Knowledge Sharing Management Risks in Outsourcing from Various Continents Perspective: A Systematic Literature Review

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Abstract

Offshore software development outsourcing (OSDO) is a famous business strategy adopted by many organizations in developed countries by outsourcing their software development work to low-wage developing countries. Developing software at offshore locations offers many benefits including access to sound and skilled human resource and high quality software development at low cost. However software outsourcing is not a risk free business for both vendor and client organizations. Vendor organizations need to address a number of factors for successful outcomes of the outsourcing relationships. Likewise knowledge sharing management (KSM) plays an important role in OSDO relationships. This research seeks to explore risks in KSM in the context of OSDO relationships from various continents perspectives. The objective is to identify the factors that can play a negative role in KSM by reviewing the literature in a systematic way. Systematic Literature Review (SLR) is based on a structured protocol, and is therefore, different from ordinary literature review. SLR provides in-depth, more thorough and comparatively unbiased results than ordinary literature review. Our finding reveals a number of critical risks, for various continents North America, Asia and Europe in KSM in the context of offshore software outsourcing relationships. These risks are ‘Geographical barriers’, ‘Project complexity’, ‘Ambiguous nature of knowledge’ and ‘Lack of synchronous and asynchronous communication’.

Keywords- Systematic Literature Review, Knowledge Sharing Management, Software Development Outsourcing, Client-Vendor Relationships, Various continents, Risks

1. Introduction

Outsourcing is recognized as one of the trends of the 21st century and a rapid growing business paradigm in global software development. Although software outsourcing has been accepted and famous business practice for over the last two decades it has shown dramatic increase in recent years and has been the engine of growth and the soul of the software and computer services sector [1]. “Software development outsourcing is a contract-based relationship between client and vendor organisations in which a client(s) contracts out all or part of its software development activities to a vendor(s), who provides agreed services in return for remuneration” [2]. Many organisations in the developed countries are outsourcing their software development projects to vendors at offshore locations to gain low-cost advantage and high quality software production. Our previous research shows that outsourcing gained a dramatic increase after 2001 and is still growing continuously due to economic downturn [3]. Countries such as India, Ireland, China and Russia are the major outsourcing destinations with an increasing offshore outsourcing presence. These countries mostly get software outsourcing work from client companies in the USA, Japan, Australia and the European countries. India’s share of the total offshore outsourcing services is significantly larger than any other country [4]. Client organisations outsource their work offshore when they expect the market to be more cost efficient or when they believe skills, knowledge or experience are available via the market that are not available in-house [5]. However, it also drew tending due to the complexity and challenges related to OSDO Vendor’s [6]. To avoid threats and to reap opportunities in an outsourcing relationships both client and vendor organisations need a mutual understanding and trustworthy relationships [7]. The probability of success in outsourcing projects and achieving long-lasting relationships between clients
and vendors depend on understanding and addressing different factors in software development outsourcing relationships [8]. We have identified in our previous research that knowledge sharing management (KSM) plays an important role in vendor’s readiness for offshore software development outsourcing [2]. Knowledge transfer as the extent to which clients acquire, absorb, and utilize knowledge on outsourced IT from vendors [9][11].

2. Research Questions

To understand knowledge sharing management in OSDO relationships from vendor’s perspective, the following research question were formulated:

RQ1: What are the barriers, faced by vendor organisations, in knowledge sharing management in the context of offshore software outsourcing relationship?

RQ2: Do the identified barriers vary from continent to continent?

3. Background and Motivation

Offshore Software Development Outsourcing (OSDO) is an emerging and a well known business strategy adopted by many organisations in developed countries by outsourcing their software development work to low-wages countries [3]. OSDO offers many benefits to client organisations in the developed countries, including access to skilled human resource, high quality software development and cheaper offshore resource options. Outsourcing involves the downsizing of more expensive onshore resources to be replaced with cheaper offshore resources [12]. However OSDO is not a risk free activity. Research reveals that many companies that have tried outsourcing have failed to realize the expected outcomes [13]. We extended our research on IT outsourcing success by looking at the human behavioral dimensions that are relevant to knowledge sharing management from vendor’s perspective. Knowledge is a key resource for construction industry [14]. Knowledge transfer has been described as a process where information and skill between entities are consistently exchanged [15]. Outsourcing of knowledge intensifier and white-collar work is also increasing and it takes place in organizational core competency areas [16, 17].

4. Existence Literature

A number of renowned researchers have tried to address some of the issues of KSM in software development outsourcing, e.g.[3]; [9]; [5]:

Khan et al., [3] study indicates that knowledge sharing management plays a vital role in offshore software development outsourcing relationships from vendors perspective. According to park et al., [9], that proper knowledge sharing management between client and vendor organizations are the destination of successful project outcomes and able to sustain good relationship in IT offshore software development outsourcing relationships.

Argote el al., [18] that knowledge is complex and key area of success as what the individual knows, facts, information skill and understanding that one have gained especially through learning and experience.

Cummings at al., [20] articulated that knowledge sharing management is meaningful and complex process through which knowledge is shared and executed properly between a vendor and a client organisations for retrieving successful knowledge within an organisation and as well as outside world. Danvenport el al., [21], “knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”. Cheng-Yong Huang et al. [27] articulated that knowledge management (KM) is concerned with information processing to obtain useful information. The key element of KM is the decision-making process, which includes: data, information, knowledge and a process for synthesizing these disparate elements either by an individual or an organization. Both [28] Knowledge Management and Enterprise Recourse Planning play a crucial role in organizations, also there have been an increasing trend to implement both systems concurrently, but are either implemented separately or in tandem. There are bulks of literature on the importance of KM in all kinds of organizations.
5. **Systematic Literature Review protocol**

We have used a Systematic Literature Review (SLR) process [23, 24] as the main approach for data collection because a SLR is a defined and methodical way of identifying, assessing and analyzing published primary studies in order to investigate a specific research question [3, 22, 26]. There are three main phases in SLR. These are planning the review, conducting the review and reporting the review. In this paper we describe the first step of a systematic review (i.e. planning the review). The output from this step is a systematic literature review protocol that defines the purpose and procedures for the review. This paper presents an extended of the previously published protocol/paper in MySec 2011 [10]. The detail methodology steps have been mentioned in MySec 2011 [10]. Moreover, the initial version of this paper has been submitted to INMIC.

6. **Constructing search terms:** The following detail will help in designing a search strings relevant to our research questions.

- **POPULATION:** Offshore software outsourcing vendors and clients
- **INTERVENTION:** Factors, characteristics
- **OUTCOME OF RELEVANCE:** Best practices for knowledge sharing management in the context of offshore software outsourcing relationships, innovation in knowledge sharing management
- **EXPERIMENTAL DESIGN:** Exploratory study, case study, experts’ opinions

7. **Search Strategy and search:** The following search strategy is used for the construction of search terms.

   (a) Use the research questions for the derivation of major terms, by identifying population, intervention and outcome;
   (b) For these major terms, find the alternative spelling and synonyms;
   (c) Verify the key words in any relevant paper;
   (d) Use the Boolean operators for conjunction if the database allows, in such away, to use ‘OR’ operator for the concatenation of alternative spelling and synonyms whereas ‘AND’ for the concatenation of major terms.
   (e) Integrate the search string into a summarized form, if required.

8. **Resources to be searched:** IEEEExplore, ACM Portal, Science Direct.

9. **Publication Selection:** The publication section has been divided into inclusion and exclusion criteria

10. **Inclusion Criteria:** The inclusion criteria have been mentioned in [10].

11. **Exclusion Criteria:** The exclusion criteria have been mentioned in [10].

12. **Data Extraction:** The review will be undertaken in a team work by the researchers (authors). The inter-rater reliability test will be performed once the data is extracted.

13. **Data storage:** The summarized data for each publication will be kept as a Microsoft Word/SPSS document and will be stored electronically.
14. **Data Synthesis**: The data will be synthesized by creating one summary table having the columns (S.No, knowledge sharing management critical barriers, Frequency, Percentages) showing the list of all the knowledge sharing management challenges/barriers, along with their frequencies and percentages.

15. **Validation of the protocol**: The protocol has been reviewed by software engineering research group members, university of malakand and a reviewer at keele university UK.

16. **Review timetable**:

<table>
<thead>
<tr>
<th>Task</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of the protocol</td>
<td>02-Feb-2011</td>
</tr>
<tr>
<td>Submission of the protocol for review</td>
<td>15-Mar-2011</td>
</tr>
<tr>
<td>Completion of the protocol</td>
<td>15-May-2011</td>
</tr>
<tr>
<td>Completion of Search</td>
<td>05-june-2011</td>
</tr>
<tr>
<td>Completion of Primary Study Selection</td>
<td>23-June-2011</td>
</tr>
<tr>
<td>Completion of Data Extraction</td>
<td>25-Aug-2011</td>
</tr>
<tr>
<td>Completion of Data Synthesis</td>
<td>26-Sep-2011</td>
</tr>
<tr>
<td>Completion of Review Report</td>
<td>10-Jan-2012</td>
</tr>
</tbody>
</table>

17. **Divergence**: In case of any divergence from the protocol, which may occur during the study, we will record any changes in a new Appendix to this document.

18. **Results and Analysis**

19. **Preliminary Results**

The SLR protocol has been implemented and we have got preliminary results and critical risk analysis. After applying the search strategy described in MySEC 2011 [10] on the specified digital libraries we found 714 papers in total from the three digital libraries. The information of the primary and final selection for each digital library is given in the Table 2. Finally 42 papers were selected after applying the inclusion/ exclusion criteria.

<table>
<thead>
<tr>
<th>Resources</th>
<th>Total results found</th>
<th>Initial selection</th>
<th>Final selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACM</td>
<td>463</td>
<td>61</td>
<td>15</td>
</tr>
<tr>
<td>ScienceDirect</td>
<td>200</td>
<td>45</td>
<td>17</td>
</tr>
<tr>
<td>IEEEExplore</td>
<td>51</td>
<td>26</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>714</td>
<td>132</td>
<td>42</td>
</tr>
</tbody>
</table>
20. Risks in knowledge sharing management based on various continents

In order to answer RQ2, Table 3 shows a list of factors identified/reported in different continents. We have categorized the SLR papers into different continents where the original study was conducted. Our aim is to find whether these factors differ from continent to continent. We suggest that understanding the similarities and differences in these factors can contribute to the body of knowledge sharing management in offshore software development outsourcing relationships. This is because of the factors that have a negative impact on client-vendor relation in any continent should be taken seriously by the offshore outsourcing organizations in that continent.

Table 3 depicts that - 45% of the studies have not mentioned the location where the actual studies were conducted. However, we are unable to find the actual reasons and this may be of one the limitation of our study. The most cited continent in our finding is Europe -26%. Another most cited category is a mixture of ‘Asia with North America’ 17% as shown in Table 2. This may be a reason that most of the vendors in GSD industry are from Asian countries and client’s organization from North America.

Our research indicates that the continent ‘Europe’ has the highest rank. The success factors identified for European organizations are ‘Geographical barriers (LCDT)’-73% got 1st rank in the identified list. Moreover ‘Lack of synchronous and asynchronous communication’ and ‘Lack of appropriate trainings’- 36% were ranked 3rd in the identified list. We argue that mostly the clients in OSDO belonging to Europe. However European clients have different culture, time zone, and language than Asia, but difficulties to manage knowledge sharing with outsourcing vendors. This may be a reason that geographical barriers are more important in Europe.

We have also found ‘Environmental challenges’ in Asia and ranked 1st in our analysis - 75%. The 2nd ranked critical barriers in our findings are ‘Lack of appropriate trainings’ and ‘Geographical barriers’ - 50%. We argue that most of the vendors organization belonging to Asia. This may be a reason that
Asian continents vendors facing more environmental challenges (Terrorism, Flood, Earthquake etc) than other listed continents.

We have also found ‘Geographical barriers (LCDT) in ‘North America and Asia’ as a significant factor for vendors - 71%. Other frequently cited factors in North America and Asia are: ‘Project complexity’, ‘Lack of skilled staff’ and ‘Lack of appropriate trainings’ - 43%. Moreover ‘Lack of synchronous and asynchronous communication’, ‘Environmental challenges’, Face-to-Face meetings’ and ‘Knowledge sharing security’ are also important for vendor’s - 29%. Many researchers worked on these factors at North America and Asia. On the other hand, these factors are common in both Europe and North America continents. We argue that North America and European clients have been considering same culture and language. However, this may be a reason that more frequently cited factor is Geographical barriers for vendor’s organizations in North America and Asia.

As the data was of ordinal nature the linear by linear association chi-square test was used in order to find significant differences between factors identified in different continents. The linear by linear association test is preferred when testing the significant difference between ordinal variables because it is more powerful than Pearson chi-square test (Martin, 2000).

By comparing the factors identified in different continents we did not found any significant difference among continents. So these factors are same and common in all continents in OSDO relationships.

21. Acknowledgement

We are thankful to Software Engineering Research Group at University of Malakand (SERG_UOM), the reviewer at Keele University UK and anonymous reviewers of the MySec2011 conference, for the review and their valuable comments at various stages of the SLR in general and for validation process of the protocol in particular.

22. References:


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