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E-PROCUREMENT FRAMEWORK FOR A SUCCESSFUL E-REVERSE AUCTION

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ABSTRACT

This research applies the balanced scorecard concept to measure the success factors of e-procurement adoption. The survey results show that organization learning is determined by service capability, organization support policy, good governance intention, and organization readiness factors. The internal process improvement and employees' satisfaction can be identified by service capability and organization support policy. Trust in e-procurement online intermediaries has no impacts on the four measures of the balanced scorecard. Employees' satisfaction has the strongest impact on financial cost improvement but organization support policy has a negative impact on financial performance improvement.

Keywords: e-procurement, balanced scorecard, e-reverse auction success factors

INTRODUCTION

Electronic business via the Internet has the great potential to transform the way business is conducted. Electronic business has the capability to broaden the choices available to buyers, to provide sellers access to a larger customer base, and lower transaction costs. Many organizations seek beneficial approaches from electronic business to assist them lower operating and investment costs. Procurement is one major area where firms try to reduce cost and inefficiencies. This function is an important activity found in all organizations e.g. public, private, and governmental sectors. The use of electronic procurement (e-procurement) is one approach that has been adopted to streamline the purchasing processes and lower purchasing costs. Electronic procurement can be defined as the use of Internet-based platform for procurement processes - from requisition through payment [17]. The use of electronic procurement seems to promise substantial benefits [12]. Traditionally, most organizations measure their performance by reviewing their financial aspects [1, 2]. Nevertheless, a financial measure alone is not a balanced inspection of the success factors because financial figures tend to measure the past. Hence, many studies have applied the balanced scorecard to measure the value of information systems and information technology, such as Hong Kong [10], Australia [5].

The balanced scorecard is a formal management tool that translates an organization's mission and strategy into a comprehensive set of key indicators performance measures and provides the framework for strategic measurement and management [9]. The balanced scorecard is based on four critical perspectives: finance, customer, internal processes, and learning and innovation. Han and Tibbits (2000) have developed the electronic commerce scorecard in four perspectives: value of the business, relationship, internal processes and structures, and information technology and telecommunications. However, there is little empirical evidence exists to support claims concerning the success factors to obtain the value of e-procurement adoption. In addition, it is more constructively to measure the impact of the success factors of e-procurement adoption on each perspective of the balanced scorecard. This paper is thus intended to investigate the success factor elements of e-procurement adoption and to examine the relationship between the success factors and the four perspectives of the balanced scorecard. The study focuses on the reverse auction of e-procurement and focuses on the reverse auction via the online intermediary.

THEORETICAL FRAMEWORK AND RESEARCH MODEL

Procurement activity is traditionally an internal service provided by purchasing department personnel. This function consists of many procedures including identifying internal customers or employees' needs, translating of the needs into service / goods specification, communicating with suppliers in terms of sourcing, request for tendering, price negotiation, ordering receipt, and assessment of the internal customer satisfaction of the service or goods. Many internal customers spend a lot of time on purchasing because of the bureaucratic functions. It is often perceived by its internal customers who see the purchasing department purchases with the higher price but with poor quality goods or service [13]. To decrease these problems, many firms have adopted the e-procurement to make the procurement processes more economical, efficient, and effective. In addition, adoption of e-procurement greatly assists in the reengineering of the purchasing processes [17] and off-process purchase – so called "maverick" [3]. Therefore, e-procurement adoption has to be managed to satisfy the internal customer and achieve firm's goal so that the goals of e-procurement adoption can be obtained.

One factor relating to the success of e-procurement is the technical capability of the e-procurement system. Johnston (1995) proposed technical service quality in terms of system quality (e.g. security, reliability, easy to use,

accessibility) and functional quality (e.g. responsiveness of service).

Trust in the service provider is one major success factor for electronic service adoption. The main attributes that have been found to create trust in the service provider are benevolence, integrity and the ability of the service provider [11]. Benevolence is the perception that the trusted party desires to do good things rather than maximize profit. Integrity means the trusting party believes that the trusted party will be honest and make an acceptable set of policies. Finally, ability consists of the skills and competencies of the trustees to do what needs to be done successfully. In this study it relates to the competencies of the e-auction intermediary of the e-procurement service. Higher trust can create better relationship between customer and service provider [15].

In addition, organization readiness is seen to be key driver for increasing internal process improvement, enhancing learning and innovation, such as knowledge of purchasing personnel, computer skill and resources. Management support is another key influence of e–procurement adoption. Good attitude of management of e-procurement can make the system adoption success. Besides, providing training to related personnel is the best support which enables personnel can use the e-procurement more efficiently. Moreover, organization culture also pays the major role in e-procurement adoption success. The organizations that are more likely to adapt or respond to the change faster can adopt new technology more effectively. In particular, the role and process changes in the organization. Finally, good governance intention of the organization can decrease malpractice purchasing within the organization.

Many organizations have applied the balanced scorecard as measurement tool for strategic management. Kaplan and Norton [7,9] suggested that financial measures provide incomplete and narrow view of organization performance. Measurement of company performance must be supplemented with the customers' satisfaction, internal processes improvement, and learning and innovation ability of the organization. As a result, the balances scorecard is designed to measure past performance and the drivers of future performance. Moreover, the balanced scorecard reflects an intention to keep score of a set of items that maintain a balance between financial and non financial measures, and between internal and external performance perspectives [9]. Conceptually, the balanced scorecard is based on four perspectives: financial, customer, internal processes, and learning and innovation. The financial perspective is the shareholders' view. The goal is to succeed financially, by delivering value to the firm's shareholders (e.g. profit, dividends, lower long term cost). The customer perspective is a value-adding view. The goal is to deliver value to the firm's customer and improve the customer's satisfaction. Specific to this context, e-procurement is an internal service. The benefits of procurement processes compliance are related to internal customers or organization employees' satisfaction [14]. Thus, this research uses the internal customer satisfaction as one scorecard measure for e-procurement success. The internal processes perspective is a process-based view. The goal is to satisfy the firm's shareholders and customers by promoting efficiency and effectiveness in the firm's business processes. Lastly, the learning and innovation perspective is future-oriented view. The goal can be achieved by sustaining the firm's innovation and change capability, through continuous improvement and preparation for future challenges [8,9]. Prior research showed that technical service capability, trust in service providers, organization support policy and good governance policy can enhance internal processes, and learning perspectives [4]. Hence, the proposed hypotheses for the research are:

H1: The higher the level of e-procurement technical capability, the higher the level of learning in the organization.

H2: The higher the level of trust in online e-procurement intermediaries, the higher the level of learning in the organization.

H3: The higher the level of e-procurement support, the higher the level of learning in the organization.

H4: The better the good governance policy of e-procurement, the higher the level of learning in the organization.

Moreover, technical service capability, trust in service providers, organization support policy and good governance policy can enhance internal processes perspectives [4]. Hence, the proposed hypotheses for the research are:

H5: The higher the level of technical e-procurement capability, the higher the level of internal process improvement.

H6: The higher the level of trust in online e-procurement intermediaries, the higher the level of internal process improvement.

H7: The better the e-procurement support policy, the higher the level of internal process improvement.

H8: The better the le-procurement good governance policy, the higher the level of internal process improvement.

This research proposes the relationship between e-procurement success factors and internal customers' satisfaction as the following:

H9: The higher the level of technical e-procurement capability, the higher the level of learning in the organization.

H10: The higher the level of trust in online e-procurement intermediaries, the higher the level of learning in the organization.

H11: The better the e-procurement support policy, the higher the level of learning in the organization.

H12: The better the e-procurement good governance policy, the higher the level of learning in the organization.

Finally, the effects of the four success factors of e-procurement on financial perspectives are proposed:

H13: The higher the level of technical e-procurement capability, the higher the level of learning in the organization.
H14: The higher the level of trust in online e-procurement intermediaries, the higher the level of learning in the organization.
H15: The better the e-procurement support policy, the higher the level of learning in the organization.
H16: The better the e-procurement good governance policy, the higher the level of learning in the organization.

RESEARCH METHODOLOGY

A survey research approach was used to measure the constructs in the proposed model. The research questionnaire was divided into three sections, the first of which asked about the success factors of e-procurement. In section two, a number of statements were used to measure the results of e-procurement adoption in terms of the balanced scorecard concept. The questions were measured using a Likert scale ranging from 1=”strongly disagree” to 5=”strongly agree”. The last section requested general information about the respondent’s demographics. A small-sample pretest with 35 respondents, among purchasing personnel in public, private and government organizations, was conducted to check the reliability of the items before going ahead with the main study. Respondents were selected using judgment sampling, selected from three sectors: private, public, and government organizations. Informant data collection was used to collect data from at least two respondents from purchasing personnel from the e-procurement adoption firms. At least one of the respondents is in manager position. The demographic of the respondents is shown in Table I.

Table I: Respondent Profile

Characteristics	N	Percent
Type		
Private	38	21.1
Public	59	32.8
Government	83	46.1
Gender		
Male	101	56.1
Female	79	43.9
Age		
< 20-30	4	2.2
31-35	21	11.7
36-40	57	31.7
41-50	78	43.3
> 50	20	11.1
Education		
Less than bachelor	9	5.0
Bachelor	138	76.7
Masters	30	16.7
PhD	3	1.7

DATA ANALYSIS

Exploratory factor analysis identifies two technical success factors: system capability and service capability (Table II). In addition, two important success issues are related to e-auction intermediaries: online intermediary ability and reputation (Table III). Organization factors are grouped into three factors: organization readiness, management support policy, and good governance policy (Table IV).

Table II: Dimensions of technical capability

Items	Factor Loading
Factor 1: System capability	
System Reliability	.809
System Security	.799
Easy to use	.788
Accessibility	.645
Speed	.574
Factor 2: **Service capability**	
Responsiveness of service	.891
Transaction	.865
Cummulative Variance = 62.328%	

Table III: Dimensions of trust in online intermediary

Items	Factor Loading
Factor 1: Service provider ability	
Honesty	.858
Keep contact policy	.837
Ability to solve problem	.786
Service efficeincy	.679
Factor 2: Service provider reputation	
Reputation	.891
IT leadership	.848
Cummulative Variance = 68.233%	

Table IV: Dimensions of organization support policy

Items	Factor Loading
Factor 1: Management support policy	
Training support	.780
Organization adaptation	.744
Management attitude	.700
e-procurement group	.694
Response to change faster	.672
Process re-engineering	.552
Factor 2: Good governance	
Define seller specification	.872
Define penalty for malpractice	.860
Define product specification	.836
Factor 3: Organization readiness	
Knowledge of IT usage	.846
IT readiness	.790
Personnel knowledge e-procurement	.530
Cummulative Variance = 67.273%	

The complete set of factor scores for each respondent served as inputs to further regression analysis. The impact of the e-procurement success factors on organization learning consists of four factors. The results are summarized in Table V. As can be seen, one of the two sub-dimensions of technical capability is significant: service capability. Trust in online intermediaries has no impact on enhancing organization learning. Organization support policy, organization readiness, and good governance policy intention show positive effects on organization learning (Table V).

Table V: Regression analysis for the impact on Organization learning

Independent Variables/ Constant	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Beta	S.E.	Beta		
(Constant)	.014	.067		.206	.837
System capability	.050	.099	.051	.504	.615
Service capability	.257	.080	.259	3.217	.002**
Online Intermediary ability	-.118	.099	-.119	-1.188	.236
Online Intermediary reputation	.083	.075	.085	1.114	.267
Organization support policy	.214	.080	.216	2.676	.008**
Good governance intention	.213	.086	.215	2.468	.015**
Organization readiness	.263	.078	.248	3.356	.001**
R^2 = .262 Adjusted R^2 = .231 F = 8.237 Sig. = 0.000					

The impact of the e-procurement success factors on internal process improvement consists of two factors. Service capability is significant. Again, trust in the online intermediary has no impact on enhancing internal process improvement. Only organization support policy shows a significantly positive effect on internal process improvement at p > .10 (Table VI).

Table VI: Regression analysis for the impact on internal process improvement

Independent Variables/ Constant	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Beta	S.E.	Beta		
(Constant)	.006	.070		.085	.933
System capability	.098	.103	.099	.950	.343
Service capability	.343	.083	.348	4.145	.000**
Online Intermediary ability	-.069	.102	-.069	-.670	.504
Online Intermediary reputation	.010	.078	.010	.130	.896
Organization support policy	.143	.084	.144	1.710	.089**
Good governance intention	.121	.089	.123	1.356	.177
Organization readiness	.125	.081	.119	1.543	.125
R^2 = .215 Adjusted R^2 = .181 F = 6.233 Sig. = 0.000					

The impact of e-procurement success factors on internal customer satisfaction consists of two factors. Service capability has a positive impact on internal employee satisfaction. Trust in online intermediaries has no impact on enhancing internal employee satisfaction. Only organization support policy shows a significantly positive effect on internal process improvement (Table VII).

Table VII: Regression analysis for the impact on internal customer satisfaction

Independent Variables/ Constant	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Beta	S.E.	Beta		
(Constant)	-.015	.071		-.218	.828
System capability	.140	.105	.140	1.330	.185
Service capability	.275	.084	.276	3.265	.001**
Online Intermediary ability	-.147	.105	-.146	-1.402	.163
Online Intermediary reputation	-.001	.079	-.001	-.012	.990
Organization support policy	.262	.085	.262	3.097	.002**
Good_governance intention	.084	.091	.084	.918	.360
Organization readiness	.056	.083	.052	.676	.500
R^2 = .191 Adjusted R^2 = . .156 F = 5.449 Sig. = 0.000					

Finally, the employee's satisfaction influences financial performance improvements. However, organization support policy has a negative impact on the financial performance.

Table VII: Regression analysis for the impact on internal customer satisfaction

Independent Variables/ Constant	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Beta	S.E.	Beta		
(Constant)	-.089	.056		-.159	.874
Organization learning	-.123	.074	-.122	-1.665	.098
Internal process improvement	.200	.107	.199	1.867	.064
Employee satisfaction	.616	.102	.615	6.013	.000**
System capability	.081	.083	.083	.983	.327
Service capability	.003	.070	.004	.054	.957
Online Intermediary ability	.049	.083	.050	.595	.553
Online Intermediary reputation	.035	.063	.036	.568	.571
Organization support policy	-.154	.071	-.155	-2.181	.031**
Good governance intention	-.084	.073	-.085	-1.153	.251
Organization readiness	.016	.068	.016	.244	.808
R^2 = .510 Adjusted R^2 = .478 F = 16.205 Sig. = 0.000					

CONCLUSION

The results of this paper have identified four main perspectives of e-procurement scorecards. The organization learning is determined by service capability, organization support policy, good governance intention, and organization readiness. The internal process improvement and employees' satisfaction can be identified by analyzing the service capability and organization support policy. Surprisingly, trust in online e-procurement intermediaries plays an insignificant role in the four measures of the balanced scorecard. Finally, employees' satisfaction has strong impact on financial performance improvement. However, organization support policy has a negative impact on financial performance improvement. This can imply that the firms adopting e-procurement do not support much about adapting the organization practice to use e-procurement efficiently. The e-procurement scorecard will allow managers to see positive and negative impacts on the e-procurement adoption. The value of the e-procurement scorecard rises if it is used to improve the organization support policy, for example through management attitude, and the organization's adaptability to change. Building upon this viewpoint, management can be evaluated in terms of efficiency and effectiveness. Internal process improvement is related to efficiency enhancement, which is related to service capability and organization support policy in this context. Effectiveness is addressed by cost improvement and employees' satisfaction. The major concern is the organization support policy has to be taken into account for improvement the performance of adopting the e-procurement system. Further, the results show that increased service capability is critical to the achievement of organization learning and internal process improvement. The implications of this research are that the organization support policy and service capability deserves a greater awareness and attention, since these are critical for a successful e-procurement adoption. In order to quantify the negative impact of the organization support policy on financial performance, future research can extend the longitudinal observation of e-procurement systems in order to model the impact of this issue in the e-procurement scorecard.

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