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Critical success factors for offshore software outsourcing contract management from vendors' perspective: an exploratory study using a systematic literature review

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Abstract: Offshore software development outsourcing is a recent and widely used business strategy for the development of high quality products at low cost. The objective of the research presented in this study is to find critical success factors (CSFs) for contract management to assist vendor organisations for successful outcomes of the offshore software outsourcing contract. A systematic literature review (SLR) process was performed for the identification of factors that can assist vendor organisations in successful management of the various activities at different stages of the outsourcing contract. that is, pre-contract, during contract and post-contract. Our findings reveal that 'contract flexibility, 'trustworthy relationship management', 'competitive bidding', 'consultation and negotiation' and 'quality management' are considered as the CSFs for outsourcing vendor organisations in planning, management and execution of outsourcing contract.

1 Introduction

'Software development outsourcing, or software outsourcing, is modern software engineering paradigm in the context of global software development, aiming at developing high-quality software in low-wage countries at reduced cost' [1, 2].

Software development outsourcing is a contract-based relationship between customers and supplier organisations, in which customers contract out full or a portion of their software development activities to a single or multiple suppliers, who is (are) responsible to provide the agreed services for remuneration [3–5]. According to Human Resource Outsourcing Association [6]: 'Outsourcing is defined as the contracting of one or more of a company's business processes to an outside service provider to help increase shareholder value, by primarily reducing operating cost and focusing on core competencies'. According to Minoli [7], IT outsourcing is defined as 'turning over of information systems and/or communication functions, as a whole or in part, to a third-party contractor as a solution to the challenge, problem and expense of creating and running a corporate information enterprise'. Software outsourcing is growing sharply and has provided a new angle to modern business process [8]. Software outsourcing is considered an established business practice in the United States of America (USA) and United Kingdom (UK) [9].

Bush *et al.* [10] define the various reasons for software outsourcing. Customers take advantages from outsourcing as suppliers in developing countries usually charge one-thirds less than onshore suppliers and it is cheaper than the in-house operations [11]. The offshore outsourcing suppliers can enhance their skills and quality of services with different outsourcing projects and can fulfill their customers' needs accordingly. It is supposed that offshore suppliers can improve their customers supply chain [12]. India, Ireland, China and Russia are the top outsourcing vendor countries, whereas the USA, UK and Japan are the major outsourcing clients. India is the leading software outsourcing industry and China is the strongest competitor to India [13, 14]. 'India and China are the two Asian countries that take the most of R&D outsourcing contracts nowadays. The top players in India's software development industry are HCL and Wipro' [15].

Offshore software outsourcing offers many benefits including cost saving, skilled professionals and time-to-market [16, 17]. Companies outsource their projects to save cost [18]. Despite the benefits of outsourcing, a number of challenges are associated with it and if not addressed properly these may yield unsuccessful projects. One of the key challenges is contract management [19, 20]. A number of researchers have tried to shed light on the importance of software outsourcing contract, for example, IT outsourcing contract requires all the feasible state of affairs efforts from both the clients and the vendors. A well-defined outsourcing contract requires a considerable co-ordination cost by using Transition Cost Theory [21]. For a durable outsourcing contract both the parties may

clearly define the scenario for its successful completion. Factors such as specificity, uncertainty, measurement and frequency of the transaction can assist in successful completion of the outsourcing contract [22].

A valuable software outsourcing contract between a vendor and a client is necessary for achieving the desired goals and for handling most of the critical issues that can cause the breakdown of the offshore software development outsourcing (OSDO) contract [23]. The outsourcing contract can be divided into pre-contract and post-contract for proper operation of the contract [23]. Different success factors such as top management support can improve the relationship between client and vendor organisations [24]. Vieru and Rivard [25] stated that research on IT outsourcing has focused on the relationship between the client and the supplier: that is the formal outsourcing contract and post-contractual relationship management (psychological contract).

Khan *et al.* [26] argued the importance of contract management in OSDO, and proper management of the OSDO contract has a positive effect on the outsourced projects. A well-managed outsourcing contract motivates both parties to successfully complete the outsourcing contract without failure [23]. For proper management and implementation, the outsourcing contract may be divided into pre-contract and post-contract phases [23]. Proper consideration of the top management can obtain the client's trust, which may improve the contract relationship [24]. Babin and Schuster [27] conducted a case study that focuses on how a company can build innovation into an outsourcing relationship when it has not been explicitly stated in the outsourcing agreement.

Despite the significance of the outsourcing contract, little empirical research has been conducted on OSDO practices in general and finding of factors for successful execution of the outsourcing contract for vendor organisations in particular. To do this, we tried to address the following research questions:

RQ1: What are the factors to be considered by vendor organisations at various stages (pre-contract, during-contract and post-contract) in order to design an effective offshore software development outsourcing contract?
RQ2: Do the identified factors of the outsourcing contract vary from continent to continent?

The rest of the paper is structured as follows. Section 2 illustrates the background. Section 3 illustrates the research method. Section 4 describes the outcome of the systematic literature review and analysis with some discussion. Section 5 illustrates the limitations of this research work. In Section 6, the conclusion as well as future work are described.

2 Background

The worth of offshore software development outsourcing has been seen globally in the last two decades, and its volume is increasing day by day because of the opportunities such as cost saving, high quality, availability of skilled human resource and appropriate infrastructure [28].

The influence of OSDO has increased over the last two decades in different organisations. It grew by 7.1% in 2011 [29]. It was predicted by Gartner (Gartner, 2011) that IT expenditure growth rate would be 5% per year through 2015. IT outsourcing revenue grew by nearly 8% to $246.6 billion in 2011 from $228.7 billion a year ago worldwide, according to Gartner [30]. Recently, different organisations have moved towards outsourcing to manage their IT operations [31]. Major advantages of outsourcing are the provision of high quality goods and services and enhancing the organisation's flexibility [32].

However, despite the importance and growth of outsourcing, it is not a risk free business. The literature reveals that the success rate of the IT outsourcing projects is 56% [33]. Dun and Bradstreet [34] identified through a global survey that 50% of outsourcing projects failed because of poor planning. Khan *et al.* [16] conducted a similar study and found out the various risks, benefits and their scope in the Indian offshore software outsourcing industry. In another study, the risk profile of client organisations in the USA to Indian software outsourcing vendors were identified by Iacovou and Nakatsu [35]. Various risks involved in outsourcing projects were identified by Sakthivel [36]. Some of the key risks were communication and collaboration problems because of differences in time zone and cultural values [15, 37].

Software outsourcing risks can be avoided or mitigated through efficient outsourcing contract management and effective relationship management [38]. The structure of the outsourcing contract is important to encircle privileges, cure, responsibilities and commitment of both the clients and the vendors, and also to enhance the relationship of both parties [38]. Gang *et al.* [39] have shed light on the outsourcing contract as 'a contractor alone is not a guarantee of success when a client engages with a supplier in an IT outsourcing arrangement'.

Qi and Chau [40] have categorised the contract and outsourcing relationship into two sections: 'formal contract is the base for relationship development; and a good relationship is needed since contract is not flexible in the implementation stage'. In the first category, Fitzgerald and Willcocks [41] identified that a good contract provides a base to produce a consequent relationship. On the basis of the relational governance theory, Goo *et al.* [42] identified that the specific attributes of a service level agreement (SLA), that is trust and commitment, lead to the success of IT outsourcing.

Chou and Chou [43] emphasised that contract is the demand for services and charges that may be fulfilled within a timeframe between the contracting parties. In a large outsourcing contract, a detailed set of responsibilities should be listed, that would be performed by the contracting parties, whereas a proper outsourcing contract arrangement reduce the opportunistic behaviours and uncertainties between the client and the vendor organisations [43].

Chittenden [44] emphasised that contract management is the practice where the service provider delivers the agreed services within a defined timeframe. In addition, the objectives of the management of IT service contracts are: specific outsourcing goal and selection of suitable IT partner. Chittenden [44] has discussed various outsourcing IT services contract risks such as service failure, reputation damage, additional cost and technical failure, which can affect the relationship between the two parties. There are various issues of the IT outsourcing relationship which are about the establishment and quality of the relationship [40]. Klepper [45] suggests the maturity of the IT outsourcing relationship as a partnership and proposes a conceptual model which is based on contract and social exchange theory. Kern [46] has proposed an IT outsourcing

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relationship model, which defines the procedure of contract and appearance of exchange attitudes external to the contract.

3 Research methodology

We have used an SLR [47] as a research method for identification of the success factors. We have used a similar approach as used by Jorgensen and Shepperd [48], Kitchenham *et al.* [49] and Khan [1]. SLR is a new way to recognise, calculate and produce the available evidence regarding a particular technology to identify the recent direction and grade of research and to investigate particular research question(s)/hypotheses [50]. A systematic review is properly arranged and systematically evaluated, which makes it different from the ordinary literature survey. It follows a systematic way of finding relevant published literature on the basis of research question(s), whereas the collected data are analysed on the basis of the pre-defined inclusion/exclusion criteria. The findings of the SLR are more reliable and less biased than the ordinary literature review. The SLR consists of three main phases. These are planning phase, conducting phase and reporting phase.

The basic purpose for conducting a systematic review is to enhance the quality of data collection in the subject of interest, as compared with the ordinary literature review, it can reduce the duplication of efforts and error and can regulate the analysis process [51]. SLR follows meticulous guidelines and predefined protocol, however, it requires significant efforts than the ordinary literature review and yields comparatively detailed and comprehensive research insights in an area of interest [47]. The main phases of the SLR and its steps are given in Table 1.

Table 1 shows that the deliverable of the planning phase is the SLR protocol. An SLR protocol has these essentials: research questions that will be answered, criteria for finding the primary papers, inclusion and exclusion criteria for articles selection, procedure for evaluating the quality of the studies, procedure for data extraction and methods for synthesising the extracted data [47]. An SLR protocol for the study was first developed, validated and published [52] which is available online at the link (http://www.iosrjournals.org/iosr-jce/papers/vol2-issue4/G0242637.pdf).

As shown in Table 1, the conducting phase is the second phase of the SLR. In this paper, we report the findings of 'conducting phase' of the SLR. Our main objective is to find all those success factors through the SLR that can play an important role in the development and efficient execution of the outsourcing contract between the OSDO client and vendor organisations. As discussed in Section 4.1, we identified a list of 15 success factors (as mentioned in Table 3), among which five success factors were marked as CSFs. This is because, we have considered the factors with frequency $\geq 50\%$, as critical. The same approach has also been used by other researchers [1, 26, 53].

Table 1 Main phases and steps of SLR

1. Planning phase
I. Find the need for a review
II. Develop and validate SLR protocol
2. Conducting phase
I. Finding primary studies based on search strings
II. Final selection of studies based on predefined inclusion/exclusion criteria
III. Evaluate the quality of the studies
IV. Extraction of data from the final selection of articles based on the predefined data extraction form
V. Synthesise the extracted data from the articles
3. Reporting the results
I. Drafting/publishing the report

3.1 Search method and procedure

The planning phase for the SLR search conduction is

- Define the search terms by identifying population, intervention and outcomes.
- Identify the substitute spellings and synonyms.
- Verify/validate the key words of the search terms in the relevant identified literature.
- Use Boolean operators (AND, OR) to guide the search engines (if applicable) for precise search.

A trial search was performed to find the relevant research articles to be searched, and the predefined search terms were used for each resource. The literature searched through the trial search string was used for validation of the major search terms. The trial search was exercised on four digital libraries (IEEE, ACM, ScienceDirect and Springer link) by using the following search string:

[('Outsourcing contracts' OR 'software outsourcing' OR 'IT outsourcing' OR 'IS/IT outsourcing') AND ('contract management' OR 'contract negotiation' OR 'pre-contract' OR 'post-contract' OR 'during-contract' OR contracting) AND (factors OR characteristics OR features OR barriers OR risks OR problems OR 'contractual issues') AND (vendors OR suppliers OR developers)].

The final/major search strings were constituted based on the criteria mentioned in Section 3.1 and the details of the search strategy are available in our SLR protocol which has been validated and published [52].

The following resources were searched:

- IEEE Xplore (http://www.ieeexplore.ieee.org/Xplore/guesthome.jsp)
- ACM Portal (http://www.dl.acm.org/)
- ScienceDirect (http://www.sciencedirect.com)
- CiteSeer Digital Library (http://www.citeseer.ist.psu.edu)
- Springer Link (http://www.springerlink.com)
- Google Scholar (http://www.scholar.google.com)

The scoping reading recognised the preliminary list of resources, and preliminary identical search terms. However,

Table 2 Data sources and search strategy

Digital libraries	Total publications identified (1992-mid 2012)	Primary selection	Final selection
IEEE	479	129	21
ACM	1291	125	29
Springer Link	865	53	17
ScienceDirect	2137	63	17
CiteSeerX	2503	28	09
Google Scholar	3342	129	40
		total	133

Table 3 List of success factors

S. no.	Success factors	Frequency ($n = 133$)	Percentage, %
1	contract flexibility	121	91
2	trustworthy relationship management	105	79
3	competitive bidding	105	79
4	consultation and negotiation	83	62
5	quality management	81	61
6	knowledge sharing	65	49
7	top management support	60	45
8	software process improvement certification	42	32
9	risk sharing attitude	38	29
10	conflict reconciliation mechanism	36	27
11	time management	32	24
12	culture awareness	25	19
13	intellectual property right	14	11
14	data security and privacy	10	8
15	detailed specifications of product and project	05	4

changes were made in the scoping study. Different digital libraries have different syntax formats for the search terms. In the search process, we have encircled various databases, relevant journals and conference proceedings to obtain a more accurate and wide range of articles. The summary of the digital libraries and publication details are given in Table 2.

3.2 Publication selection

3.2.1 Inclusion criteria: We have used the following criteria for finding the relevant literature (journal papers, technical reports, experts' opinions etc.) for the purpose of extracting the desired data as per the data extraction form. Papers written in English language were only considered. The criteria are given as follows:

- Studies that describe vendor's capability for the software outsourcing contract.
- Studies that define the CSFs in the contract management process of the software outsourcing vendor.
- Studies that suggest the relationship between the software outsourcer and the vendor.
- Studies that suggest practices for a successful software outsourcing contract.
- Studies that suggest motivation for software outsourcing contract management.
- Studies that suggest effectiveness in the outsourcing contract management.
- Studies that suggest vendor role for effectiveness of the contract.

3.2.2 Exclusion criteria: This section defines the exclusion criteria in order to define which pieces of literature (papers, technical reports or 'grey literature') found through the search terms were excluded/ignored. The criteria are listed as follows:

- Studies that have not fulfilled the research questions.
- Studies which are not about the software outsourcing contract.
- Studies that do not describe the success factors of the contract management for the software outsourcing vendor.
- Studies which are not relevant to offshore outsourcing.
- Studies which are not relevant to contract management in the context of software outsourcing.
- Excluded all duplicate papers.

3.2.3 Selecting primary sources: We have divided the selection process of the literature review into two sections: Initially, we selected the papers by reading the title and the abstract only; after that the final selection was made based on reading the entire papers. Inter-rater-reliability test was performed to mitigate the researchers' bias. The SLR final selection list is mentioned in the Appendix, whereas the duplicate papers have been removed from the finally selected list of papers.

3.3 Publication quality assessment

Quality assessment is performed after the completion of the final selection of the publications. It is performed during the data extraction phase. We have defined the following questions for quality assessment.

- Is it clear how the vendor screening was performed?
- Is it clear how the success factors of the contract management for the software outsourcing vendor were identified in the outsourcing business?

The defined factors were marked as 'YES' 'NO' or 'NA'.

3.4 Data extraction

The review was performed in a team work. However, the primary reviewer was responsible for the data extraction phase. To limit the researcher's bias, an inter-rater reliability test was performed by the secondary reviewer. The secondary reviewer selected ten papers randomly from the sample of the final selection for his independent data extraction. The results were compared with the results produced by the primary reviewer and no disagreements were found. We have extracted the following data from each of the articles in our final sample of selected publications: Date of review, Title, Authors, Reference, Database and Success Factors: factors that have a positive effect on the software outsourcing contract from the vendors' perspective, study strategy (interview, case study, report, survey etc.), target population, sample population, publication quality description, organisation type (software house, university, research institute etc.), company size (small, medium and large), country/location of the analysis, SPI certification of the organisation and year of the study.

3.5 Data synthesis

The data synthesis was performed by both the reviewers (the authors) jointly. Different categories/groupings of success factors were made based on the extracted data from 133 papers and a total of 16 success factors were identified. The synthesis or the grouping of the factors was validated through an external reviewer who suggested merging of the two categories 'reward and penalty policy' and 'conflict resolution' to form a single category 'conflict reconciliation mechanism'. Finally, a list of 15 success factors was identified as shown in Table 3.

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4 Results

In this section, we discuss the results and analyse the identified success factors for each of the Research Questions as mentioned in Section 1. The details are given in the following subsections.

4.1 CSFs for the outsourcing contract identified through the SLR

In order to answer RQ1, Table 3 presents a list of success factors identified through the SLR. Our main objective is to find all those success factors through the SLR that can play an important role in the development and the efficient execution of the outsourcing contract between the OSDO client and the vendor organisations. As discussed in Section 3, we identified a list of 15 success factors (as mentioned in Table 3), among which five success factors were marked as critical success factors (CSFs). This is because we have considered the factors with frequency $\geq 50\%$, as critical and the same approach has also been used by other researchers [1, 26, 53]. Table 3 shows that 'contract flexibility' is the most common factor (91%) among the identified list of factors. This confirms that a flexible contract is usually preferred as compared with a tight and dry contract. Owing to flexibility in the contract, both the vendor and the client organisations can carry on the contract on need basis to complete their future requirements. Contract flexibility covers the SLA, contract structure/development, contract management and contract duration. The outcome of an outsourcing agreement may be diminished if there is no contract flexibility and scope for development [54].

Our findings also show that 'trustworthy relationship management' (79%) is the second most important factor for outsourcing contract management. It is clearly mentioned that without trust and proper relationship management, the vendor cannot meet the deadlines for completion of the contracted tasks. Trust establishment is the basic component for successful designing and development of any work team [55]. Moreover, trust directs towards free communication, decision making, risk mitigation and satisfaction [55]. The literature shows that the outsourcing vendors can obtain the trust of their clients if the contract is successfully implemented. 'Trustworthy relationship management' covers the working relationship, mutual trust and psychological trust between the client and the vendor organisations [24, 56].

'Competitive bidding' (79%) is the third most important factor in our findings. It covers cost-saving, transaction cost, financial stability and project profit. Vendors can attract their clients with the offer of highest cost-saving. This emphasises that the highest cost-saving offer of software development has a positive effect on the outsourcing customer in the agreement process of outsourcing with the suppliers. Cost-saving is one of the key motivations for client organisations in developed countries to outsource their software development projects to vendors in developing countries to obtain the benefit from the lower labour costs [26]. OSDO vendor organisations should offer cheaper and quality services to the client [57].

'Consultation and negotiation' (62%) is also an important factor in our findings. A good 'consultation and negotiation' between the OSDO vendor and the client organisations is important for proper management of the outsourcing contract. A proper communication between both the outsourcing parties can clear the position, fulfill the requirements concisely and establish a good contract relationship. The 'consultation and negotiation' can cover some of the following practices:

- Face-to-face meetings and open-ended interviews for obtaining the required information [58].
- Proper documentations and implementations of the contract schedule to obtain the deliverables on time [59].
- Budget for sound and safe flow of the contract [60].
- Regular communication to mitigate any raised risk [60].
- Proper negotiation to avoid any misunderstanding [61].
- Communication skills which are essential to obtain desired information about contract management [62]
- Deep understanding of client specific requirements which is used for successful software development [63].

'Quality management' (61%) was also found as the critical success factor for vendors for successful outsourcing contract management. A quality software development can improve the relationship and enhance the trust between the client and the vendor organisations. As per the free markets concept of globalisation and progression in IT and communication policies, organisations expect to take benefit from reduced cost and also from the advance quality of services offered by outsourcing vendors [64]. Bhatnagar and Madon [65] have argued that Indian software firms provide quality software production. That is why Indian software firms are considered as the main outsourcing destinations in the global software export market [66]. The quality management covers quality of products, service, staff and infrastructure:

- Quality of products where the vendors' main focus is to produce quality software to gain the trust of the client organisation and to strengthen the relationship for the purpose of a successful OSDO contract [61].
- Vendor organisations should pay attention to the quality of infrastructure which include experienced staff, latest technology, licensed software and best communication facilities [67].

'Knowledge sharing' (49%) is also an important factor for outsourcing contract management. This is because proper knowledge sharing can make the job easy for outsourcing vendors and clients. Vendor organisations can properly manage the outsourcing contract on the basis of information sharing, knowledge exchange, management of information and information partnership. Alam *et al.* [68, 69] have identified various challenges in knowledge sharing management in the context of the OSDO relationships. These include geographical barriers, project complexity, ambiguous nature of knowledge and lack of synchronous and asynchronous communication.

'Top management support' was cited in 45% of the articles as an important factor for successful outsourcing contract management. The support of the top management encourages the contractual parties to establish a sound, reliable and well documented agreement. The top management support encourages better decision making, evaluation of the staff, definition of customer support procedures, better management control of services, access to senior experts, definition of the performance of supplier, stress to fulfill the commitment between the outsourcing parties and classification of the responsibility of the outsourcing vendors and clients. Lee and Kim [70]

Table 4 Continent wise paper detail

Continents	Frequency	Percent
Asia	34	25.6
Europe	45	33.8
N. America	38	28.6
mixed	16	12.0

identified that top management support is an important factor for successful outsourcing partnership. For better contract management, the officials involved in signing the bond must ensure the support of their top management.

4.2 Continent wise comparison of the success factors

To answer RQ2, Table 5 presents a list of the success factors identified in various continents. The ratio of the articles signifying data from different continents is shown in Fig. 1. We have considered the articles of three continents only for analysis that is, Asia, North America and Europe, whereas the data for other continents have not been considered for the analysis because of low sample size. Our aim is to find any differences in these three continents in respect of the identified success factors.

For analysis of the identified factors we have used linear by linear association χ^2 test to identify any significant difference between the factors found in these three continents. For finding the major variations between the ordinal level data variables, a χ^2 linear by linear association is used which is considered more powerful than Pearson's χ^2 test [71].

The factors found in the three continents show minor variations in the identified success factors. There are 13 factors in Asia, 15 factors in N. America and 15 factors in Europe. There is one major variation in the identified factors list for the three continents, that is, 'culture awareness'. The 'culture awareness' has the highest frequency (32%) in Asia, the lowest frequency (5%) in N. America and 18% in Europe. It is also observed that 12% of the factors were found from mixed (Asia–N. America, Europe–Asia, Australia, global survey etc.). Table 4 has the detailed percentile of continent wise distribution of the articles.

It is clear that 'contract flexibility', 'trustworthy relationship management', 'competitive bidding', 'consultation and negotiation' and 'quality management' are considered important factors in the three continents because of the higher frequencies. Similarly, the success factors 'knowledge sharing' and 'top management support' have comparatively higher frequencies in Asia (56 and 41%), Europe (51 and 56%) and N. America (37 and 39%). Another factor 'culture awareness' has frequencies such as 32, 5 and 18% in Asia, N. America and Europe, respectively. Culture awareness has the highest frequency in Asia. This indicates that this factor is given more attention in Asia as compared with vendors in other continents. This may be a reason that Asian countries have more differences in culture than Western countries. Culture may include attitude, behaviour, work style, communication style, language and response to achieve the desired goals. Asian vendors should be properly aware of their client's culture while dealing with the clients in other continents. Some of the factors are important, having higher frequencies, in one continent but not important, having lower frequencies, in other continents as shown in Table 5. We invite an independent study to identify the cause as to why these factors are not important factors, as per the findings of our SLR for vendor organisations in Asia, North America and Europe.

5 Summary and discussion

Through the SLR we have identified various success factors to be addressed by vendor organisations in OSDO contract management. The identified factors present some of the key areas, needing vendors' attention for developing OSDO contract management. Similarly, the identified factors will aid vendor organisations to find out the real needs of the target clients and also to develop and strengthen a contract-based relationship.

To decide the importance of a factor, we have used the following criterion:

Table 5 List of identified factors through SLR in three continents

Success factors	Sample size find through SLR ($N = 133$)						χ^2test (linear-by-linear association) $\alpha = 0.05$		
	Asia ($N = 34$)		N. America ($N = 38$)		Europe ($N = 45$)		X^2	df	P
	Freq	%	Freq	%	Freq	%			
contract flexibility	30	88	33	87	43	96	0.071	1	0.790
trustworthy relationship management	27	79	29	76	37	82	0.167	1	0.683
competitive bidding	27	79	30	79	37	82	0.321	1	0.571
consultation and negotiation	20	59	21	55	31	69	0.055	1	0.815
quality management	21	62	21	55	29	64	0.086	1	0.769
knowledge sharing	19	56	14	37	23	51	0.813	1	0.367
top management support	14	41	15	39	25	56	0.061	1	0.805
software process improvement certification	7	21	11	29	18	40	1.352	1	0.245
risk sharing attitude	8	24	7	18	16	36	0.401	1	0.527
time management	7	21	8	21	12	27	0.283	1	0.595
conflict reconciliation mechanism	7	21	9	24	17	38	0.004	1	0.947
culture awareness	**11**	**32**	**2**	**5**	**8**	**18**	**4.185**	**1**	**0.041**
intellectual property right	3	9	5	13	5	11	0.028	1	0.868
data security and privacy	0	0	4	11	6	13	0.889	1	0.346
detailed specifications of product and project	0	0	1	3	4	9	0.099	1	0.754

The bold values have statistical significant differences, as $P < 0.05$.

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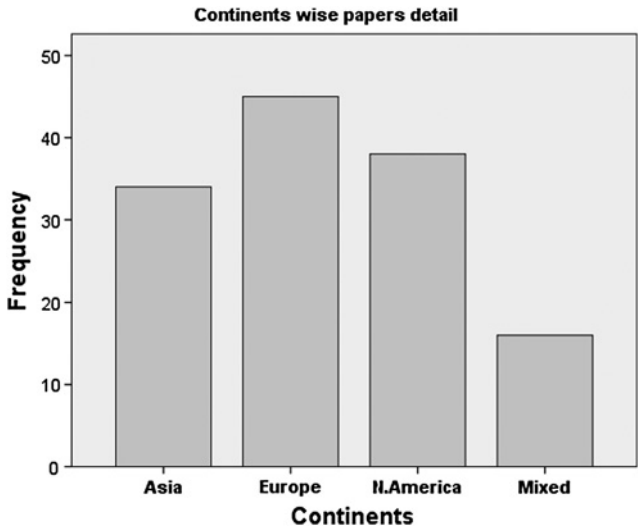

Fig. 1 *Continent wise papers details*

- Factor with frequency $\geq 50\%$ will be treated as CSF in this study.

We have used the same criterion in our previous research [1, 26, 53]. However, software outsourcing practitioners and the stakeholders in the OSDO contract may define their own criteria to decide the significance of the listed success factors for managing the OSDO contract.

To address RQ1, by using the above criterion we have identified five CSFs for vendor organisations in OSDO contract management. The factors are: 'contract flexibility', 'trustworthy relationship management', 'competitive bidding', 'consultation and negotiation' and 'quality management'.

To address RQ2, we have identified a significant difference for only one factor ('culture awareness') in the identified list of 15 success factors across various continents as shown in Table 5.

6 Limitations

How valid are our findings of success factors in the OSDO contract management? One possible threat to internal validity is, for any specific article is that their reported factors may not have indeed described the underlying reason. We are unable to independently overcome this threat. The authors of the study have not reported the original reasons why these factors were considered in OSDO contract management. Possibly, in some studies there might be a tendency for particular kinds of factors to be reported. Many of the contributing studies were self-reported experience reports, case studies and empirical studies which might be subject to publication bias.

Our sample contains a total of 133 papers. Most of these papers have been published by academicians who may not have the experience of current trends in OSDO industry. To handle this threat, we plan to conduct empirical study in OSDO industry to validate these findings and to find any other factors, apart from the identified 15 success factors, which may have been missed in this study.

With the increasing number of papers in software outsourcing, our SLR process may have missed some relevant papers. However, like other researchers of SLR, this is not a systematic omission [72].

7 Conclusion and future directions

Through the SLR, we have identified a list of 15 success factors as shown in Table 3. Five of these success factors were ranked as critical success factors (CSFs) for OSDO vendor organisations for managing OSDO contract. These CSFs are: 'contract flexibility', 'trustworthy relationship management', 'competitive bidding', 'consultation and negotiation' and 'quality management'. The identified CSFs may lead OSDO vendors towards a successful outsourcing contract, resulting in long-lasting relationships with their client organisations.

We have also compared these identified factors in different continents. Our objective is to provide OSDO vendors with a sound OSDO knowledge to help them in designing and implementing successful software outsourcing contract. We suggest outsourcing vendors to focus in general on the frequently cited factors identified in Table 3 (RQ1). Vendors engaged in outsourcing contract in different continents should focus on the frequently cited factors identified in Table 5 (RQ2).

In our analysis on the basis of continents, we identified differences in the list of success factors for Europe, N. America and Asia as shown in Table 5. This may be a reason that people with different cultural backgrounds have different priorities. However, we encourage independent studies on the topic. This will increase confidence in our findings and also track changes in attitudes to OSDO contract management activities with the passage of time. From the study, we have identified the following goals that we plan to follow in future:

- Validation of the identified list of 15 success factors, using empirical studies with practitioners working in OSDO industry.
- Identification of the success factors apart from the identified ones, if any, from OSDO industry practitioners perspective through empirical study.
- To analyse the factors of OSDO contract management from clients' perspective.
- To conduct empirical studies for determining practices for the implementation of the identified critical success factors.

Our ultimate aim is to develop Outsourcing Contract Management Model (OCMM). This will assist OSDO vendors to manage OSDO contract efficiently for successful outcomes of outsourced projects and building long-lasting relationships between client and vendor organisations. The structure and various stages involved in the development of our proposed model OCMM has been published [73]. This paper contributes to the identification of the CSFs through SLR, which is the first input to our proposed OCMM model. We have used a similar research method for the development of Software Outsourcing Vendors' Readiness Model [74, 75].

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10 Appendix

10.1 List of 133 selected papers in the SLR

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