The Implementation of e-procurement System in Health Sector in Greece: Attitudes of Potential Users and Implications for Hospital Management

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Abstract

Information technology has already penetrated to the health care organizations, promoting their efficiency and effectiveness. Electronic procurement, as an application of information technology, abolishes the traditional procurement procedures introducing information systems and the use of computer. End-users perception of usefulness and ease of use of the information system is a crucial variable for a successful implementation of electronic procurement. Aim of the study was to assess end-users attitude towards the introduction of e-procurement procedures in Greek public hospitals. Technology Acceptance Model was used to examine users' attitude. Randomly selected administrative employees of procurement units and head/deputy physicians of all Greek public hospitals participated in this cross-sectional study (N=283). The survey was conducted from May till October 2011. The response rate exceeded to 70%.

Findings revealed the positive perception of usefulness of e-procurement both for employees and physicians. The majority of employees (94.7%), as end-users, expressed their intention to use e-procurement procedures. Although one third of employees reported that e-procurement will not be ease of use, the majority (almost 96% of administrative staff) reported their willingness to take part in training programs. Ease of

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use internet, was significantly correlated with the perception of ease to use e-procurement (p=0.001).

At last, in a percentage that approximately amounts 80%, employees consider that the cost of the materials' provision is going to be reduced, by the application of the electronic procurement system.

Due to the economic crisis and the necessity for cost containment Ministry of Health, identifying the benefits of e-procurement, has to take advantage of the positive attitude of end-users and put on, as a priority the development and implementation of e-procurement systems in hospital sector.

1 Introduction

Governments face up to an increasing cost of health sector, while at the same time they have to reduce their budgets. Hospital administrators have to provide safe and high quality health care services under the pressure of limited resources. Innovative and expensive medicines constantly evolved biomedical technology and aging population are some of the major factors that rise health care costs [1].

Computers, information systems and technologies have penetrated to health care organizations and enhanced their performance by providing better communication, access to information and knowledge and promoting innovation and efficiency [2]. Electronic procurement (e-procurement), as an information technology application, consists of a useful tool for administrators to save money and increase organizations' effectiveness and efficiency. Process cost savings, reduced administration costs, decrease in costs through reduced staffing levels, increased quality through increased competition, reduction in time through improved internal workflow and shortened overall procurement cycle times compose some of the benefits that stem of e-procurement process [3, 4].

A well designed process and policy willing can be essential pre-conditions for e-procurement implementation. However, there is a crucial variable which put at risk the success of the implementation. This variable tends to be users' acceptance of the new process. E-procurement consists change for the organization and specifically for the employees of the procurement unit. Abolition of the traditional handwritten procedure and its replacement of new procedures based on the use of computer and information technology consist some of the major changes. Resistance to change is a barrier for e-procurement process construction and users' acceptance isn't considered given. Davis [5, 6, 7] developed and validated the Technology Acceptance Model (TAM) to explain the mechanisms that influence and shape users' acceptance of new information technology. According to TAM, there are two specific variables that are fundamental determinants of users' attitude toward using information technology and actual use of the system: perceived usefulness and perceived ease of use relatively to new information system design features. Usefulness is defined as the degree to which someone believes that using a system will enhance his performance and ease of use is defined as the degree to which user believes that benefits of systems' use are outweighed the efforts for using it. Before e-procurement implementation, administrators have to assess employees' attitude across to this new information technology, in order to prevent a failure in implementation and waste of resources.

2 Aim

The aim of the study was to assess the attitude of administrative employees of procurement units, head physicians and deputy head physicians of public hospitals to the introduction of e-procurement procedures in their hospitals. Head physicians and deputy head physicians were included to the study, because they get involved in the process by drawing up the technical characteristics of the medical supplies.

3 Sample

Randomly selected administrative employees of the procurement units, head physicians and deputy head physicians of all (135) Public Greek Hospitals participated in this cross-sectional study. Permission was granted by Administration Board of the 7 Regional Health Authorities. All questionnaires were sent via Fax. Each one was accompanied by a letter describing the personal data of researchers, the aim of study and ethical aspects (anonymity and voluntary participation). Participants returned the completed questionnaires via Fax. The period during which the study was conducted was May 1st to October 31th 2011. One hundred eighty nine completed questionnaires were returned and analyzed, out of the 268 that were sent (response rate 70.52%).

Instrument

Researchers used two questionnaires, one for administrative employees and one for the physicians. The questionnaires were developed by the researchers based on literature and experts recommendations. A pilot study was conducted. Thirty five administrative employees were interviewed by the researchers

Administrative employees' questionnaire consisted of four parts. First one (16 questions) referred to the perceived usefulness of e-procurement implementation to the hospital and the second (4 questions) to the perceived ease of use it. At the third part (4 questions) participants completed their demographic characteristics. Finally at the fourth (2 questions) they answered about their work status.

Head and deputy physicians' questionnaire consisted of two parts. The first part (12 questions) referred to the perceived usefulness of e-procurement implementation to the hospital where the second (5 questions) to demographics and work status.

Data analysis

Categorical variables are presented as absolute and relative frequencies, while continuous data are presented as mean (standard deviation). The normality assumption was evaluated both using the Kolmogorov-Smirnov criterion (p>0.05 for all variables) and normal probability plots. Continuous variables appeared reasonably normally distributed. Relations between categorical variables were estimated by chi-square test, Fisher's exact test and chi-square trend test. A t-test was used in order to explore the relation between a continuous and a dichotomous variable. A two sided p-value <0.05 was considered statistically significant. The Statistical Package for Social Sciences (IBM SPSS) program, version 19.0 (Chicago, Illinois, USA) was used for statistical analysis.

4 Results

Demographic characteristics of the participants are shown in Table 1.

Administrative employees (97.4%) together with the physicians (90.4%) reported that the current procurement procedure has to change. The use of information technology is essential for the improvement of the procurement procedure answered the majority of the employees and physicians. The introduction of e-procurement into public hospitals is indispensable according to 93.7% of the employees and 89.4% of the physicians. The introduction and use of e-procurement will make the procedures more transparent, safe, quick and will reduce transaction costs. E-procurement will increase the competition and contribute to increased patients' satisfaction of the public hospitals. Descriptive results about perceived usefulness of e-procurement are summarized in Table 2**.**

Thirty nine percent of the employees answered that the e-procurement process won't be easy and simply to use, while another 34.4% believed the opposite. The majority of employees (95.8%) were willing to learn how to use the new process and take part in training programs, either during their work time either after that. Employees reported that e-procurement will facilitate their work and consequently they will take better control over their work. Descriptive results about perceived ease of use e-procurement are shown in Table 3.

The majority (94.7%) of employees expressed their intention to use the e-procurement process. Ninety three per cent of the employees reported that they have great/moderate ease of use internet. The ease of internet use was significantly correlated with the perception that e-procurement have to introduced into public hospitals (p=0.001) and even immediately (0.007) and that information technology is essential for the improvement of procurement procedures (p=0.02). Also, the ease of internet use was associated with the perception that e-procurement process will be easy and simply to use (p=0.03) and with the willingness to participate in training programs (p=0.01). Another significant finding was that ease of internet use, was correlated with the intention to use the e-procurement procedure (p=0.02). Ease of internet use and its statistical significant correlations are shown in Table 4.

About 60% of physicians expressed the opinion that the e-procurement system has immediately to be implemented, while only 33% of administrative staff expressed the same opinion, a difference that is statistical significant (p<0,0004).

5 Discussion

Findings of the present study revealed the respondents' positive perception of usefulness of e-procurement for the organizations. The findings are consistent with findings of other studies in Malaysia [8] and Australia [9]. Davis [5] confirmed in his study, followed the TAM introduction, the strong and significant direct and indirect (through attitude) effect that perceived usefulness have on actual use. Chau and Hu [10] research among physicians on telemedicine technology acceptance found usefulness perception as the most significant factor for the acceptance of the telemedicine technology. Greek public health sector is undergoing the devastating effects of economic crisis. Ministry of health decreased its budget by 1.4 billion euro for the year of 2011. Two thirds of this reduction targeted the hospitals' operating costs [11]. Recently, the Greek Minister of Health presented the results of an e-auction for medicines supply, announcing a 99.6% reduction

on medicines prices. Perceived usefulness, combined with the high percentage (94.7%) of intention to use e-procurement, creates the conditions for a successful implementation of it in health sector and gives to the Greek Government the opportunity to get the direct and indirect benefits that stem of e-procurement process.

Although, the majority of employees believe that e-procurement will facilitate their work, only 1 to 3 answered that e-procurement will be easy and simply to use. Also the majority expressed their willingness to participate in training programs for e-procurement. Studies have demonstrated that employees' training is a crucial factor for perception of ease of use and acceptance of information technology [9, 12]. The lack of system knowledge may create anxiety, negative attitude and diffusion to use e-procurement technology. Training programs provide knowledge and primarily experience of computers and new information technology, making employees more confident [13]. According to our findings, perception about e-procurements' ease of use, was significantly associated with those that reported ease of internet use. This finding is consistent with findings of other studies [14, 15], where individuals' computer self-efficacy and system experience had a significantly positive effect on perceived ease of use of the specific system.

5 Conclusion

The economic crisis that undergoing the Greek Government has deprived of health sector important resources. E-procurement and information technology can help administrators to save money through more effective and efficiency procedures. Our study findings revealed end-users perception of usefulness, willingness to learn new information systems and their intention to use them, making way for a successful e-procurement implementation. Greek Government and public health sector agencies, identifying the benefits of e-procurement, have to take advantage of the positive attitude of end-users and put on as a priority the development and implementation of e-procurement.

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Appendix

Table 1: Demographic characteristics of the participants

Characteristic	Employees	Physicians
Gender		
Female	134 (70.9)	29 (30.9)
Male	55 (29.1)	65 (69.1)
Age[a]	42.2 (7.1)	54.8 (6.5)
Education level		
Higher school	70 (37)	
University diploma	96 (50.8)	
Master/PhD Degree	23 (12.2)	
Work position		
Head physician		66 (70.23)
Deputy head physician		28 (29.8)
Manager	20 (10.6)	
Deputy manager	33 (17.4)	
Employee	136 (72)	
Years of experience[a]	14.6 (8.5)	22.76 (0.1)

[a] Mean (standard deviation)
  Values are expressed as n (%).

Table 2: Perceived usefulness of e-procurement according to the respondents

	Employees	Physicians
Information technology will improve procurement procedure	187 (98.9)	90 (95.7)
E-procurements' introduction into Public hospitals is essential	177 (93.7)	84 (89.4)
E-procurement will make procedures more transparent	135 (71.4)	76 (80.9)
E-procurement will make procedures more safe	112 (59.3)	60 (63.8)
E-procurement will make procedures more quick	149 (78.8)	83 (88.3)
E-procurement will reduce transaction costs	142 (75.1)	75 (79.8)
E-procurement will increase the competition	123 (65.1)	66 (70.2)
E-procurement will increase patients' satisfaction	108 (57.2%)	*

Values are expressed as n (%). * this question was not applied to physicians

Table 3: Perceived ease of use e-procurement according to the respondents

	Employees
The e-procurement process will be easy and simply to use	
Yes	65 (34.4)
No	74 (39.2)
Don't know	50 (26.4)
I am willing to learn how to use e-procurement	
Yes	181 (95.8)
No	8 (4.2)
E-procurement will facilitate my work	
Yes	155 (82)
No	28 (14.8)
Don't know	6 (3.2)
I will take better control of my work due to e-procurement	
Yes	161 (86)
No	14 (7.4)
Don't know	14 (7.4)

Values are expressed as n (%).

Table 4: Ease of internet use and its statistical significant correlations

	Ease of use internet				**P value**
Information technology is essential for procurement procedures improvement	None	Little	Moderate	Great	0.02
Yes	1 (0.5)	11 (5.9)	52 (27.8)	123 (65.8)	
No	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	
	Ease of use internet				**P value**
The introduction of e-procurement into public hospitals is essential	None	Little	Moderate	Great	0.001
Yes	1 (100)	9 (75)	48 (94,1)	119 (98,3)	
No	0 (0)	3 (25)	3 (25)	2 (1,7)	
	Ease of use internet				**P value**
E-procurement procedures have to be introduced immediately (N=182)	None	Little	Moderate	Great	0.007
Yes	0 (0)	2 (18,7)	10 (20)	47 (39,2)	
No	1 (100)	7 (63,6)	38 (76)	68 (56,7)	
	Ease of use internet				**P value**
E-procurement procedures will be easy and simply to use	None	Little	Moderate	Great	0.03
Yes	0 (0)	1 (9,1)	15 (41,7)	49 (53,8)	
No	1 (100)	10 (90,9)	21 (58,3)	42 (46,2)	
	Ease of use internet				**P value**
Employees will use the e-procurement procedures (N=189)	None	Little	Moderate	Great	0.02
Yes	1 (100)	1 (100)	50 (94,3)	119 (96,7)	
No	0 (0)	3 (25)	3 (5,7)	4 (3,3)	
	Ease of use internet				**P value**
Participation in training programs for the use of e-procurement (N=189)	None	Little	Moderate	Great	0.01
Yes	1 (100)	10 (83.3)	53 (100)	117(95.1)	
No	0 (0)	2 (16,7)	0 (0)	6 (4,9)	

Values are expressed as n (%).