

An Empirical Investigation of Vendor Readiness to Assess Offshore Software Maintenance Outsourcing Project

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Summary

The process of correcting, upgrading, and improving software products after they have been handed over to the consumer is known as software maintenance. Offshore software maintenance outsourcing (OSMO) clients benefit from cost savings, time savings, and improved quality software through OSO. In most circumstances, the OSO vendor makes a lot of money but not in all the cases. Especially, when the OSO project offer is not properly assessed. An efficient outsourcing contract might yield successful outcomes for outsourced projects. But before sending a detailed proposal to bid on the OSO project the vendor must have to assess the client's project (business offer) requirements. The purpose of this study is to find out common trends within the assessment of a OSO project. A case study approach along with semi-structured interviews from eight companies concluded ten common practices and several roles. Among these practices, four (code structure, requirements, communication barriers and required infrastructure) were consistent amongst the responses. The findings, limitations and future work are discussed.

Keywords:

An empirical study, Client project assessment, Offshore software maintenance outsourcing, Software risk, Software Practices.

1. Introduction

Offshore software maintenance outsourcing (OSO) is a modern business strategy for developing high-quality software at low cost in low-wage countries [1, 2]. Software maintenance outsourcing is a contract-based relationship between client and vendor organizations in which client(s) contracts out all or part of its software development activities to vendor(s), who provides agreed services in return for remuneration [3].

This paper aims to identify such practices that are essential to an OSO vendor while assessing a project. These practices will help vendors shortlist a more suitable project and move further for a detailed proposal to be sent to the short-listed OSO client. This may also help to ensure successful outcomes of outsourcing projects and long-lasting relationships between clients and vendors. Along with essential practices. While this paper does not

address the ethical and regulatory aspects of undertaking OSO [25], it highlights common roles within a context of continuous erosion of centralized technology management. The paper also accentuates some of the drivers behind outsourcing software maintenance services.

Client organizations benefit from OSO because of lower costs of manpower in developing countries that might reach to one-third less than domestic vendors and even less when compared with in-house operations [reference]. McKinsey Consulting argues that for every dollar of US client organizations spent on outsourcing to vendor organizations in India, American corporations benefit \$1.14 and India by 0.33 cents [4]. Moreover, Vendors often seek OSO projects as opportunities for skills, exposure, and experience development, and learning new ways to satisfy clients' requirements. It is professed that OSO vendors can add significant value to their clients' supply chains. To balance the outsourcing benefits there are substantial risks in the software outsourcing decisions [5, 6, 7, 8].

Despite the growing regulations and rise apprehensions about data security and privacy, pervasive cloud computing seems to unfold the geographical barriers for OSO services [25]. Most of the identified risks entwined with OSO are skewed towards projects' social (e.g., client-vendor capacities, communications, and commitments) rather than technical, legal, or geographical nature [23]. Hence, the cloud has been considered an enabler to OSO projects [24].

One of the key challenges is the selection of an appropriate and more suitable project. This is only possible by keenly observing the client's business offer or project and taking the right decision. To do this we intend to address the following research questions;

RQ1. What practices are important while assessing the OSO client's project?

RQ2. What are the key team roles within OSO projects?

Section 2 of the paper is about the background and motivation, Section 3 is about the methodology used, Section 4 presents results, and finally, Section 5 contains the conclusion and Section 6 contains future work.

2. Background and Motivation

Offshore software outsourcing activities have been going on for well over a decade. The outsourcer and the supplier are the two key players in software outsourcing. Software outsourcers (client) are companies that subcontract software development to other companies, known as suppliers or vendors [9, 22]. Offshore software maintenance outsourcing is also termed as ‘far-shore’ outsourcing in the literature, but the name ‘offshore outsourcing’ has been used very often. Offshore outsourcing is nothing but ‘international trade’ and nations benefit considerably from international trade.

Companies in the US are progressively implementing an offshore software outsourcing approach to minimize development and maintenance costs. OSMO is an up-to-

date business strategy to develop high-quality software at comparatively low cost in low-wage countries. The cost reduction factor motivates firms to outsource their software development and maintenance work to countries like India, Pakistan, South Korea, Mexico, Taiwan, and Hong [10].

Many studies in the existing literature only discuss the contract, risks, and decisions related to software contracts

or service level agreements [11, 12, 13]. Some of the studies have more focused on the partnership between vendor and client and identified the useful practices [14, 15]. But these studies have limitations towards the OSMO context. Therefore, the current study will focus on finding out such practices that help the OSMO vendor shortlist more appropriate project options among many other options.

3. Methodology

To design the research plan, this research has chosen the guidelines proposed by Wohlin and Aurum [21]. Figure 1 shows the research structure split into three phases with eight decision points. In addition, different methods are used to execute each decision point.

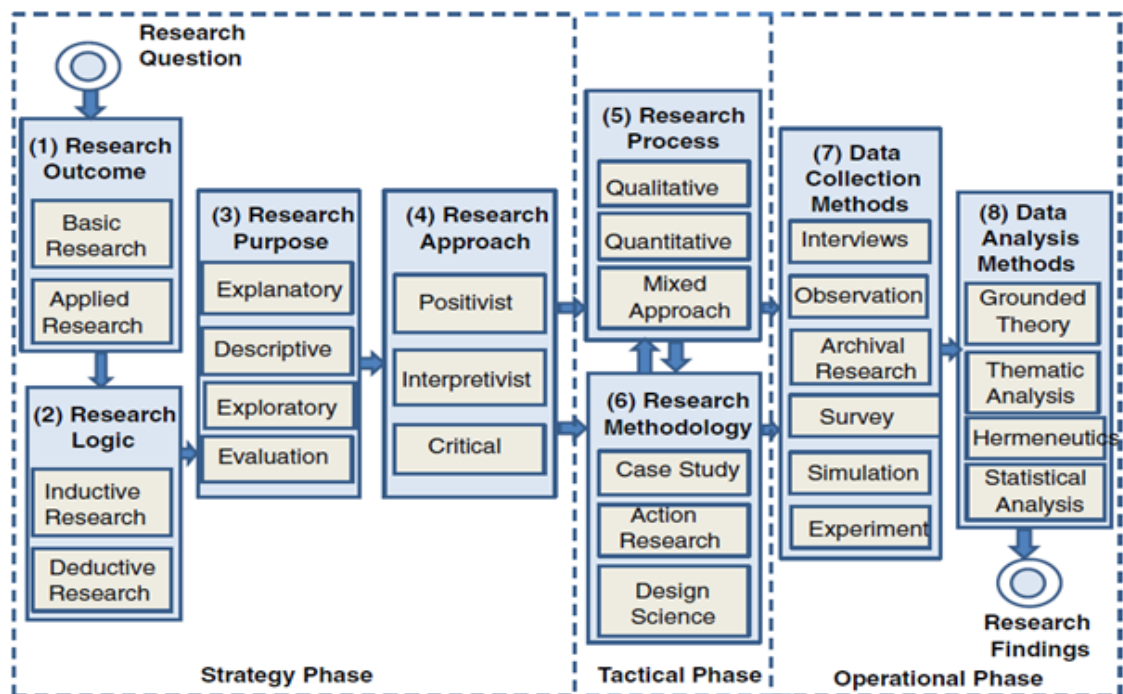


Fig. 1 Research Structure [21]

As a result, this research used Wohlin and Aurum’s guidelines and mapped the research decision-making process of the research design with the research structure shown in Figure 2.

The current study has chosen a case study approach as its research methodology since a case study is a powerful and versatile technique that can be used for both prospective and retrospective exploratory research [16, 17]. The data was collected from eight such companies which are

involved in offshore software maintenance outsourcing from a developing country. Each company nominated one or two experienced people for interviews. The nature of the interview was semi-structured. The interview included both fixed and open-ended questions to collect qualitative data. The open-ended questions allow the interviewee to give any other related information [18,19]. Figure 3 shows the adopted research methodology.

The guide used for the interview was adopted from the study [20]. The interview questions aimed at identifying (a) Practices that are important while assessing the OSMO client's project (b) Active roles during the execution of these practices.

The interviews were completed with audio recording. This phase generated a lot of qualitative data. This qualitative data was further transcribed and analyzed. The inter-rater reliability was ensured by the other authors by

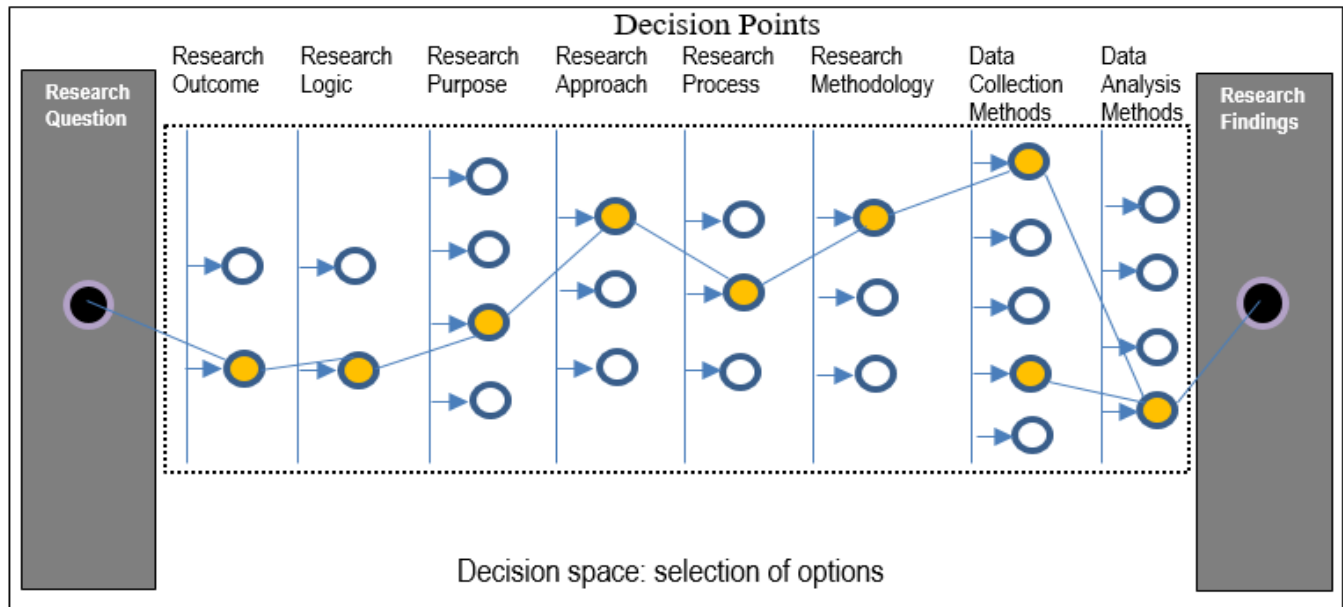


Fig. 2 Research decision-making process

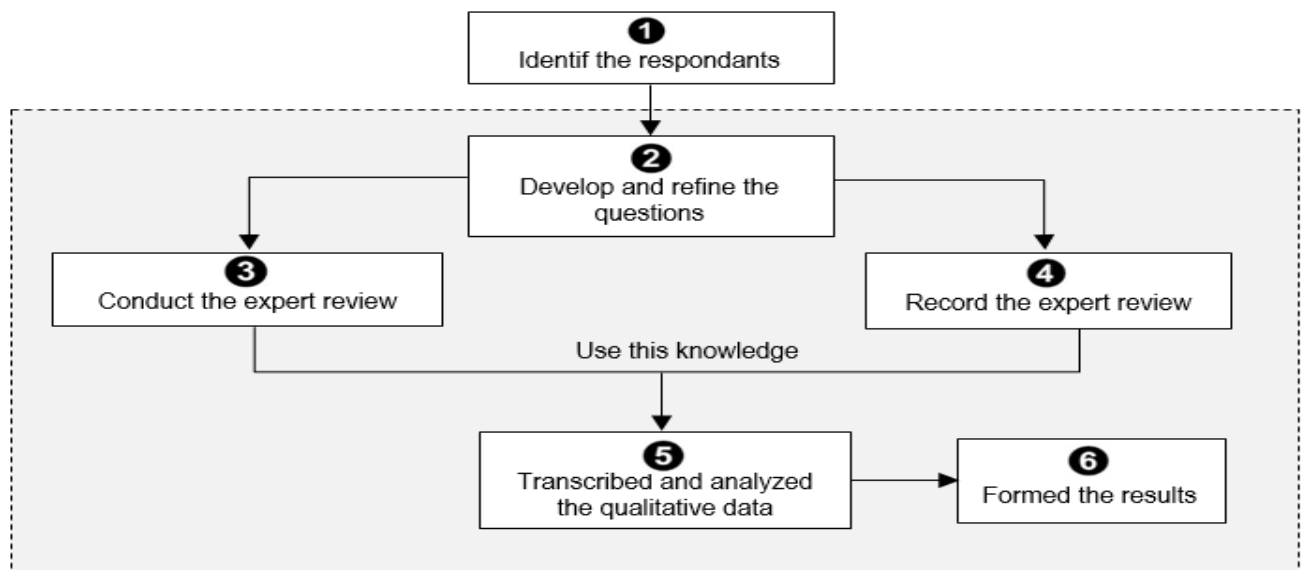


Fig. 3 Adopted research methodology

listing again any part(s) of the randomly selected interview. This check makes sure that the first author has done an accurate analysis of the recorded interviews. Finally, results were produced by assessing the contents of the interviews

4. Results

4.1 Demographics

We selected ten companies for the interview purpose. Due to an audio recorder malfunction, two interview tapes could not be retrieved. The investigation does not include them. So we considered eight recordings. All eight companies are from a developing country with clients in advanced countries such as France, Denmark, and the United Kingdom. All of the OSMO vendors (selected companies) have been in the outsourcing industry for more than ten years. All of the interviewees have worked on software maintenance outsourcing projects in the past. Table 1 provides more information about the selected company's demographics.

Table 1: Demographics of the interviewees and their companies

Interview	Title	Experience of the interviewee in years	Company	Total employees in the company	Experience of a company in Outsourcing
1	Chief Technology Officer	8-9	C1	67	10
2	Chief Operating Officer	10-11	C2	73	10
3	Business unit manager	10-11	C2	81	15
4	Project Manager	9-10	C3	90	11
5	Vice-Director	15-16	C3	102	16
6	Chief Technology Director	12-13	C4	75	17
7	Chief Technology Officer	11-12	C4	69	16
8	Project Manager	10-11	C5	71	17
9	Vice-Director	9-10	C6	101	11
10	Project Manager	10-11	C6	99	14
11	Technical Lead	9-10	C6	87	10
12	Product Manager	12-13	C7	93	12
13	Program Manager	11-12	C7	95	15
14	Chief Technology Officer	12-13	C8	91	13

Table 1 shows that the selected companies have employees number from 70 to 100. This indicates that all of these companies are medium size companies. Table 1 shows that selected interviewees have a minimum of 8 years of experience. It also reveals that the majority of the interviewees held a high position inside the organization. We have not yet examined if demographics had an impact on the results of this study.

4.2. RQ1: What practices are important while assessing the OSMO client's project?

Table 2 illustrates the core and important practices which can be used in the assessment phase of an OSMO client's project. All fourteen interviewees mentioned and

appreciated these practices during the interview for the assessment phase of the OSMO client's project. Some of the practices have more appreciation for vendors during the assessment of OSMO client's project.

Like, all fourteen interviewees showed their concern on the condition or health of the available code. For the reader's ease, we have mentioned the interviewee's responses in a separate table that is Table 3. So, Table 3 presents the same practices with a short name of the practice, frequency, and percentage columns.

Table 3 shows that OSMO vendors are more concerned about code structure, client requirements, communication barriers, and required infrastructure. Table 3 shows that code structure is considered important by all 100% (14 out

of 14) respondents. The interviewees highlighted that they faced a lot of problems while providing software maintenance services of such code that has poor structure. It is very difficult to maintain such software code.

Table 2: Important practices for assessment of OSMO project

Number	Practice
1	Assess the structure of the written code/program
2	Assess the client's requirements in the project concerning written code and available document
3	Assess error/exception handling in the written code
4	Assess dedicated teams (required number) as per requirements of the client's project
5	Assess the suitability of the client's project as per the vendor's portfolio
6	Assess the level of expertise required in offshore knowledge transfer (handover)
7	Assess the possible communication barriers involved between vendor and client teams
8	Assess the cultural differences and time zone differences
9	Assess available infrastructure to fulfill client's requirements
10	Assess clients' contracts in terms of financial risks like (fixed price OR currency inflation) before accepting it

Table 3: Practices with Frequencies and Percentage

Number	Practice	Frequency	Percentage
1	Code structure	14	100 %
2	Client's requirements	14	100 %
3	Error/exception handling in code	12	85%
4	Required team size	10	71%
5	Suitability of client's project	11	78%
6	Expertise in knowledge transfer	10	71%
7	Communication barriers	14	100%
8	Cultural and time zone differences	12	85%
9	Required infrastructure	14	100%
10	Currency inflation	5	35%

Table 4: Critical Roles

Role	Details
Offshore team lead	Works as an interface between offshore and on-site teams
Offshore program manager	Plans and revises the project execution plan as needed, and ensures that the plan is followed
Chief technology officer	Directing the advancement of technologies for external customers, vendors, and other clients to improve and expand business
chief operating officer (COO)	A senior executive tasked with overseeing the day-to-day administrative and operational functions of a business
Onsite coordinator	Review of the delivery, communication, transparency, and feedback management
Delivery manager	Supervise employees, coordinate meetings, and ensure that services and products fulfill customer expectations
entrepreneurial middle manager	Reporting to CIO, appraise the strategic benefits of entrepreneurial ventures arising from lower organizational levels and their future company growth potential
Business unit manager	Provides market and client-related information on the project, Start, plan, execute, manage, and evaluate project operations to ensure that they are completed on time and within budget.
PMO Manager	Responsible for vendor management, Managing the PMO's day-to-day operations, offering direction on PMO rules and processes, supervising project management employees, and coordinating with other department heads on the project and program development.

The interviewees mentioned that a good code for maintenance project will be that which followed some coding standards during software development phase. The coding standards must have focused on maintainability goals.

The second practice which attained the full attention of OSMO vendor 100% (14 out of 14) is the OSMO client's requirements. All the fourteen interviewees considered the assessment of the client's requirements as an important practice before sending a detailed proposal in the reply to the client's project. The OSMO vendor mentioned that they found it useful to spend more effort to clarify the client's requirements at an early stage. The interviewees mentioned that whenever they have missed this assessment of requirements, it put them into a lot of trouble. So, it is better to understand and clarify the OSMO client's requirements.

The next practice which attained the full attention of OSMO vendors 100% (14 out of 14) is communication barriers. The interviewees mentioned that if there is some misunderstanding because of communication barriers then it irritated the team and as a result the service delivery was poor.

The last practice which gained 100% (14 out of 14) attention of the OSMO vendor is the required infrastructure. The interviewees mentioned that if any time they underestimated the required infrastructure to complete the client's requirement it put them into great trouble in terms of financial loss. The other five practices are mentioned in Table 3 with their normal frequencies except the last one, 'Currency inflation', with a special frequency of 35% (5 out of 14). The interviewees have not given much importance to currency inflation. The detailed analysis showed that as the OSMO vendors belong to a developing country and vendors receiving foreign currencies which already higher (in some cases 150 times) than vendor's own country. The OSMO vendor mentioned that small variations in currency do not create any problem while giving software maintenance services to OSMO clients.

The OSMO vendor mentioned that if the assessment of the OSMO client's project is performed correctly, then there are maximum chances of getting profit for the vendor. The client will get its quality-oriented service within the specified time.

4.3. RQ2: What are the related important roles?

Table 4 outlines the critical roles mentioned by interviewees. The OSMO vendors highlighted the point that there should be a separate role for every specific required area. The OSMO vendors mentioned that the right person for the right job policy maximized success in the projects.

Whenever any company tries to assign multiple roles to single a single resource, its consequences have many damages. The name of roles and required details have been mentioned in Table 4.

5. Conclusion

The findings of this paper will initially help OSMO vendors to shortlist a more suitable project and finally to move further for a detailed proposal to be sent to the short-listed OSMO client. This empirical study adopted a case study as research methodology with semi-structured interviews. The study used both fixed and open-ended interview questions. As a result, ten practices and multiple important roles were found. The interview respondents mentioned that they have saved a lot of time and money by focusing on these practices, especially, code structure, client's requirements, communication barriers, and required infrastructure. Other practices are also important and to be considered during the assessment of the OSMO client's project. The findings of the current study are useful for other researchers as well as for software industry experts.

6. Future work

These ten practices found in this research paper give a direction to industry experts and researchers to make such a tool that can be used by the OSMO vendor in the right selection of a project. This tool may be in the form of a website or a mobile application. We are planning an initial survey and a case study in the software industry for the formation of this tool.

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