Vendor or Client: What are the Important Factors for SDO Project Success?

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Abstract

SDO (Software Development Outsourcing) projects have been consistently increasing and expanding but also have many failures. In order to improve SDO performance, the factors affecting SDO performance are investigated in this study. SDO has relational risk as well as performance risk in nature, and the factors affecting the SDO performance caused by these mixed risks are drawn from the prior studies. With field survey targeted client IS personnel who experienced SDO, 214 survey questionnaires are collected and analyzed. Research results show that vendor power, client requirements certainty, goal clarity and goal alignment affect the SDO performance. However, vendor knowledge and client knowledge do not have much effect on SDO performance. The results of this study can be effectively utilized to decrease the failures of SDO and increase the possibility of success.

Keywords: SDO (Software Development Outsourcing), IS Outsourcing, Project Performance

1. Introduction

Recent the business environment is changing rapidly. In particular, the change speed is diversified and being advanced beyond our imagination in the information field. Because of the faster the rate of change in the information field and the diversification of the customer’s requirements, the necessity increased to meet the needs of customers.

However, it is difficult to repair and maintain a program that is already in use by IT personnel. So it very is difficult to supply a new information system in a timely manner, as well as is difficult to maintenance and repair of existing systems.

Therefore, most companies are worried elimination of development backlog, proper maintenance and repair of the existing system than elimination advantage of the information system. Because of these drastic changes in the information society, the IS satisfaction is difficult to meet within the internal organization of the enterprise. So IS outsourcing has been come necessary.

Many previous studies showed an interest in the mismatch of supply and demand for these IS [1-4]. And the next existing research focused on outsourcing decision making factors of information system [5-9].

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IT outsourcing has become one of the important alternatives for the management of an organization's information system [10]. This phenomenon as one of several indicators showing, the large companies of 75 percent maintain large-scale long-term outsourcing contracts in the world [11]. Despite the increase and diffusion of outsourcing, about half of all Software Development Outsourcing (hereinafter SDO) success in industry survey [12]. These failures result in the delay of project deadline and over budget, finally do not satisfy the requirements of user [13].

The reason for the failure of the SDO is that SDO risk is essentially complex. From the point of view of IT investment, the major risks of SDO can be divided financial, project, and technology risk [14].

In many studies for improving project performance by SDO risk management and SDO risk control, has been piecemeal approach in IT outsourcing perspective and system development perspective.

In the field of IT outsourcing research has been suggested that to improve outsourcing performance by effective contract and partnership which is focused on the relationship between vendors and clients.

In the field of system development research has suggested that to improve system development performance through the effective interaction between stakeholders which is associated with the effective use of the system development tools. However, basically SDO is to develop the software which is external vendors available software in the internal organization [15]. Therefore IT outsourcing and systems development at the same time and integrated to be considered in order to increase the performance and reduce the failure of the SDO.

In this study, IS Outsourcing and System Development should be considered an integrated manner at the same time, and explores the factors affecting the performance of the SDO. An integrated perspective of this study will be able to provide a clearer understanding about the factors affect the performance of the SDO, instead of in many of the existing studies was done fragmentary approach of IS Outsourcing Perspective and System Development Perspective. Specific research goal of this study 1) explores the factors affecting the performance of SDO, 2) compare the relative importance of the factors affecting the performance of SDO, and 3) suggests a way to improve the performance of SDO.

2. Theoretical Background and Research Hypotheses

2.1. Software Development Outsourcing (SDO)

The effective risk management is the key to successful outsourcing. In the case of Software Development Outsourcing, effective risk management is a very important. They are reason that the risks of SDO are complex nature, and effective risk managements are not easy [15, 16, 13].

These failures of risk management lead to the failures of the SDO project. SDO project's failures are represented by a variety of negative results which are excess project term, over budget, dissatisfaction of user needs, and finally a falling-off in quality developed software [17, 13].

The risk of SDO can be categorized into the following two categories: (1) relational risk in accordance with opportunistic behavior of the relative by the work performed between different organizations, (2) performance risk in difficult to achieve the project objectives by the inherent complexity of information systems development work in the SDO.

In existing studies, to reduce relational risk, research competitive relationship perspective represented by the contract and cooperative relationship perspective represented by the
partnership are suggested each different research results and ways. From the point of view of competitive relationship, it is not easy to build partnership because of the basic purpose by the difference between the vendor and the client. Therefore strong contract management is of important meaning [18, 15].

On the contrary, from the point of view of cooperative relationship, they urge the importance of cultivation of a partnership several vendors for long time than competition among vendors and formal contract management [19, 20].

In existing studies, to reduce performance risk, research technology-oriented perspective represented by the effective use of the system development or methodology and behavior-oriented perspective represented by the effective interaction of the stakeholders related to the development of the system are suggested each different research results and ways. From the point of view of technology-oriented, they perceived system development work as mere technical work. Therefore they are suggested that development performance improved by effective use of development tool and development methodology [21, 22]. From the point of view of behavior-oriented, they are suggested that development performance improved by stakeholders’ ability and experience [17, 23].

2.2. Software Development Outsourcing Project Performance

The key indicators of the SDO project performance are effectiveness and efficiency [17, 13, 24]. The effectiveness is the degree to which as software developed to meet the needs of client, as is referred to as the product performance. The concept of effectiveness concept has to do with detailed quality characteristics of developed software.

On the other hand, efficiency is the degree to which management of the development process itself. In other words, it is to evaluate the process performance. The efficiency concept has been associated with software development on the time within budget. An objective comparison between the projects is available by efficiency characteristics which is the degree of compliance with cost, budget, and requirement.

There often is a trade-off between the two. In case of the short period project and low-budget project, the final output software is of bad quality. And it occur opposite result [12]. In this study, project performance is intend to evaluate efficiency.

2.3. Vendor Property

2.3.1. Vendor power: The SDO project performance affecting vendors property has the Vendor power and Business Knowledge of power. In outsourcing relationship, vendors and client hold steady form of powers, then they exercise these power [25].

Generally it would appear that vendor would tend to have technical skill in the IT field, therefore vendor have expert power or information power [26, 27]. The use of these powers improves project performance to develop software at low cost and in a timely manner.

In addition, vendors have reward power and referent power [20]. The vendors used of these powers improve project performance through the project experience and the additional education and training.

This is connected with the hypothesis of the following.

Hypothesis 1: Vendor power will have a positive effect on the project performance.

2.3.2. Business knowledge of vendor: The clients want effectively to gain vendor’s technology knowledge by IT outsourcing. That is to say, generally, Vendor may be occurred a lack of understanding of the industry and business to which the client belongs. Because
vendor compared with customers is considered that to have professional technical competence in the IT section.

For this reason, client to reduce the risk may occur as a wrong choice, in advance vendor how many have performed to the business in the industry to which the client belongs may be considered as a major evaluation factors [15, 20].

When actual SDO project progressed, in such a case vendor developers’ lack of knowledge of the business section, it occur an increase in development time and cost owing to additional manpower which has accumulated experience in the industry or business.

This is connected with the hypothesis of the following.

**Hypothesis2** Vendor Knowledge will have a positive effect on the project performance.

### 2.4. Client Property

2.4.1. **Client Requirement Certainty:** Project scope is connected to the client’s requirements for the system to develop a system.

If there is a conflict between the requirements, the scope of the project will be must varied during the course of the project [13, 28]. And if the scope of the project changes, it increases the time and cost invested in the development. So project performance is degraded.

This is connected with the hypothesis of the following.

**Hypothesis3** Client requirement certainty will have a positive effect on the project performance.

2.4.2. **Technology Knowledge of Client:** The IT departments or the user departments of client will be directly participated or involved in SDO project. They perform a knowledge provision role by industry or business or organization considered the lack of vendors, and project control role by project’s output review.

If client have to technology knowledge in the system development methodology or process as well as business knowledge, knowledge sharing and knowledge integration will be done effectively. So communication of clients and vendors will be smooth [19, 13].

This is connected with the hypothesis of the following.

**Hypothesis4** Client knowledge will have a positive effect on the project performance.

### 2.5. Task Property

2.5.1. **Goal Clarity:** SDO project to a variety of goals to be achieved at the same time, so goal conflict, priorities confusion, and goal obscurity will be occurred [19]. Because SDO project need to develop software with excellent quality in limited in time, efficient process of the project and effective development system called catch two rabbits will progress at the same time [29].

Client and vendor may be pursued different goals by different perspective of each. So SDO project through, a goal who wish to pursue will change or may be unclear. As a result, the project performance is reduced. This is connected with the hypothesis of the following.

**Hypothesis5** Goal Clarity will have a positive effect on the project performance.

2.5.2. **Goal Alignment:** The level of the SDO project objectives is varied as stakeholders to participate in the project [18].
From the point of view of customer executive level, outsourcing projects try to introduce and promote. On the other hand, from the point of view of project team level, they can also to develop a system that is technically superior [28]. In addition, each project team try to personal goals which is different organization or team goals. The goal mismatching will appear the bad result in project performance.

This is connected with the hypothesis of the following.

_Hypothesis6_ Goal Alignment will have a positive effect on the project performance.

3. Survey Measures

In the study, the unit of analysis of this study is a software development outsourcing (SDO) project. Population was included all domestic companies from outsourcing software development projects.

Survey design was chosen to verify the research model. The survey for this research was pretested by the work site experts before distribution and measured by 7 point Likert scale. The questionnaire was designed to respond to customers who participate in the SDO project information system personnel. Information systems personnel were considered as the optimal respondents of the survey for this study, owing to role of SDO project preparation, progress, and manage.

The definition for the research variables are summarized in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor power</td>
<td>Potential influence of the vendor that client company perceives, which is the ability to lead some change in the relation of outsourcing</td>
<td>[25],[26]</td>
</tr>
<tr>
<td>Business knowledge of vendor</td>
<td>The knowledge of the application domain which the vendor developers retain for the system development</td>
<td>[19]</td>
</tr>
<tr>
<td>Client requirement Certainty</td>
<td>Unclearness and inexactitude of the user’s requirement in the beginning of the project</td>
<td>[19],[13]</td>
</tr>
<tr>
<td>Technology knowledge of client</td>
<td>Understanding about general system development process and project development process</td>
<td>[13] [28]</td>
</tr>
<tr>
<td>Goal clarity</td>
<td>The Project Team’s goals and the success criteria are clearly defined and shared</td>
<td>[29] [13]</td>
</tr>
<tr>
<td>Goal alignment</td>
<td>Alignment of the goal of project team with that of client company at the level of organization.</td>
<td>[28]</td>
</tr>
<tr>
<td>SDO project performance</td>
<td>The degree of compliance with the contract of development process</td>
<td>[17]</td>
</tr>
</tbody>
</table>

4. Research Method and Results

4.1. Sample and Data Collection

The data collection was carried out by mail, e-mail, fax and a personal visit. For sampling frame were more than 200 businesses participating in the business management course of executives in a university in Korea, and more than 200 businesses attending PMP(Project Management Professional) course of study conducted by the Federation of the Korean Industries.
Table 2. Sample Characteristics

<table>
<thead>
<tr>
<th>Project period</th>
<th>Frequency</th>
<th>Percent</th>
<th>Project volume</th>
<th>Freq.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 6 months</td>
<td>60</td>
<td>28.0</td>
<td>fewer than 5 people</td>
<td>41</td>
<td>19.2</td>
</tr>
<tr>
<td>more than 6 months ~less than 1 year</td>
<td>85</td>
<td>39.7</td>
<td>more than 6 people ~fewer than 10 people</td>
<td>75</td>
<td>35.0</td>
</tr>
<tr>
<td>more than 1 year ~less than 2 year</td>
<td>51</td>
<td>23.8</td>
<td>more than 10 people ~fewer than 20 people</td>
<td>40</td>
<td>18.7</td>
</tr>
<tr>
<td>more than 2 year ~less than 3 year</td>
<td>10</td>
<td>4.7</td>
<td>more than 20 people ~fewer than 40 people</td>
<td>33</td>
<td>15.4</td>
</tr>
<tr>
<td>more than 3 year</td>
<td>5</td>
<td>2.3</td>
<td>more than 40 people</td>
<td>24</td>
<td>11.2</td>
</tr>
<tr>
<td>non response</td>
<td>3</td>
<td>1.4</td>
<td>non response</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>total</td>
<td>214</td>
<td>100.0</td>
<td>total</td>
<td>214</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The 586 surveys were sent and distributed during the 9 weeks of survey period, and the final collected surveys were 242. To remove the abnormality for the date, the surveys including errors or insincere responses were excluded, 214 projects (163 companies) were used for the final analysis. PASW 18.0 of SPSS was used for the statistics analysis.

According to Table 2, the project period for more than 6 months and less than 1 year has the highest percentage of 39.7, the volume of the project team of more than 6 people and fewer than 10 people has the highest percentage of 35.0.

4.2. Reliability and Validity Test of Measurement Instrument

According to Table 3, the analysis shows this research the reliability as the value of Cronbach’s α is more than 0.7, and the validity through the factor analysis of independent variable and dependent variable.

Table 3. Results of Reliability Analysis & Validity Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor1</th>
<th>Factor2</th>
<th>Factor3</th>
<th>Factor4</th>
<th>Factor5</th>
<th>Factor6</th>
<th>Factor7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Power</td>
<td>.741</td>
<td>.078</td>
<td>.096</td>
<td>.256</td>
<td>.083</td>
<td>-.021</td>
<td>.155</td>
</tr>
<tr>
<td>VP2</td>
<td>.716</td>
<td>-.101</td>
<td>.153</td>
<td>.076</td>
<td>-.029</td>
<td>-.154</td>
<td>.077</td>
</tr>
<tr>
<td>VP3</td>
<td>.714</td>
<td>-.045</td>
<td>.191</td>
<td>.107</td>
<td>.223</td>
<td>.018</td>
<td>.050</td>
</tr>
<tr>
<td>VP4</td>
<td>.749</td>
<td>.038</td>
<td>.236</td>
<td>.044</td>
<td>.239</td>
<td>-.018</td>
<td>.180</td>
</tr>
<tr>
<td>VP5</td>
<td>.790</td>
<td>-.003</td>
<td>-.008</td>
<td>.052</td>
<td>.178</td>
<td>-.017</td>
<td>.048</td>
</tr>
<tr>
<td>VP6</td>
<td>.786</td>
<td>-.014</td>
<td>.151</td>
<td>.083</td>
<td>.059</td>
<td>.072</td>
<td>.116</td>
</tr>
<tr>
<td>VP7</td>
<td>.708</td>
<td>.051</td>
<td>.171</td>
<td>.150</td>
<td>-.004</td>
<td>.025</td>
<td>.091</td>
</tr>
<tr>
<td>Business knowledge of vendor</td>
<td>.110</td>
<td>.068</td>
<td>.833</td>
<td>.095</td>
<td>.094</td>
<td>.017</td>
<td>.044</td>
</tr>
<tr>
<td>VK2</td>
<td>.204</td>
<td>.121</td>
<td>.836</td>
<td>.087</td>
<td>.044</td>
<td>-.029</td>
<td>-.030</td>
</tr>
<tr>
<td>VK3</td>
<td>.223</td>
<td>.075</td>
<td>.863</td>
<td>.078</td>
<td>.061</td>
<td>.039</td>
<td>.049</td>
</tr>
<tr>
<td>VK4</td>
<td>.158</td>
<td>.076</td>
<td>.766</td>
<td>.143</td>
<td>.166</td>
<td>.088</td>
<td>.183</td>
</tr>
<tr>
<td>VK5</td>
<td>.200</td>
<td>.024</td>
<td>.688</td>
<td>.186</td>
<td>.239</td>
<td>.146</td>
<td>.164</td>
</tr>
<tr>
<td>Client requirement certainty</td>
<td>.048</td>
<td>.791</td>
<td>.033</td>
<td>.114</td>
<td>.019</td>
<td>.082</td>
<td>.050</td>
</tr>
<tr>
<td>CR2</td>
<td>-.028</td>
<td>.858</td>
<td>.115</td>
<td>.093</td>
<td>.078</td>
<td>.054</td>
<td>-.032</td>
</tr>
<tr>
<td>CR3</td>
<td>-.051</td>
<td>.855</td>
<td>.172</td>
<td>.011</td>
<td>-.015</td>
<td>-.014</td>
<td>-.046</td>
</tr>
<tr>
<td>CR4</td>
<td>.029</td>
<td>.845</td>
<td>-.015</td>
<td>.100</td>
<td>.055</td>
<td>.054</td>
<td>.062</td>
</tr>
</tbody>
</table>
4.3. Hypothesis Test

To test the hypothesis, the multiple regression analysis was conducted. The project period and the volume were controlled [20], project volume means the complexity of the project and the one of the task. Both variables appeared to be statistically significant at 0.05 significance level.

As the result of the hypothesis testing, while vendor power proved statistically significant of the vendor property, vendor knowledge was not statistically meaningful. Summarizes the results of the hypothesis tests are presented in Table 4.

Client requirement certainty statistically significant of the two variables related to client property, whereas client knowledge was insignificant. The two variables of the task property, both the goal clarity and the goal alignment are significant.

Table 4. Result of Hypothesis Testing

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Dependent variable</th>
<th>Beta</th>
<th>t-value</th>
<th>not reject or reject</th>
<th>R²</th>
<th>adj R²</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project volume</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor power</td>
<td>Project performance</td>
<td>-.158</td>
<td>-2.599***</td>
<td>control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business knowledge of vendor</td>
<td></td>
<td>.134</td>
<td>2.183**</td>
<td>control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client requirement certainty</td>
<td>Technology knowledge of client</td>
<td>.197</td>
<td>3.295***</td>
<td>not reject</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal Clarity</td>
<td>Goal Alignment</td>
<td>.132</td>
<td>2.208**</td>
<td>not reject</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology knowledge of client</td>
<td></td>
<td>-.222</td>
<td>-.367</td>
<td>not reject</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p <.1, **p<.05, ***p<.01
5. Conclusions

In this study was to explore the factors affecting the performance of SDO (Software Development Outsourcing), in order to improve the performance of SDO project. Empirical result, vendor power, client requirement certainty, goal clarity, and goal alignment affect the performance of SDO.

The SDO performances can be improved in the SDO project by vendor’s strong power, vendor’s excellent ability, certain requirements for the client’s system, and low volatility of requirements for the client’s. In addition, The SDO performance can be improved in the SDO project by clarity of project goal, and goal alignment.

But there are no significant influence vendor’s knowledge and client knowledge project. A lack of knowledge of the business area with professional technology vendors will be a big problem, but business knowledge is an important part of vendor [19]. Nevertheless, regardless of the amount of knowledge, the knowledge sharing by knowledge form or the knowledge creation by knowledge integration mechanism is more important [29, 20]. Likewise the client’s knowledge, the project performance is determined by mechanism of these knowledge sharing and these knowledge integration, whether large or small of client’s IT technical knowledge.

The main implications of this study are as follows. First, as the academic implications, mixed risk of SDO was studied, in other words relational risk and performance risk were considered integrated. Because of relational risk and performance risk from each individual approach about the risk of SDO, until now many studies could not provide an effective description about the unique mixed risk of SDO and the relative importance of these risks.

Second, as the practical implications, it is proposed the factors to be considered realistically. Those factors include the selection of excellent vendor, clarity of client company requirements, clarity of project goal, and goal alignment of project stakeholders.

The limitations of this study are as follows. First, we did not consider the various performance factors of SDO project. SDO performance also includes the system performance as well as process performance that mainly discussed in this study. In this study did not consider these systems to performance.

Second, nevertheless some variables (especially the business knowledge of vendors or technology knowledge of client) could greatly change the value as time passes, survey was measured in a certain time at SDO project was shut down. These limitations will be complementary through future longitudinal study.

References


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