Escalation of Software Project Outsourcing: A Multiple Case Study

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Abstract. Project escalation is the phenomenon of continuously devoting resources into a seriously delayed and troublesome project. This study focuses on project outsourcing in which both client and vendor may lead to the result of escalation. As both parties may take a position of termination or continuation of the project, four escalation types were studied. In each escalation type, two cases were studied through in-depth interview. Using content analysis, determinants of escalations were identified. In the case of low intention of continuation by the vendor, but high intention of continuation by the client, credible deterrence resulted in project escalation. In the case of high intention of continuation by the vendor, but low intention of continuation by the client, credible commitment resulted in project escalation. This study provides lessons learned from eight escalation cases to avoid ineffective investment in time and money.

Keywords: Escalation, Information System Project, Outsourcing, Credible Deterrence, Credible Commitment

1   Introduction

Any project has a predefined budget, a schedule, and a set of goals. Project escalation is the situation where more and more resources are invested into a delayed and troublesome project [17, 19]. Regardless of the additional investment, these escalated projects eventually fail or their goals are not entirely met. Staw and Ross (1987) proposed a framework of four dimensions, including project factors, psychological factors, social factors, and organizational factors, to explain the phenomenon of project escalation. Previous research in escalation focused on in-house project, however, in today's competitive environment, outsourcing has become a common practice. These outsourced projects saw a higher percentage of project failure, often demonstrating a more complicated escalation effect. This complexity involves the vendor characteristics, the client characteristics, the contract terms, and the relationship between the two stakeholders.

As project runs into serious delay, both the client and vendor may choose to terminate or to continue by devoting more resources into the project. During the negotiation process, client who holds the money often has stronger bargaining power. However, the vendor is the one that has control over crucial project technology. Because of this, the objectives and strategies of both parties may be quite different. Considerations of long term relationship, company image, and strategic system development lead to continuation, while short term profit, lack of value in relationship, low transition cost, or working with mature technology often lead to termination of a project. In this paper, four scenarios (client/vendor × continuation/termination) were studied to determine the considerations of each party and the true reasons behind escalation.

2 Literature Background

2.1 Project Escalation

The escalation determinants can be explained using the framework of project factors, psychological factors, social factors, and organizational factors proposed by Staw and Ross (1987). This topic has been discussed by many authors.
(1) Project factors include low salvage value, high closing costs, long term benefit, and benefit of project completion [4, 5]. Other situations include the development of a complementary set of core competencies [22] or regarding the problem as temporary and solvable [6].
(2) Psychological factors include responsibility of the project manager, determination for success, and avoidance of punishment. The classic example is project manager's self-justifying their decision [7].
(3) Social factors include the social value of turning a defeat into victory, keeping one's promise, over commitment [20], and the habit of carrying on till the end [2, 4, 5].
(4) Organizational factors include the lack of control mechanism [18], conformance to organizational policy, and the disproportional influence by vocal leaders [8, 9, 10].

From a theoretical point of view, Keil et al. (2000a) explained the complex in-house escalation phenomena using self-justification theory, prospect theory, agency theory, and avoidance theory.

2.2 Software Outsourcing

Outsourcing is a way to acquire technology, to reduce cost, to share workload, and to achieve strategic goals. The client wishes to achieve these goals by leveraging external resources and maximizing cost effectiveness [11, 12, 13, 14]. To obtain these benefits, it is necessary to build an effective project control system, vendor selection mechanism, contract management system, and risk management system. The vendor wishes to utilize its technical skill, to gain experiences, and to make profit. Similarly,

the vendor has to build up competitive technology, project management ability, risk management system, and customer relationship [15] to obtain these benefits.

The requirements of software project are often vaguely defined or prone to change. Therefore, staying on schedule and quality control become difficult to the developers. These characteristics all contribute to project escalation [24].

3 Research Steps and Method

The process of this study included four steps. In the first step, a pilot study was conducted. In the second step, eight cases were selected based on the results from the pilot study. In the third step, interviews and data collection were conducted. Data analysis is the final step.

3.1 Step 1: Pilot Case Study

First, a pilot case study was conducted to obtain the following objectives:
1. To clarify the definition of escalation for outsourced project.
2. To understand the situation, attitude, and major decisions of the client and vendor during project escalation.
3. To modify the escalation determinants from literature review and to develop guidelines for interview questions.

The pilot case was originally a one year project. This project ultimately lasted three years before being terminated. Based on literature review and our learning from this pilot case, the following criteria were set to help define an escalated project:
1. Serious overrun in schedule or budget.
2. The client has detected serious problems with its vendor and vice versa.
3. Termination has been proposed by at least one party.
4. Additional resources have been devoted to the project.

3.2 Step 2: Cases Selection

Based on the method of pattern matching in case study [27], four scenarios (2×2; client/vendor × continuation/termination) were defined. Each scenario yielded two escalation cases resulting in a total of eight cases. The set of criteria defined in step 1 were used to select the eight cases for further study. The eight cases cover all four scenarios and represent a variety of industry to reduce sampling bias. The basic information of these eight cases is summarized in Table 1.

Table 1. Summary of the eight information system outsourcing cases

Case	Industry/System	Schedule	Project situation
1	Rubber/ERP system	Plan:1.5yrs Actual:2.5yrs Final:terminated	• Client is a leading rubber manufacturing company. • Vendor expected to enter the new market but did not have sufficient domain knowledge. • Client proposed to terminate the project due to serious delay. • Vendor proposed to continue the project without extra charge.
2	Gas/GIS system	Plan:4yrs Actual:8yrs Final:terminated	• Vendor expected to enter GIS market and build up experiences. • The vendor's project manager was the key technical person yet busy with two projects. • The client changed three presidents during that period. • Both parties did not have good project control.
3	Hospital/MIS system	Plan:1yr Actual:4yrs Final:closed	• Vendor expected to enter the hospital information system market. • Client was not familiar with the new development platform. • Two project managers resigned due to pressure from project delay.. • Top management of client side did not notice the problems until too late.
4	Insurance/ Transaction system	Plan:3 months Actual:1.5yrs Final:closed	• Vendor promised a compressed schedule of 3 months but did not have enough people to work on the project. • Personnel change in client side caused delay in requirements analysis.
5	Banking/Asset management system	Plan:1yr Actual:4yrs Final:closed	• Frequent change of contact person. • Changes of acceptance criteria. • Client has strong bargaining power. • Vendor had to conform to client's requests.
6	Electronics/ Manufacturing system	Plan:1.5yrs Actual:5yrs Final:closed	• Pioneer project for both client and vendor. • Vendor had financial problem due to long development time. • Client is a leading company in that industry. • Vendor cares about company image.

Case	Industry/System	Schedule	Project situation
7	Steel/ERP system	Plan:1.5yrs Actual:2.5yrs Final:closed	• Client and vendor are business unit of the same business group. • Rely on top management communication rather than contract. • Only finish part of the original requirements. • Long term cooperation to finish the incomplete requirements.
8	Government/ Property management	Plan:1.5yrs Actual:1yr and 8 months Final:closed	• Government unit had a firm deadline of system completion. • Vendor did not have the experience of deploying large scale information system of 265 sites. • Vendor had to complete the project under tight schedule and budget. • Vendor devoted significant amount of extra cost to finish the project. • Company image and future business opportunities are important considerations of the vendor.

3.3   Step 3: Data Collection

For each case, a semi-structured interview was conducted. The interviewees included top management and project manager of both the client and vendor. The interview questions were developed to include project factors, psychological factors, social factors, and organizational factors. The specific questions were modified to take into account of learning from literatures and our pilot case study. The interviews were recorded, transcribed, and verified later for assurance. In addition to the interview data, project documents, meeting records, and e-mails were also collected for analysis. Data triangulation technique which validates the consistency and correctness of data through cross verification of multiple sources was used [26].

Along the timeline, there are some major events associated with project escalation. These major events include initial contract agreement, observation of serious problems, proposals of termination, negotiation, major decisions, and final resolutions. Data of these major events were collected through interview and documents.

3.4   Step 4: Data Analysis

Using coding and categorization, the raw data was grouped into escalation determinants. The importance of a determinant is rated as low (L) if it's mentioned once, rated as medium (M) if it's mentioned twice, and rated as high (H) if it's mentioned three times or more. The grouping is listed in Tables 2-5.

Table 2. Escalation determinants of project factor

Determinant/case	1	2	3	4	5	6	7	8
Vendor: low salvage value	L	L	L	L	H	H	H	H
Vendor: high termination cost (contract penalty)	H	L	H	H	H	M	L	L
Vendor: long term benefit if the project is finished	H	H	H	M	M	M	H	H
Vendor: alternative solutions	N	N	N	N	N	N	Y	Y
Vendor: sunk cost	H	H	H	H	H	H	L	L
Vendor: experiences learned from the project	H	H	H	M	L	L	L	L
Client: high transaction cost	M	M	H	M	M	H	H	H
Client: high agency cost	M	M	M	M	H	M	H	H

Table 3. Escalation determinants of psychological factor

Determinant/case	1	2	3	4	5	6	7	8
Vendor: risk aversion attitude	M	M	M	M	M	L	L	M
Vendor: decision biases	H	H	H	M	L	L	L	M
Vendor: loss aversion attitude	H	H	H	M	H	L	L	L
Vendor: over commitment	H	H	H	M	H	L	M	M
Client: responsibility for project success	H	M	H	M	H	H	M	H

Table 4. Escalation determinants of social factor

Determinant/case	1	2	3	4	5	6	7	8
Vendor: importance of company image	H	H	H	M	H	H	H	H
Vendor: challenge from other vendors	H	H	M	M	M	M	H	H
Vendor: experiences of previous success	H	H	H	M	H	H	H	H

Table 5. Escalation determinants of organizational factor

Determinant/case	1	2	3	4	5	6	7	8
Vendor: poor project control	L	L	M	M	L	H	H	M
Vendor: comply with company policy	H	H	H	M	L	L	L	M
Vendor: top management support	H	H	H	M	L	L	L	M
Client: poor project control	L	L	L	L	L	M	M	L
Client: need of project completion	L	L	H	M	H	H	H	H
Client: importance of the project	L	L	H	M	M	H	H	H

The results in Tables 2-5 are further summarized into Table 6.

Table 6. Escalation determinants of outsourcd project

	client	vendor
Project factors	• high transaction cost • high agency cost	• low salvage value • high termination cost • long term benefit • sunk cost • experiences learned from the project
Psychological factors	• responsibility for project success	• risk aversion attitude • decision biases • loss aversion attitude • over commitment
Social factors	n/a	• importance of company image • challenge from other vendors • experiences of previous success
Organizational factors	• poor project control • need of project completion • importance of the project	• top management support • comply with company policy • poor project control

Factors related to the attitude of escalation were retrieved from Tables 2-5. The escalation index is calculated by averaging the rating of related determinants. The rating of (H, M, L) is translated into (3, 2, 1). The two-dimensional index represents (client escalation score, vendor escalation score). The final escalation indexes of the 8 cases are (1.5, 3), (1.5, 3), (2.75, 3), (2.25, 2.2), (2.5, 1.8), (2.75, 1.8), (1.75, 1.8), and (1.5, 1.4) and shown in Figure 1.
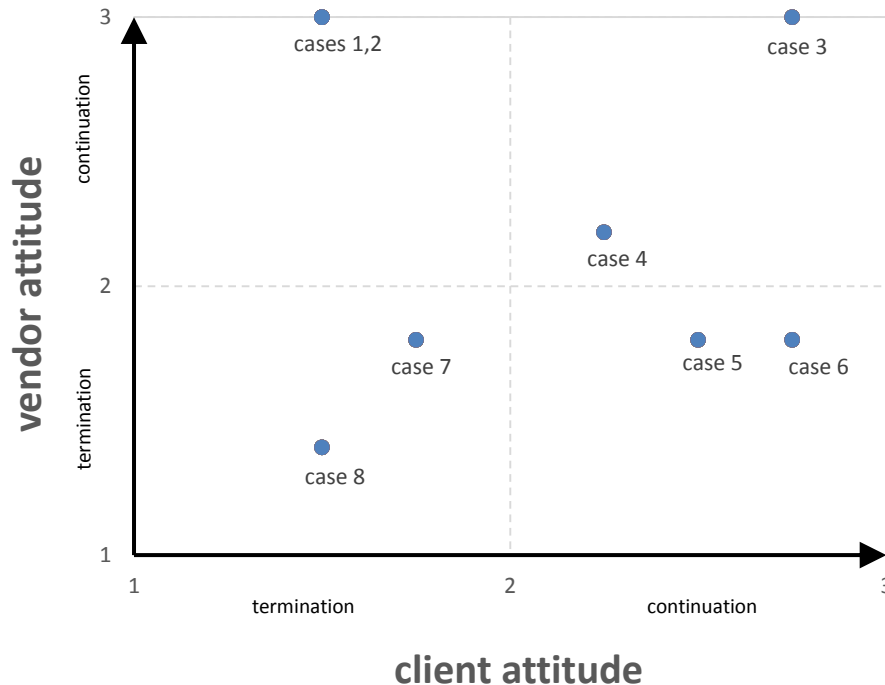
Fig. 1. The attitude of client vs. vendor

In cases 1 and 2, the vendors wanted to continue and were committed to devoting resources into a delayed project. In both cases, the vendors cared very much about their company image, wanted to build experiences, and expected the project benefits to be long-tern. They also had support from top management and their actions were aligned with company policy. In both cases, however, the client preferred to termination as the project was not critical to their business. The chairman of the vendor in case 1 showed strong determination to support the project. "To develop this market, we have invested large amount of money and efforts. Shall the project be terminated, all of our investment will vanish." He said, "I promise to fully support the project team and to add experienced people from our headquarters without extra charge." The president of the client side in case 1 was willing to give this vendor a chance after seeing their commitment to complete the project. "We understand that the vendor have absorbed a large amount of extra cost sending people from their headquarters to support this project. We may not be able to find a better vendor at this moment." Interview data shows that credible commitment is a key cause of escalation in cases 1 and 2. This escalation situation is labeled as the commitment type.

In cases 3 and 4, both the client and vendor were willing to continue and devoted resources into the project. For the client, the project was critical to the company and changing vendor would incur high cost. The vendor's considerations were similar to those observed in cases 1 and 2. For an escalation situation like this, where both

parties made a common choice based on their best interest, this escalation situation is labeled as the equilibrium type.

In cases 5 and 6, clients preferred to continue the project while vendors preferred to terminate. For the clients, the project was important enough that board of director showed special concerns. Their management team was consequently pressured to finish the project. For the vendors, however, termination bared little risk and continuation would have led to moderate benefits. Regardless, in each case, the vendors were still forced into continuing the project. "Security and reliability are so important to the banking industry. They maintain a long term relationship with information systems providers. They only do business with vendors they think they can trust." said an upper management in case 5. The vendor of case 6 recalls "The client is a world class semiconductor manufacturer. They have a strong legal department, so even though the requirements are not clearly defined in the contract, terminating the project and going through the legal process would not be wise." These are evidences that credible deterrence is the key factor causing cases 5 and 6 to escalate. Therefore, this escalation situation is labeled the deterrence type.

In cases 7 and 8, both the client and vendor sought termination. On the vendor side, the sunk cost and termination cost were low. In these cases, conflicts were resolved through top management, which diluted the responsibility of the project managers. Although schedule was delayed and only part of project was completed, both parties decided to close the project and solve the problem at a later time. This escalation situation is labeled the cooperation type.

Figure 2 shows four types of escalation observed in this study and how credible commitment of the vendor and credible deterrence of the client lead to project escalation.
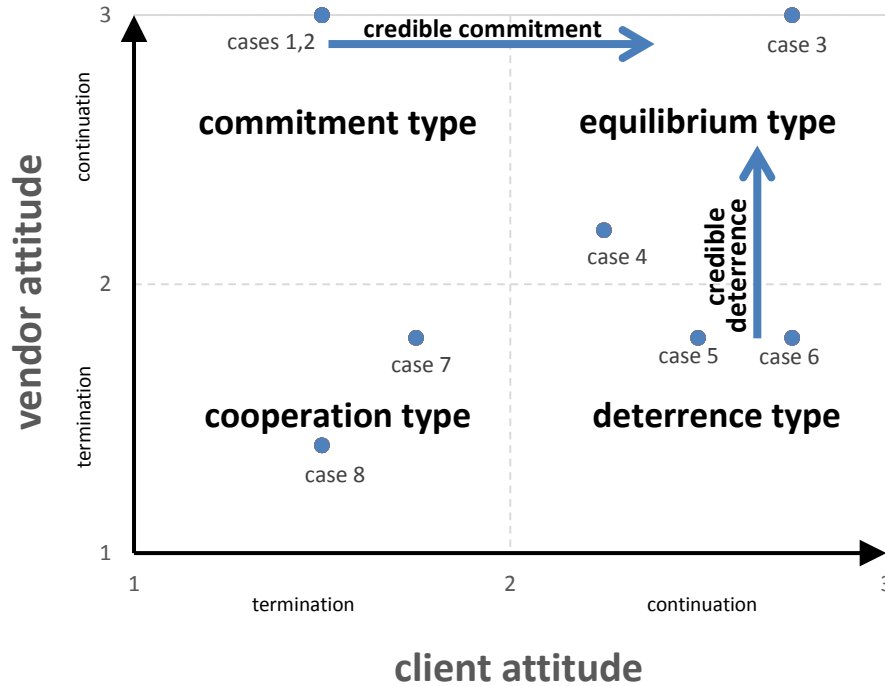
Fig. 2. Attitude change toward escalation

4　Discussions and Suggestions

The commitment type escalation resulted mainly from an over-commitment by the vendor. Long-term benefit and market potential were the major considerations to continue on with the project. The vendor underestimated the complexity of the project and did not have sufficient domain knowledge. This proves that commitment alone cannot guarantee the success of a project. As shown in data analysis, lack of control mechanism is a common problem for both the client and vendor. Continuing the project without improving project management does not help completion.

In the equilibrium type escalation, both stakeholders decided to continue with the project. The client bears the responsibility of project success, while the vendor fears the large amounts of penalty and damage to their image as a result of termination. This is similar to the prisoner's dilemma in game theory [25]. Both parties choose the alternative in their best interest but ends up with a poor result. In this situation, the loss of termination is immediate, but will be smaller than the loss of continuation.

In the deterrence type escalation, the clients are leading company in the industry with strong bargaining power. In this situation, vendors tend to comply with the requests of the client. However, if vendor do not have sufficient domain knowledge and technology know-how, delaying the problem will only incur higher cost for both

parties. The client must consider the opportunity cost of project failure as deterrence alone cannot help the completion of a project.

In the cooperation type escalation, the client and vendor maintained a cooperative relationship and the project was either reassigned into phases or reduced [21, 23]. The unfinished parts were delayed but could be completed in the future.

Escalation wastes time and money. Through our learning from this study, suggestions are made to avoid escalation or to reduce the damage. For vendors, trying to enter a new market, starting out by working on the projects with a leading company is often costly and risky. First off, an imbalance in bargaining power often throws these projects into a rabbit hole. Taking a joint development approach or cooperative relationship can reduce risk. Secondly, being overly optimistic about the potential market often results in over-commitment. Always evaluate a potential market based on solid market research. Thirdly, project opportunities must be evaluated not only based on technology and cost, but also with a risk management point of view. Inexperienced users, frequent change to requirements, frequent change to the contact person, and changes to the client policy are all risks to be evaluated and managed.

For client, evaluation of continuation or termination should be based on long-term benefit rather than short-term problem solving. With the fear of taking an immediate loss and the trouble of restarting a project, continuation may seem like an easy solution. However, if the underlining problems are not solved, the project will fail eventually. Furthermore, a monitoring system for outsourced project must be built. Poor project control is one of the most common problems observed in this study. Lastly, deterrence has a negative effect on escalation. It leads to vendor hiding the problems and client overlooking them. In summary, a cooperative attitude and ample communication between the client and its vendor can avoid ineffective measures and reduce losses.

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