



Assessment of e-procurement auction with a balanced scorecard

Assessment of
e-procurement
auction

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Abstract

Purpose – The purpose of the paper is to assess success factors associated with e-procurement auctions. The impacts of e-procurement auction success factors on the four indicators of the balanced scorecard are investigated.

Design/methodology/approach – A survey approach is used to measure the constructs in the proposed model. Respondents were selected from three sectors: private, public, and government organizations using judgment sampling. Data are collected from at least two respondents from purchasing personnel in the e-procurement user firms. At least one of the respondents is in a managerial position. The sample size is 186, representing 20.4 percent from private enterprises, 33.3 percent from public enterprises, and 46.3 percent from government agencies.

Findings – The survey results show that organizational learning of e-procurement is influenced by service capability, good governance intention, management support policy, and organizational readiness factors. Service capability and organization learning of e-procurement influence e-procurement process improvement. Employee satisfaction can be determined by management support policy and e-procurement process improvement. Employee satisfaction has the strongest positive impact on financial cost improvement. Management support policy has a negative impact on financial performance improvement. Trust in e-procurement online intermediaries has no impact on the four measures of the balanced scorecard.

Originality/value – The study contributes to the literature by using the four balanced scorecard indicators to measure the success of e-procurement to assist organizations to assess performance in terms of organizational learning, internal process improvement, employee satisfaction, and the financial benefit of e-procurement.

Keywords E-procurement, Balanced scorecard, E-procurement auction success factors, Performance management

Paper type Research paper

Introduction

Electronic business via the internet has great potential to transform the way business is conducted. Electronic business has the capability to broaden the choices available to buyers and to provide sellers access to a larger customer base with lower transaction costs. Many organizations use electronic business to lower operating and investment costs. Procurement is one major area where firms try to reduce cost and improve efficiency. This function is an important activity found in all organizations (Croom and Brandon-Jones, 2007; Smart, 2010). The use of electronic auctions in electronic

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procurement (e-procurement) is one approach that has been adopted to streamline the purchasing process and lower purchasing costs. E-procurement can be defined as the use of an internet-based platform for the procurement processes – from requisition through payment. Adoption of e-procurement facilitates the reengineering of the purchasing process (Thomson and Singh, 2001) and limits the off-process or “maverick” purchase (de Boer *et al.*, 2002).

One key factor relating to the success of e-procurement auctions is the technical capability of the e-procurement system (Johnston, 1995). Organizational factors also have a major influence on the deployment of e-procurement, including management support, organization culture, and personnel capability (Croom and Brandon-Jones, 2007). Trust in the service provider is another major success factor of the electronic service via the web system (Mcknight and Chervany, 2001-2002; Rotchanakitumnuai and Speece, 2009).

The use of electronic procurement seems to promise substantial benefits if the system can be managed efficiently (Neef, 2001). One key measurement benefit of e-procurement adoption is cost improvements through opportunities for lower prices from vendors (Emiliani, 2000; Min and Galle, 1999; Zsidisin and Ellram, 2001). However, a financial measure alone is not a balanced assessment of success factors because financial data tends to be too limited to measure information technology investment and strategic direction of the firm (Hasan and Tibbits, 2000; Kaplan and Norton, 2002; Martinsons *et al.*, 1999). Kaplan and Norton (2002) mention that financial measures inadequately measure the health of a firm and may lead to long-term deterioration of the firm performance when only financial measurement is reported. Besides financial measurement, a firm must evaluate its strategic performance through investment in customers, employees, processes, technology, and innovation. This is the balanced scorecard.

The balanced scorecard is a formal management system that translates an organization’s mission and strategy into a comprehensive set of key performance indicators and provides the framework for strategic measurement on four critical perspectives: finance, customer, internal processes, and learning and innovation (Kaplan and Norton, 2002). In the context of procurement, the operations involved do not deal directly with external customers, but many scholars define internal users of the system as “internal customers”. In general, the linkage between internal customer satisfaction and external customer satisfaction is well established (Bouranta *et al.*, 2009; Jun and Cai, 2010). Some researchers have begun to assess e-procurement benefit in terms of operational improvement (one dimension of the balanced scorecard measurement) and its impact on internal employee satisfaction (Croom and Johnston, 2003; Mukhopadhyay and Kekre, 2002). However, there is little empirical research yet on how the balanced scorecard overall relates to e-procurement adoption. Further, little research has been done on the impact of the success factors related to e-procurement adoption for each perspective of the balanced scorecard. This paper investigates the success factors for e-procurement adoption and the relationship between the success factors and the four perspectives of the balanced scorecard. The study focuses on e-procurement using an online intermediary to facilitate e-auctions.

Literature review and research framework

E-procurement success factors

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 those needs into specifications, communicating with suppliers in terms of sourcing, request for quote, price negotiation, ordering and assessment of the internal customer satisfaction with the service or goods. Many internal customers spend significant time on purchasing because of complicated procedures resulting in the purchasing department paying a higher price for poor quality goods or service (Nolan, 1999). To decrease these problems, many firms have adopted e-procurement to make the process more economical, efficient, and effective (Knudsen and Sweden, 2003).

E-procurement adoption has to be managed well to achieve the firm's performance goals. There are several key success factors, related to both the competency of the e-procurement service provided by an online auction intermediary and to the organization's own internal capabilities. One key success factor relating to e-procurement is technical capability of the system (Johnston, 1995). Johnston (1995) specified technical service quality in terms of system quality (e.g. security, reliability, easy to use, accessibility) and service quality (e.g. responsiveness of service). In addition, trust in the service provider is another major success factor for electronic service adoption (Mcknight and Chervany, 2001-2002; Rotchanakitumnuai and Speece, 2009). Although Carr and Smeltzer (2002) cautioned that increased use of information technology may not improve the level of trust between buyer and sellers, many scholars have shown that increased use of e-procurement can enhance the buyer-seller relationship (Amit and Zott, 2001; Gadde and Snehota, 2000). Moreover, the greater use of e-procurement and inter-organizational systems can enhance trading partners' relationship (Archer and Yuan, 2000; Croom, 2001) and the online auction intermediary can be considered one of the trading parties of the e-procurement system. The main attributes related to trust in the service provider are benevolence, integrity and capability (Mcknight and Chervany, 2001-2002). Benevolence is the perception that trusted parties will do positive actions rather than only maximize profit. Integrity means the trusted parties will be honest and have transparent policies. Finally, capability includes the provider's skills and competencies to perform successfully (Gefen *et al.*, 2003).

Organizational factors also have a major influence on the deployment of e-procurement (Croom and Brandon-Jones, 2007; de Boer *et al.*, 2002; Kennedy and Deeter-Schmelz, 2001). Organizational readiness is an important driver for increasing internal process improvement, enhancing learning and innovation including the knowledge of purchasing personnel, their computer skill and resources. Management support is another key influence on new electronic service adoption (Rotchanakitumnuai and Speece, 2004). Positive management support for e-procurement can ensure system adoption success. Training is the best support to enable personnel to use the e-procurement more efficiently. Organizational culture also plays a major role in e-procurement adoption success. Organizations that are more likely to adapt or respond to change faster can adopt new technology more effectively (Rajkumar, 2001). Moreover, Croom and Brandon-Jones (2007) found that governance structure is one key success factor of e-procurement implementation management. E-procurement makes the

procurement process more transparent and helps organizations achieve good governance impacts (Hui *et al.*, 2011).

The scope of e-procurement success factors in this study covers three dimensions of success: technical capability of the e-procurement system (system quality and service quality), trust in online intermediary (ability and reputation), and organizational factors (management support policy, organizational readiness, and good governance intention). Table I summarizes the definitions of e-procurement auction success factors.

Balanced scorecard

Many organizations have recognized the benefit of a comprehensive measurement of the balanced scorecard and applied it as a performance measurement system of the organization (Brignall and Ballantine, 1996; Gumbus and Lyons, 2002; Kaplan and Norton, 1996a; McAdam and O'Neill, 1999). Kaplan and Norton (1996b, 2002) suggested that financial measures provide an incomplete and narrow view of organizational performance. The financial measurement of company performance must be supplemented with measures of customer satisfaction, internal process improvement, and the learning and innovation ability of the organization. The scorecard design reflects a balance between financial and non-financial measures, and internal and external performance perspectives (Kaplan and Norton, 1996b).

The financial perspective reflects delivering value to the firm's shareholders (e.g. profit, dividends, or lower long-term cost) (Smart, 2010). The customer perspective is based on value to the firm's customers and customer satisfaction. Hasan and Tibbits (2000) have developed four electronic commerce scorecards related to the value of business, relationship, internal processes and structures, and information technology and telecommunications.

These issues are certainly relevant for supply chain management. For example, Brewer and Speh (2000) identify that procurement is one of the important activities in the supply chain. They suggest that a balanced scorecard approach is an integrated performance measurement of supply chain management, which can assist managers and employees to focus on achieving organizational goals. Bhagwat and Sharma (2007) develop a balanced scorecard to evaluate order process performance.

| Success factor | Description |
|---|--|
| 1. Technical capability of e-procurement system | E-procurement system capability in terms of reliability, security, ease of use, and speed E-procurement service capability in terms of responsiveness and service accuracy of the e-auction service |
| 2. Trust in online intermediary of e-auction | E-procurement auction intermediary ability to solve problems, be efficient, and fulfill contact policy E-procurement auction intermediary reputation |
| 3. Organizational factors | Management support policy in terms of positive commitment of management, adaptation of the organization, and training support for using e-procurement Organizational readiness in terms of sufficient IT resources and knowledge to use e-procurement Good governance intention to conduct best practices of e-procurement |

Table I.
Definitions of
e-procurement auction
success factors

To achieve long-term performance excellence of the organization, the e-procurement performance measurement requires both financial and non-financial measures of employee satisfaction, process improvement, learning and innovation.

Research framework

The research framework is derived from the relationship of the three dimensions of e-procurement success factors and the four measurement indicators of the balanced scorecard. As mentioned in the literature, e-procurement success factors consist of three dimensions of success: technical capability of the e-procurement system (system and service capability), trust in online intermediary (ability and reputation), and organizational factors (management support policy, organization readiness, and good governance intention).

The learning and innovation perspective relates to sustaining the firm's innovation and change capability through continuous improvement and responsiveness to future challenges (Kaplan and Norton, 1993, 1996b). Technical service capability, trust in service providers, organization support and management relate to the organizational learning capabilities (Croom and Johnston, 2003). This is the basis for H_1 :

- H_1 . The higher the level of e-procurement success factors, the higher the level of learning and innovation improvement in the organization.
- $H_{1.1}$. The higher the level of e-procurement system capability, the higher the level of learning and innovation improvement in the organization.
- $H_{1.2}$. The higher the level of e-procurement service capability, the higher the level of learning and innovation improvement in the organization.
- $H_{1.3}$. The higher the level of trust in the ability of e-procurement online intermediary, the higher the level of learning and innovation improvement in the organization.
- $H_{1.4}$. The higher the level of trust in the reputation of e-procurement online intermediary, the higher the level of learning and innovation improvement in the organization.
- $H_{1.5}$. The higher the level of organizational readiness in using e-procurement, the higher the level of learning and innovation improvement in the organization.
- $H_{1.6}$. The higher the level of management support policy in using e-procurement, the higher the level of learning and innovation improvement in the organization.
- $H_{1.7}$. The higher the level of good governance intention in using e-procurement, the higher the level of learning and innovation improvement in the organization.

The internal process perspective is based on efficiency and effectiveness in the firm's business processes. Successful e-procurement implementation can improve internal processes (Croom and Johnston, 2003; de Boer *et al.*, 2002; Emiliani, 2000; Mukhopadhyay and Kekre, 2002; Zsidisin and Ellram, 2001). This leads to H_2 :

- H_2 . The higher the level of e-procurement success factors, the higher the level of internal process improvement.

- H_{2.1}*. The higher the level of e-procurement system capability, the higher the level of internal process improvement in the organization.
- H_{2.2}*. The higher the level of e-procurement service capability, the higher the level of internal process improvement in the organization.
- H_{2.3}*. The higher the level of trust in the ability of e-procurement online intermediary, the higher the level of internal process improvement in the organization.
- H_{2.4}*. The higher the level of trust in the reputation of e-procurement online intermediary, the higher the level of internal process improvement in the organization.
- H_{2.5}*. The higher the level of organizational readiness in using e-procurement, the higher the level of internal process improvement in the organization.
- H_{2.6}*. The higher the level of management support policy in using e-procurement, the higher the level of internal process improvement in the organization.
- H_{2.7}*. The higher the level of good governance intention in using e-procurement, the higher the level of internal process improvement in the organization.

In addition, the four perspectives of the balanced scorecard are interrelated; when one element works well, it can itself become a “success factor” for another element. Here, organizational learning can also enhance internal process efficiency (Kaplan and Norton, 1996b). This is the focus of *H₃*:

- H₃*. The higher the level of e-procurement learning in the organization, the higher the level of internal process improvement.

Specific to this context, e-procurement is an internal service. The benefits of procurement process are related to internal customers’ satisfaction (Croom and Johnston, 2003; Oliver, 1993). This research uses internal customer satisfaction as a measure for e-procurement success. The success factors should have an impact on this perspective. This is considered in *H₄*:

- H₄*. The higher the level of e-procurement success factors, the higher the level of internal customer satisfaction.
- H_{4.1}*. The higher the level of e-procurement system capability, the higher the level of internal customer satisfaction.
- H_{4.2}*. The higher the level of e-procurement service capability, the higher the level of internal customer satisfaction.
- H_{4.3}*. The higher the level of trust in the ability of e-procurement online intermediary, the higher the level of internal customer satisfaction.
- H_{4.4}*. The higher the level of trust in the reputation of e-procurement online intermediary, the higher the level internal customer satisfaction.
- H_{4.5}*. The higher the level of organizational readiness in using e-procurement, the higher the level of internal customer satisfaction.

H_{4.6}. The higher the level of management support policy in using e-procurement, the higher the level of internal customer satisfaction.

H_{4.7}. The higher the level of good governance intention in using e-procurement, the higher the level of internal customer satisfaction.

Moreover, internal process improvement, a scorecard measure, should itself contribute to higher employee satisfaction (Kaplan and Norton, 1996b). This is emphasized in *H₅*:

H₅. The higher the level of e-procurement process improvement, the higher the level of internal customer satisfaction.

E-procurement success factors have a major financial impact (Croom and Brandon-Jones, 2005; de Boer *et al.*, 2002; Gadde and Snehota, 2000; Yen and Ng, 2003). For instance, e-procurement system capability can reduce total cost of acquisition (e.g. reduce search cost) (Croom and Brandon-Jones, 2007), or transparent e-procurement can ensure an organization to get the best choice of product/service with reasonable price (Hui *et al.*, 2011). This is tested by *H₆*:

H₆. The higher the level of e-procurement success factors, the higher the level of financial benefit.

H_{6.1}. The higher the level of e-procurement system capability, the higher the level of financial benefit.

H_{6.2}. The higher the level of e-procurement service capability, the higher the level of financial benefit.

H_{6.3}. The higher the level of trust in the ability of e-procurement online intermediary, the higher the level of financial benefit.

H_{6.4}. The higher the level of trust in the reputation of e-procurement online intermediary, the higher the level financial benefit.

H_{6.5}. The higher the level of organizational readiness in using e-procurement, the higher the level of financial benefit.

H_{6.6}. The higher the level of management support policy in using e-procurement, the higher the level of financial benefit.

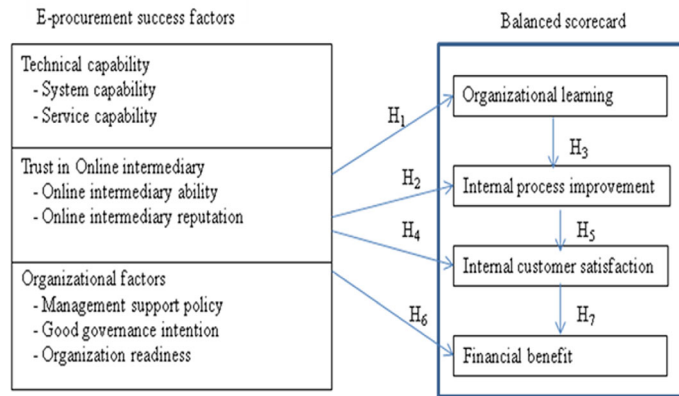
H_{6.7}. The higher the level of good governance intention in using e-procurement, the higher the level of financial benefit.

Finally, internal customer satisfaction has a major impact on e-procurement cost effectiveness (Croom and Johnston, 2003). This is the focus of *H₇*:

H₇. The higher level of internal customer satisfaction, the higher the level of financial benefit.

Figure 1 shows the seven hypotheses, and shows the conceptual model of the assessment of e-procurement success factors with the balanced scorecard.

Figure 1.
Conceptual model



Methodology

Measures

A survey questionnaire was used to measure the constructs in the proposed model. The questionnaire was divided into three sections, the first of which asked about the measurement of e-procurement success factors. The e-procurement success factors included the technical capability, trust in the online intermediary, and organizational factors measurement items. Section 2 assessed the four balanced scorecard measurements related to e-procurement adoption results. Questionnaire items were derived from the literature, and adapted to the specific context of e-procurement as appropriate. The questions were measured using a Likert-type scale ranging from 1 – “strongly unimportant” to 5 – “strongly important”. The last section requested general demographic information. A small-sample pretest with 35 respondents, selected from among purchasing personnel in public, private and government organizations, was conducted to check the reliability of the items before the main survey study. This paper reports on the survey data related to two issues. First, the components of e-procurement success factors and balanced scorecard were analyzed using exploratory factor analysis to check convergent and discriminant validity. Second, the impacts of e-procurement success factors on the balanced scorecard measurement were tested by regression analysis. SPSS version 14.0 is used for data analysis.

Sample and data collection

Respondents were selected from three sectors: private, public, and government organizations. Judgment sampling was used to choose purchasing personnel who have experience in using e-procurement auctions. Informant data collection was used to collect data from at least two respondents at each of the e-procurement adoption firms. At least one of the respondents held a managerial position. Data was collected by personal interview from 186 respondents representing 20.4 percent from private enterprises, 33.3 percent from public enterprises, and 46.3 percent from government agencies. Demographic characteristics of the respondents are shown in Table II.

| Characteristics | N | % | Assessment of e-procurement auction |
|--------------------------|-----|------|---|
| <i>Organization type</i> | | | |
| Private enterprise | 38 | 20.4 | |
| Public enterprise | 62 | 33.3 | |
| Government agency | 86 | 46.3 | |
| <i>Gender</i> | | | |
| Male | 106 | 57.0 | |
| Female | 80 | 43.0 | |
| <i>Position level</i> | | | |
| Administration | 75 | 40.3 | |
| Operation | 111 | 59.7 | |
| <i>Age</i> | | | |
| < 20-30 | 4 | 2.2 | |
| 31-35 | 21 | 11.3 | |
| 36-40 | 58 | 31.2 | |
| 41-50 | 82 | 44.1 | |
| > 50 | 21 | 11.3 | |
| <i>Education</i> | | | |
| Less than bachelor | 11 | 5.9 | |
| Bachelor | 141 | 75.8 | |
| Masters | 31 | 16.7 | |
| PhD | 3 | 1.6 | |

Note: Average years of e-auction usage: 3.14 years

Table II.
Respondent profile

Data analysis

An exploratory factor analysis with varimax rotation confirmed the convergent and discriminant validity of the measurement of success factor constructs. There were seven factors with eigenvalue above 1, which corresponds to the seven success factors. Factor loadings were high, and there were negligible cross-loadings (Table III).

Table III identifies two technical success factors: system capability and service capability. Two important trust criteria are related to e-procurement intermediaries: including online intermediary ability and reputation. Organization factors include organizational readiness, management support, and good governance. All constructs of e-procurement success factors have the high levels of reliability with Cronbach's α values ranging from 0.785 to 0.890.

Table IV shows the number of items for the four measurement dimensions of the balanced scorecard. All the items loaded on their target constructs with Cronbach's α exceed the recommended value of 0.7, showing good reliability.

The complete set of factor scores served as inputs to the multiple regression analysis. Table V shows the significant regression coefficients at the confidence level of 99 percent.

The impact of the e-procurement success factors on organization learning consists of four factors. Among the technical capability sub-dimensions, service capability is significantly related to organizational learning of e-procurement, but system capability is not. All three of the organizational factor sub-dimensions have an impact; management support policy, organizational readiness, and good governance all have positive effects on organizational learning. The sub-dimensions of trust in online intermediaries have no impact on enhancing organization learning (Table V).

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| Items | Factor loading | Mean | Cronbach's α |
|---|----------------|------|---------------------|
| Factor 1: system capability | | | 0.835 |
| System reliability | 0.809 | 4.65 | |
| System security | 0.799 | 4.61 | |
| Easy to use | 0.788 | 4.08 | |
| Accessibility | 0.645 | 3.87 | |
| Speed | 0.574 | 4.13 | |
| Factor 2: service capability | | | 0.836 |
| Responsiveness of service | 0.891 | 4.02 | |
| Process accurate transaction | 0.865 | 3.93 | |
| Factor 3: online intermediary provider ability | | | 0.841 |
| Honesty | 0.858 | 4.57 | |
| Keep contact policy | 0.837 | 4.57 | |
| Ability to solve problem | 0.786 | 4.35 | |
| Service efficiency | 0.679 | 4.32 | |
| Factor 4: online intermediary reputation | | | 0.758 |
| Reputation | 0.891 | 3.68 | |
| IT leadership | 0.848 | 3.86 | |
| Factor 5: management support policy | | | 0.844 |
| Providing training support | 0.780 | 4.02 | |
| Adapting to change of the organization | 0.744 | 3.82 | |
| Good attitude of management | 0.700 | 4.13 | |
| Having e-procurement working group | 0.694 | 4.06 | |
| Faster response to change of the personnel | 0.672 | 4.02 | |
| Re-engineering the procurement process | 0.552 | 4.17 | |
| Factor 6: good governance intention | | | 0.890 |
| Concerning the governance of defining specification of the vendors | 0.872 | 4.63 | |
| Defining penalty for malpractice | 0.860 | 4.62 | |
| Concerning the governance of defining product/service specification | 0.836 | 4.63 | |
| Factor 7: organizational readiness | | | 0.785 |
| Knowledge of computer and internet usage | 0.846 | 4.24 | |
| IT resources readiness of the organization | 0.790 | 3.95 | |
| Knowledge of e-procurement process | 0.530 | 3.93 | |

Table III.
Dimensions of
e-procurement
success factors

Service capability also has major impact on e-procurement process improvement, and is the only sub-dimension among the success factors that is significant. Trust in the online intermediary has no impact on enhancing internal process improvement, nor do any of the organizational factors examined. The balanced scorecard factor of organizational learning of e-procurement does influence e-procurement process improvement.

Management support policy improves internal customer satisfaction, but none of the other success factor sub-dimensions is significant. Again, trust in online intermediaries has no impact on enhancing employee satisfaction, nor does technical capability. The balanced scorecard factor of e-procurement process improvement is positively related to employee satisfaction.

Finally, the balanced scorecard factor employee satisfaction influences financial performance. Here, management support policy has a negative impact on the financial performance, but none of the other success factor sub-dimensions is significant.

| Items | Factor loading | Mean | Cronbach's α |
|---|----------------|------|---------------------|
| Organization learning | | | 0.809 |
| Enhance e-procurement skill | 0.906 | 3.69 | |
| Enhance ability to use IT | 0.868 | 3.53 | |
| Enhance transparent procurement culture | 0.777 | 3.81 | |
| Internal process improvement | | | 0.957 |
| Reduce procurement processes | 0.979 | 2.58 | |
| Faster time of procurement processes | 0.978 | 2.61 | |
| Internal customer satisfaction | | | 0.799 |
| Satisfaction among purchasing personnel | 0.914 | 3.01 | |
| Satisfaction among users for the better quality of products/service | 0.913 | 2.76 | |
| Financial benefit | | | 0.722 |
| Reduce product/service price | 0.885 | 3.36 | |
| Lower acquisition costs | 0.884 | 2.97 | |

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Table IV.
Dimensions of the balanced scorecard

| Independent variables | Coefficient for path to dependent variable | | | |
|--------------------------------|--|------------------------------|--------------------------------|-------------------|
| | Organization learning | Internal process improvement | Internal customer satisfaction | Financial benefit |
| System capability | 0.119 | 0.059 | 0.087 | 0.085 |
| Service capability | 0.291 * | 0.184 * | 0.037 | 0.011 |
| Online intermediary ability | -0.146 | -0.059 | -0.108 | 0.038 |
| Online intermediary reputation | 0.051 | -0.045 | -0.007 | 0.020 |
| Organizational readiness | 0.220 * | -0.003 | -0.022 | -0.014 |
| Management support policy | 0.224 * | 0.005 | 0.175 * | -0.153 * |
| Good governance intention | 0.241 * | -0.034 | 0.037 | -0.074 |
| Organization learning | | 0.484 * | | |
| Internal process improvement | | | 0.764 * | |
| Internal customer satisfaction | | | | 0.712 * |
| R^2 | 0.267 | 0.307 | 0.656 | 0.450 |

Table V.
Regression of balanced scorecard elements on e-procurement success factors

Note: *Significant coefficient value at $p < 0.01$

Conclusion and implications

This paper contributes to understanding application of the balanced scorecard assessment to e-procurement auctions. The intention is to explore the e-procurement auction success factors and their impacts on the four balanced scorecard measurement indicators. The e-procurement success factors provide insight into the many perspectives of success which include technical capability of the e-procurement system, trust in online auction intermediary, and organizational factors which facilitate

effective e-procurement. The results show seven distinct factors of e-procurement success which are system and service capability of the e-procurement system, trust in online auction intermediary ability and intermediary reputation, organizational readiness, management support policy and good governance concern of the organization. Moreover, the study confirms that four main factors of a balanced scorecard assessment are meaningful in examining e-procurement performance.

The success factors have significant impact on the first dimension of the balanced scorecard, although not every sub-dimension plays a role. The organizational learning scorecard dimension is determined by service capability, management support policy, good governance intention, and organizational readiness. After that, the success factors play a smaller direct role, their main influence being through the mediating variable of the previous balanced scorecard element. The internal process improvement is directly influenced by service capability, but the larger impact comes from organizational learning. Management support policy has a direct positive impact on enhancing internal customer (employee) satisfaction, but the scorecard dimension of internal process improvement has a bigger impact. Internal customer satisfaction has a positive impact but management support policy has a negative impact on enhancing financial performance. Compared to other aspects of management support policy, respondents do not see as much adaptation to change of the organization to adopt e-procurement more efficiently (Table III). In addition, the findings do indicate that respondents apparently see quite low internal process improvement and acquisition cost improvement (Table IV). The results imply that management needs to address these issues to raise the positive management support of e-procurement auction performance.

Considering the managerial implications from the study, this model can serve as a basis for evaluating e-procurement success and developing the future improvement of e-procurement adoption. First, the results show that increased service capability is critical to the achievement of two of the four balanced scorecard factors, organizational learning and internal process improvement. Second, management support policy requires greater awareness and attention because it has a direct impact on three of the four balanced scorecard factors. The e-procurement scorecard allows managers to see the positive and negative impacts of e-procurement adoption. In other words, management support policy has positive impacts on organization learning and internal employee satisfaction, but the impact on financial benefit is negative. This may be interpreted by recognizing that building in good management support has some cost. Focusing only on financial indicators would cause managers to overlook the importance of management support in contributing to other balanced scorecard factors, which themselves positively influence financial benefit. Financial performance is not likely to be improved simply by cost cutting in efforts to build management support. Finally, trust in online e-procurement intermediaries has no significant role in any of the four measures of the balanced scorecard. Specific to this study, the respondents rated e-procurement intermediary reputation and IT leadership among the least important factors (Table III). Trust in intermediary ability is rated higher in importance, but also has no impact. While this consideration is important, there may be little variance in actual intermediary ability in practice, because trust is established by best practice intermediaries listed on the e-government procurement web site (www.gprocurement.go.th). Based on this guarantee government agencies and organizations can select reliable e-procurement auction intermediaries for their firms. In other words,

questionable suppliers would not be listed, so organizations would not need to worry much about assessing reliability of the listed e-procurement auction intermediaries.

Several limitations need to be mentioned. First, the study concentrates on three sectors, private, public enterprise, and government sector. Respondents from private sector are too few to analyze the differences of e-procurement auction performance that might be caused by organization type. It would be interesting to analyze whether there is any moderating effect of organization type on the results, particularly because of the more profit-oriented private sector organizations. Second, probably the negative impact of management support policy on financial performance should not be generalized. In order to quantify the negative impact of management support policy on financial performance, future research should consider a longitudinal study of e-procurement systems in order to investigate the impact of this factor on the e-procurement scorecard performance. Organizations in Thailand are still relatively early in adopting e-procurement systems, but later on, the initial costs of setting up the systems to work well will decline, and the benefits will increase. This negative impact is likely to be characteristic of the early phase. Finally, future study can also extend the measurement of e-procurement success related to good governance practices of e-government procurement.

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