Linking Organization and Individual Factors to Government-to-Business System Performance
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ABSTRACT
In an attempt to deliver better service performance and improve the interactions, a large number of public agencies have taken the steps to transform their conventional business activities to online system known as government-to-business (G2B) system. Hence, the reformation of the business process has led to the evaluation of the system service performance and investigation of the factors that shape the success of the G2B implementation. Therefore, we attempt to evaluate the G2B service performance and examine the linkage of organizational and individual factors to the performance. Findings of the study show organizational learning and user attitude of organizational and individual factors respectively play a major role in determining the G2B system use. In addition, the use of IS in the interaction between government agencies and business entities has significant influence on the service performance, measured as transparency, service quality and information quality. The findings provide a new perspective for public agencies in their future e-government implementation.

Keywords: government-to-business, system performance, human and organizational factors

1. Introduction

In today’s era, the urge from citizens and businesses has demanded government administration over the world to offer services which are more accessible and transparent. In an effort to meet the mandate, many government institutions have transformed their public administration services and rushed to adopt web technologies to improve their service performance. Hence, in most countries, present government administration is synonym with e-government system, the process by which public agencies deliver information and services via digital means.

While there seem to be endless number of e-government activities, the one that gives the most significant impact to government administration and the social, economic structure is the government-to-business (G2B) system. The decision to automate public sector business processes is seen among others as a mean to improve transparency and service quality. The changes and reformations of the government-to-business practices have led to the evaluation
of the system performance and investigation of the factors that shape the success implementation. Undoubtedly, it is important for practitioners and researchers to understand the performance success and its factors which will provide further insights into the effective implementation of information technology applications as a business tool in public organizations.

Hence, the study was conducted with the aims to assess the performance success of government-to-business, and investigate the role of human and organizational factors as the antecedents. However, several limitations were placed on the study. First, as there are different types of G2B system, the application was limited to public e-procurement system. Second, as the public e-procurement system is an inter-organizational system that requires integration and interaction between buyer and seller, the focus was only on the government agencies as the buyer.

2. Government-to-Business System

2.1 E-business in the Public Sector

In general, the government-to-business system resembles the private business-to-business application. However, while the usage functions and platforms are similar to the B2B marketplace, Oliveira and Amorim (2001) in Henriksen and Mahnke (2005) assert the underlying processes are complex and an extra set of influential factors must be considered that include financial risks, design and implementation risks and legislative issues.

The core functions and purposes of business-to-business systems differ between private and public sector usage. For the former, the main goal of usage is to reduce operational costs, maximise profits and improve performance, whereas for the latter, the main agenda is for value creations in which to reduce transparency (Moe, 2004), improve information flow and management, and more informed decision making (Amit and Zott, 2001). Vaidya, Yu and Soar (2002) also highlight on the detail objectives for government-to-business, which among others are to increase top-level funding availability, to create open marketing which every supplier can compete, to harness aggregated buying power of the government to achieve dynamic pricing of goods and services, to improve efficiency of the procurement cycle while meeting all legislative mandates and to ensure compliance with purchasing policies, both within departments and across the government agencies.

2.2 Factors of Government-to-Business System Use

Public sector is a large institution with many agencies and huge numbers of employees. Adopting and using the G2B system to change the traditional business process among the agencies though seem to be a simple process, is actually complex and challenging. In this context, as argued by many organizational theorists, there exist relationships that explain the integration between organization and individual in public organizations (Harmon and Mayer, 1986). The government agencies as the organizational entities must be responsible for the structures and processes that constraint or facilitate the system adoption. This is the organizational context emphasized by Tornatzky and Fleischer (1990). In addition, the decision to use the G2B system is also determined by the members of the agencies, especially the users. Thus, we predict two factors will have an influence on the G2B system use among
government agencies; the organizational factor which include the constructs of top management emphasis, organizational learning and facilitating condition, and the individual factor which the constructs are user IS skills, user training and user attitude.

2.2.1 Organizational Factor

The importance of top management support or top management emphasis in the adoption and use of G2B system among government agencies have been studied by Seong and Lee (2004) and Vaidya et al., (2006). Larsen (2003) defines top management emphasis as the extent to which top and mid-level management allocate sufficient resources to the implementation effort and are willing to accept the risks, while encouraging and promoting the implementation effort.

In each public government agencies, the top management provides an influential decision as they are the key figure in shaping the organizational strategies and ensuring the procurement reformed is well understood. Furthermore, the management team is also responsible for shaping the vision and goal, bringing about collective commitment for change and formulating the necessary strategies (Vaidya et al., 2006). Therefore, based on the discussion, the following hypothesis is offered:

**H1: Top management emphasis has a significant relationship with G2B system use.**

In addition, many studies have also found a strong linkage between organizational learning and the use of public e-procurement system as a G2B application. Deeter-Schmelz et al., (2001) conclude that organizational capabilities and organizational influences are significant motivators to the adoption of e-procurement. It is further supported by Croom and Brandon-Jones (2007) who assert the extent to which e-procurement is adopted and used is strongly influenced by the general disposition of the organization as a whole.

Organizational learning is defined as the firm capability to recognize external knowledge and information value, to assimilate and to apply them to commercial ends (Hung et al., 2010). An important component of learning is the organization wide-sharing and dissemination of information. The adoption of e-procurement by its nature is a function-spanning task. As a result, a learning organization, characterized by high levels of cross-functional information dissemination and coordination is likely to be more successful in cooperating new e-procurement process (Wu et al., 2007). Hence, the viewpoints lead to the following hypothesis:

**H2: Organizational learning has a significant relationship with G2B system use.**

Another important organizational attribute is the facilitating conditions. In the context of G2B system use, the provision of support from the central government for the public agencies to use the system is one type of facilitating condition that will influence its usage. By assisting the facilities set up and providing assistance when they encounter difficulties, some of the potential barriers to system use will be reduced or eliminated. Besides, support provisions such as trainings, seminars and call centers are the essence for successful government-to-business system use (Croom and Brandon-Jones, 2007; Chu et al., 2004). Thus, the discussion leads to the following hypothesis:
2.2.2 Individual Factor

The behavioral decision to adopt and use the G2B system is also influenced by human or user factor. In this study, two dimensions of human factor will be tested to investigate their relationships with G2B system use, which are information system skills and user attitude. Even though previous studies of human dimensions focus on emotional and behaviour on individual system use, we believe it is imperative to investigate their contributing factor towards information system usage at the organizational level. This again relates to the human relations theory in public organizations.

One of the most important human factor of G2B system use is user skills of the particular system. Similarly, the term skill is used interchangeably with self-efficacy. Compeau and Higgins (1995) define self-efficacy as the belief that one has the capability to perform a particular behaviour. The belief on the capability to successfully execute the behaviour will lead to the expectations of positive outcomes. Hence, investigating user skill is relevant in the context of the study as having an adequate skill to use the G2B system is an essential characteristic. Thus, the viewpoints lead to the following hypothesis:

$H_4$: User skill has a significant relationship with G2B system use.

Similarly, the importance of user training for information system success has been widely recognised (Guimaraes et al., 2003). Igbaria et al., (1995) defined user training in information system as the extent to which an individual has been trained about ISs through college courses, vendor training, in-house training and self-study. Training is important to provide a general background to familiarize users with the general use of computer technology (Guimaraes et al., 2003).

In G2B system, the role of training has been found to be an determinant to the system use (Md Mahbubur, 2008; Leipold et al., 2004). Md Mahbubur (2008) concludes training is an important factor as more mistakes can be made by employees if they are poorly trained. Thus, the viewpoints lead to the following hypothesis:

$H_5$: User training has a significant relationship with G2B system use.

Additionally, user attitude is also posited as an important dimension of human factor in the G2B system use. Fishbein and Azjen (1975) view attitude as the affect that one feels against or for some object or behaviour. From the viewpoint of the G2B system, the attitude of the users towards the system will determine the level of use since should they possess negative behaviour, such feeling may delay the G2B system adoption and use. Thus, we offer the following hypothesis:

$H_6$: User attitude has a significant relationship with G2B system use.

2.3 Service Performance of Government-to-Business

Many dimensions of G2B system benefits have been used as measures to gauge the outcomes. These include costs reduction, operational efficiency, improved decision making, better communication and coordination, improved transparency and increased relationship
development. In this study, we use transparency, service quality and information quality as the service performance measures of the G2B system use among government agencies since they are in line with goals of many G2B system implementations.

2.3.1 Transparency as G2B Performance

In general, two points of view describe transparency. First, transparency corresponds to the outcome measure of communication behaviour. Second, transparency is also seen as an outcome of an exchange process between two or more entities (Street and Meister, 2004). In the meta-systems of governments and electronic markets, transparency is realized via information transfer and sharing of sensitive information that seeks to distribute or share the benefits of greater openness as widely as possible (Lamming et al., 2001).

The elements of transparency lead to various economic and business changes, for example the creation of perfect market commoditization that discloses value creation (Lamming et al., 2001). In the public sector, Panayiotou et al., (2004) affirm transparency is the basic requirement of the sector’s buying procedures. Greater transparency can be achieved via information systems as several literatures recognize the important enabling role of IS in this situation (Street and Meister, 2004). In addition, transparency in the public sector will result from the simplified processes and the electronic support of the purchasing activities (Panayiotou et al., 2004). In Italy, the government-to-business system signals the existence of a wider array of opportunities for potential suppliers by reducing the power of invitation. Thus, it reflects the greater openness to market and transparency (Magrini, 2005). Hence, based on the discussion, the following hypothesis is offered:

\( H_7 : \text{The use of G2B system has a significant relationship with transparency.} \)

2.3.2 Service Quality as G2B Performance

There are three distinct areas of quality in the public sector; customer, professional and management (Agus et al., 2007). It is without doubt there are differences in the service quality uptake between the private and public organizations. Whereas the former adopt the service quality concept and principals in a much faster rate, the process of adoption among the latter is rather slow due to difficulties in measuring the outcomes. Irrespective of the challenge, public sector organizations have come under increasing pressure to deliver quality services (Agus et al., 2007).

One of the key strategies to improve public sector service quality is by adopting information technology in the administration activities. A report by SAP Global (1995) testifies the ability of a public sector to adopt new business models and IT innovation as an essential indicator of its transformation success. Similarly, the IT uptake to automate the public procurement processes is seen as a strategy to improve the public sector quality of service. Thus, we offer the following hypothesis:

\( H_8 : \text{The use of use of G2B system has a significant relationship with service quality.} \)
2.3.3 Information Quality as G2B Performance

Information quality has also been assessed as an outcome of G2B system use as in Hackney et al., (2007). The success of the information is in its ability in conveying the intended meaning from the perspective of the desired characteristics and the quality of the system such as accuracy, data format, meaningfulness, reliability and timelines.

Similar to other information system applications, the public e-procurement system keeps data in data warehouse and provides meaningful information within seconds. In addition, the information will be more organized, well structured and properly managed. In the context of the study, the use of the system is predicted to improve the accuracy, completeness, correctness and consistency of information. Thus, the viewpoints lead to the following hypothesis:

H$_0$: The use of G2B system has a significant relationship with information quality.

The theoretical framework of the study is shown in Fig. 1.

![Theoretical framework and hypotheses of the study](image)

3. Methodology
3.1 The Sample

The sample of the study consists of federal government agencies which have participated in the G2B system in Malaysia. They comprise of organizations and institutions from all ministries. For simplicity, these public organizations are referred as government agencies. 550 questionnaires were randomly distributed and 284 responses representing 284 government agencies from 22 ministries were received, yielding a response rate of 51.64%. However, only 244 were used for the analysis, while the other 40 was discarded due to major incomplete answers.

In order to tackle the issue of non-response bias, two procedures were performed. First, a comparison was done on the acceptance of the responses with the potential respondents’ distribution in the sampling frame. Second, a comparison was performed on the responses between early and late respondents. A chi-square test was conducted to compare the percentage of agency distribution and the returned responses. It was assumed there was no significant difference between the sampling distribution and returned percentage. The result indicates the response pattern reflected the sampling frame ($\chi^2 = 21.96$, $p = .462$), thus ruling out any bias in ministry categorization level.
The second procedure was performed by running an independent sample t-test to confirm there was no significant difference between the early and late responses. It was assumed those who returned the questionnaire after the first reminder have the characteristics of non-respondents. Hence, a comparison between the early respondents and late respondents was conducted. 79.5% of the returned survey were received within a month, and classified as early respondents (n=194). The other 20.5% returned the survey after the first reminder, and classified as late respondents (n=50). The result shows there is no significant difference between the means of all constructs across the two groups ($p > 0.10$ for all paired comparisons). Thus, it was concluded that non-response bias did not pose a major problem for this study.

**3.2 The Instrument**

The survey instrument used for this study comprised of 3 sections. The first section dealt with the agency’s profile and the use of the G2B system, the second section asked about the factors of usage, while the last section required the respondents to answer items related to performance. The items on usage, factors and performance were measured as likert scale, ranging from 1 as strongly disagree to 7 as strongly agree. 6 measures for usage were adapted from Wu et al., (2007).

For organizational factor, items for both top management emphasis and organizational learning were also adapted from Wu et al., (2007) while the items on facilitating condition were developed based on both field interview and Thompson et al., (1991). On the other hand, the individual factors items of user skills, training and user attitude were adapted from Koufaris (2003), Guimaraes et al., (2003) and Taylor and Todd (1995) respectively. Finally, the items to measure transparency were developed from interviews and from the concept of information transparency while information quality and service quality were developed based on Watson and Wixom (2003) and Agus et al., (2007).

**3.3 Validity and Reliability**

**3.3.1 Exploratory Factor Analysis**

A principal component analysis as a procedure of exploratory factor analysis (EFA) was conducted to reduce sets of variables using a smaller set of factor by looking for groups among the inter-correlations of a set of variables. All items were loaded using the principal axis factoring and Varimax with Kaiser Normalization rotation. The results produced a total variance of 76.86%. The KMO of 0.926 indicated factor analysis was appropriate, the MSA>0.5 suggested all variables should be included in the factor analysis, and the Bartlett’s test was significant, implying the variables were correlated.

All items were loaded into nine components, instead of ten. This is due to the items on top management emphasis and organizational learning that loaded into a similar factor. However, since the validity of the construct will be confirmed in the confirmatory factor analysis (CFA) procedure, running a separate EFA for the construct was not performed.
3.3.2 Confirmatory Factor Analysis

A further confirmatory factor analysis was then performed prior to the structural equation modelling (SEM) assessment. First, a separate CFA was run on the constructs of organizational factor. Running all the items in the CFA provides a result that a two-factor model with all the top management and organizational learning items was not acceptable (chi-square/df > 3, all the fit indices < 0.9, RMSEA > 0.08 and AIC = 348.985). The factor score weight suggested there were some evidences items initially posited to be in the top management and organizational learning constructs were loaded into two different factors. Thus, the items were separated and the model was respecified and rerun. However, the items on facilitating conditions were not fit to be included as part as the organizational factor. Thus, the items and the construct of facilitating condition were eliminated from the organizational factor analysis and it became a distinct factor.

Then, all constructs were run simultaneously. The CFA yielded a result of chi-square/df = 1.725, the comparative fit index (CFI) = 0.936 and the root mean square of approximation (RMSEA) = 0.063. The standardized path loadings for all items were above the threshold value (Hair et al., 2010).

In addition to the model fit, we also checked for the convergent validity, composite reliability and discriminate validity (Hair et al., 2010). The instrument was also checked for its reliability. Results of the analyses were shown in Table 1. Results of the analyses show the convergent validity exceeded 0.50 and the composite reliability exceeded 0.70 for each latent variable. The cronbach’s alpha scores indicated the questionnaire was reliable. Therefore, based on the analysis, there were evidences that each measurement is valid (Hair et al., 2010). Thus, the results confirm that the responses from the government agencies generally support the conceptual distinctions of all the variables proposed in this study.

Table 1: Construct validity and reliability

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s alpha</th>
<th>Variance extracted</th>
<th>Composite reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization Factor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Management</td>
<td>0.923</td>
<td>0.761</td>
<td>0.945</td>
</tr>
<tr>
<td>Organizational learning</td>
<td>0.883</td>
<td>0.723</td>
<td>0.886</td>
</tr>
<tr>
<td>Facilitating condition</td>
<td>0.857</td>
<td>0.616</td>
<td>0.888</td>
</tr>
<tr>
<td><strong>Individual Factor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User skill</td>
<td>0.896</td>
<td>0.745</td>
<td>0.898</td>
</tr>
<tr>
<td>Training</td>
<td>0.737</td>
<td>0.526</td>
<td>0.689</td>
</tr>
<tr>
<td>User attitude</td>
<td>0.952</td>
<td>0.877</td>
<td>0.955</td>
</tr>
<tr>
<td>Use</td>
<td>0.857</td>
<td>0.603</td>
<td>0.856</td>
</tr>
<tr>
<td><strong>Service Performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transparency</td>
<td>0.921</td>
<td>0.810</td>
<td>0.955</td>
</tr>
<tr>
<td>Service Quality</td>
<td>0.960</td>
<td>0.861</td>
<td>0.961</td>
</tr>
<tr>
<td>Information Quality</td>
<td>0.978</td>
<td>0.916</td>
<td>0.978</td>
</tr>
</tbody>
</table>
4. Results

Structural equation modelling (SEM) analyses were run to test the hypotheses. Following Kline (1994), the overall fit statistics indicate a fit for the model (chi-square/df = 1.803, CFI = 0.927, RMSEA = 0.066). The results confirm that the responses from the Malaysian government organizations generally support the theoretical and conceptual distinctions of all the constructs proposed in the study. As such, the data can be applied to test the hypotheses.

Table 2 illustrates the results with respect to the nine hypotheses constructed. Referring to the table, only five hypotheses were supported. Only organizational learning (H2) and user attitude (H6) had a significant effect on the Malaysian government electronic procurement system use with the factor loadings of 0.341 and 0.413 respectively. However, the use of the system had a significant effect to service performance via transparency (H7), service performance (H8) and information quality (H9) with the system use explains nearly 68% of the variance in transparency, 79% in service performance, 70% in information quality. Thus, it can be concluded the highest success achievement is on the improvement of service performance, followed by information quality and transparency. All predictors explain about 70% of the variance in G2B system use among government agencies.

Table 2: Results of Hypothesis Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Relationship</th>
<th>$R^2$</th>
<th>$\beta$</th>
<th>p</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Top management and system use</td>
<td>0.700</td>
<td>0.042</td>
<td>0.729</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H2</td>
<td>Organizational learning and system use</td>
<td></td>
<td>0.341</td>
<td>0.009</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>Facilitating condition and system use</td>
<td></td>
<td>0.152</td>
<td>0.122</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H4</td>
<td>Skills and system use</td>
<td></td>
<td>0.126</td>
<td>0.312</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H5</td>
<td>Training and system use</td>
<td>-0.072</td>
<td>0.564</td>
<td></td>
<td>Not Supported</td>
</tr>
<tr>
<td>H6</td>
<td>Attitude and system use</td>
<td></td>
<td>0.413</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H7</td>
<td>Use and transparency</td>
<td>0.679</td>
<td>0.824</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H8</td>
<td>Use and service performance</td>
<td>0.796</td>
<td>0.892</td>
<td>***</td>
<td>Supported</td>
</tr>
<tr>
<td>H9</td>
<td>Use and information quality</td>
<td>0.709</td>
<td>0.842</td>
<td>***</td>
<td>Supported</td>
</tr>
</tbody>
</table>

*** $p < 0.000$

The findings from the study suggest use of information system in the interaction between government and business has indeed significant influence to the public service performance by improving transparency, increasing service quality and enhancing quality of the information. In addition, while many factors shape the usage of the government-to-business system, our study suggests both organizational learning and user attitude of the organizational and individual factors are the key determinants in predicting the usage success of the government-to-business system among government agencies.

Hence, it suggests for any organizational information systems implementation and deployment, the determinants that shape the use do not come in isolation. Rather, they are integrative predictors which are accumulated by the interactions of the individuals who form the organizations.
5. Conclusion

The results of the study highlight the importance of adopting and using information systems in enhancing the public sector business process between the government agencies as the buyer and business entities as the seller. One of the important contributions of this study is the inclusion and validation of the transparency measure as one of the service performance indicator. In addition, the study has proved user attitude as a human factor has a significant influence to the IS use even at the organizational level. Thus, it may give a strong signal to top management level in order to be more cautious on the effect that users have towards information system adoption and use, especially in the public sector. In addition, the findings of the study can be used to assist public sector policy makers to reevaluate and reassess general e-government initiatives in order to seek for best approaches in promoting vast usage of technology in the government administration.

References


