0.88	High	1
2	Users Satisfaction Index	3.52	1.04	High	2
3	Number of complaints are classified according to each service	3.51	1.19	High	3
4	Average length of user relationship	3.17	1.29	Medium	4
5	Index to the opinion of users	3.14	1.23	Medium	5
6	User loyalty	2.92	0.49	Low	6
Total degree of effect for applying the BSC in evaluating the performance of e-government to increase users' satisfaction		3.11	0.60	Medium	

Table VII.
Results of test second
hypothesis (*t*-test sample)

Test value = 3			
Mean	df.	<i>t</i>	Sig.
3.11	247	5.29	0.00
Note: *Statistically significant at the level of significance ($\alpha = 0.05$)			

No.	Measurements	Avg.	SD	Level	Rank
1	Usability expenses/total revenues	3.38	0.87	Medium	8
2	Standard time allocated for data collection	4.25	1.93	High	2
3	Standard time allocated for testing	4.28	0.89	High	1
4	Standard time allocated for the consideration of complaints	3.88	1.07	High	5
5	Number of hours of notification to the time standard	4.09	0.73	High	3
6	Average time spent in taking decisions to support and testing desktop	4.00	0.88	High	4
7	Capacity of information technology (bandwidth)	3.63	1.29	High	7
8	Information technology expenditures/capital expenditure allocated to administration	3.84	1.17	High	6
Total degree of effect for applying the BSC in evaluating the performance of e-government to increase efficiency and effectiveness		3.92	0.63	High	

Table VIII.
Statistical results for
internal business process
perspective

Test value = 3			
Mean	df.	<i>t</i>	Sig.
3.92	30	14.94	0.00
Note: *Statistically significant at the level of significance ($\alpha = 0.05$)			

Table IX.
Results of test third
hypothesis (*t*-test sample)

No.	Measurements	Avg.	SD	Level	Rank
1	Expenses related to research and development of electronic service to total expenditure	3.10	0.65	Medium	6
2	Cost of training programs for e-service	3.24	0.90	Medium	4
3	Cost of training programs on the application of electronic software package	3.43	0.93	Medium	1
4	Product support investment in new services such as providing advice through the internet and hotline and training	3.34	1.08	Medium	2
5	Cost of uses for the development and acquisition of staff for negotiation skills	2.99	0.88	Medium	7
6	Employees satisfaction index	3.25	0.95	Medium	3
7	Loyalty of workers and management – promotions and bonuses index	3.19	0.89	Medium	5
8	Percentage of new electronic services to the services provided	2.92	1.04	Medium	8
Total degree of effect for applying the BSC in evaluating the performance of e-government to increase skills of employees		3.19	0.52	Medium	

Table X.
Statistical results for
innovation and learning
perspective

of importance of this measure. Also, standard time allocated for data collection has a high average or degree of importance measure, with an average of 4.25. As before, we have ranked all the measurements according to the degree of importance conceived by the respondents.

To test the validity of third sub-hypotheses (*HO3*), we have employed *t*-test on the sample and we observe from the Table XI that the value of *t* is equal to 14.94, and the value of probability (0.00) is less than the significance level ($\alpha = 0.05$), indicating

the rejection of the hypothesis. That means that there is statistically significant effect of applying the BSC in evaluating the performance of e-government to increase efficiency and effectiveness at internal processes.

Next, we had collected data by means of a survey questionnaire to test the fourth sub-hypothesis: there is no statistical significant effect of applying the BSC in evaluating the performance of e-government to increase skills of employees. A questionnaire consisting of eight measurements (based on innovation and learning perspective) was designed with descriptive paragraphs and was distributed to 33 employees in e-government and a group of researchers related to the field of e-government. Apart from researchers in Jordan, some researchers who are Jordan citizens living in Australia were also included to participate in the study so as to understand how they are able to make use of the Jordanian E-Government services remotely and view them as compared to those e-government services designed in other developed countries.

Similar to the previous hypotheses, we have calculated averages and standard deviations for the fourth hypothesis. Table X provides the statistical results obtained.

We observe from Table XI that there is significant effect of applying the BSC in evaluating the performance of e-government to increase the skills of employees, with the total degree calculated as medium (3.21). All the eight paragraphs show medium effect for these measurements, and the third paragraph (the cost of training programs on the application of electronic software package) indicates almost high (3.43) effect. Also, product support investment in new services such as providing advice internet and hotline and training has almost high average or degree of importance measure, with an average of 3.34. As before, we have ranked all the measurements according to the degree of importance conceived by the respondents.

To test the validity of fourth sub-hypotheses (*HO4*), we have employed *t*-test on the sample and we observe from the Table XI that the value of *t* is equal to 6.11, and the value of probability (0.00) is less than the significance level ($\alpha = 0.05$), indicating the rejection of the hypothesis. That means that there is statistically significant effect of applying the BSC in evaluating the performance of e-government to increase skills of employees at Innovation and Learning perspective.

According to testing the four sub-hypotheses that pointed the degree of importance for all measurements, the rejection of all four sub-hypotheses has led to reject main hypothesis: “there is no effect of applying of BSC in evaluating the performance of e-government to maximize the return (the financial perspective, user perspective, internal processes perspective and Innovation and Learning perspective)”. This means that by applying BSC in evaluating the performance of e-government, it will perform to maximize the return for all perspectives of BSC. Hence, we have achieved the purpose of the study in investigating and verifying the importance of using BSC approach in e-government to evaluate and measure its performance.

Table XI.
Results of test fourth
hypothesis (*t*-test sample)

Test value = 3			
Mean	df.	<i>t</i>	Sig.
3.19	32	6.11	0.00

Note: *Statistically significant at the level of significance ($\alpha = 0.05$)

Conclusions

The empirical study conducted in this research work reveals the need to use the BSC framework in assessing and evaluating the performance of e-government and measuring the performance of e-service delivery. The testing of hypotheses clearly suggests that applying BSC has maximized the return on investment of such services in Jordan E-Government. Among the four perspectives of the BSC, the maximum positive effect was attributed to internal business process and following this is the financial perspective. However, customer perspective has received least effect. The feedback through comments collected through the questionnaire of the study has identified the need to provide user training programs to encourage interactions with such services electronically with a view to keep pace with global development in preserving the green environment. There is also a strong desire and motivation to use mobile devices in all government services and transactions.

The innovation and learning perspective shows the next least effect indicating that continuous attention has to be given towards employees' development and to activate rewards and promotions systems that would lead to their advancement and growth. Motivation among workers should be uplifted and in order to elevate the degree of belonging to the organization and their job satisfaction and these require to be measured from time to time.

Overall, we conclude that by applying the BSC framework in evaluating the performance of e-government, the efficiency and effectiveness of internal processes have improved, and this would have an important role in raising the measurements of the other three perspectives in the long-term.

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