

Practitioner's view of barriers to software outsourcing partnership formation: An empirical exploration

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Abstract

Software Outsourcing Partnership (SOP) is considered as a kind of risk and reward sharing client-vendor relationship. Generally, a fruitful outsourcing association might be converted to an outsourcing partnership. The objective of this research is to identify and analyse barriers that are hurdles to vendors in renewing or promoting their ongoing client-vendor relationship to outsourcing partnership. A questionnaire survey based on the findings of Systematic Literature Review (SLR) was performed with 50 experts. The study identifies five critical barriers such as “insufficient quality of technical capability,” “poor infrastructure,” “poor quality of service,” “communication gap and poor coordination,” and “relational risk.” The results indicate that barriers' insufficient quality of technical capability, poor infrastructure, and poor quality of service were common in four types of experts while insufficient quality of technical capability is common in three levels of experts. Furthermore, barriers were classified based on their criticality from client-vendor perspective. The results of Spearman correlation test ($r_s = 0.714$ and $p = 0.000$) confirmed that the participant strongly agrees with the outcomes of the SLR. The results suggest that for successful renewal or promotion of their existing outsourcing association, vendor organizations should address all the identified barriers in general and the most common barriers in particular.

KEYWORDS

client-vendor relationship, contract renovation, empirical study, Software Outsourcing Partnership, Systematic Literature Review

1 | INTRODUCTION

Software development outsourcing (SDO) is a corporate business strategy adopted from the last two decades and is growing towards its maturity. It may be simply defined as a bond, between client and vendor, to engineer better and cheaper software across national borders.¹ The bond normally involves clients from advanced countries and vendors from developing countries to engineer better and cheaper software at the vendor site to be delivered to the client.¹

There are numerous tasks in software development such as software architecture and design, programming, and software testing, which can be outsourced. SDO offers many benefits to client organizations.² Small- to medium-sized organizations with limited technical expertise and resources are best served by outside service providers. Large organizations may also use an outsourcing approach to work with new information

and communication technologies (ICTs) without making any further investment.¹ Large organizations may exercise SDO because of unavailability of in-house software development capability and to reduce processing costs.³ Since the scope of SDO is expanding, today's organizations not only outsource to reduce cost but also to improve the company's overall working performance.⁴

Meanwhile, different kinds of companies having different types of requirements; consequently, considerably many varieties of associations are obligatory.⁵ SDO organizations nowadays use a diversity of methods to outsource software development tasks such as they subcontract, develop in-house, broaden in-house competence via acquisitions, form joint ventures, and shape partnerships with overseas organizations.⁵ Because of big economic changes, globalization, antagonism from low remuneration unindustrialized countries, and improvements in ICTs, from 1980 onwards numerous business networks have been formed that include multivendor contracts, strategic networks, different kinds of alliances, coalition, association, joint ventures, and partnerships.⁶ Organizational relationships, however, in these networks go beyond the traditional order and supply sequence trades.⁷ In this type of relationship, everything such as profits, losses, investments, risks, and work burden are distributed amongst the partners' organizations.⁸

1.1 | What software outsourcing partnership actually is?

The SDO is a rapidly growing software engineering area in the perspective of global software development, aiming to develop better and cheaper software at the vendor site to be delivered to the client.⁹ Outsourcing normally involves clients from advanced countries and vendors from developing countries.¹ Software Outsourcing Partnership (SOP) is different from conventional SDO relationship. This is because in conventional outsourcing relationship a client contracts software development work to an outside vendor who delivers services in returns of payments, whereas SOP is the enhanced form of conventional outsourcing relationship.¹⁰ A key difference between SOP and conventional SDO is that SOP is a long-term relationship in which many traditional limits between the client and vendor firms are broken.¹¹ These relations vary on the level of depths, partnership outsourcing is a deeper relationship.⁸ It could be thought as a long-term collaborative relationship with renegotiations and mutual adjustment of tasks with long-term commitments that exceed the contractual obligations, as stated in the initial stage of the collaboration.⁸ In partnership relationship, the foundations are trust and achieving general business goals while in contractual relationship, the stress is given on the obligation of a formal contract and on achieving narrowly specific business goals. In summary, partnerships are about relationships not contracts.¹²

Collaborative relationships are typically divided into associations, alliances, coalitions, and joint ventures.¹³ A relationship with high trust and low contractual control in enforcing the contract is called an alliance.¹³ Outsourcing partnership is a category of an alliance.¹⁴ It is that category, which is a combination of both outsourcing and partnering. Therefore, a thorough understanding of both terms is required to understand the combined term outsourcing partnership. Kinnula et al⁸ expressed outsourcing as "The process of transferring the responsibility for a specific business function from an employee group to a non-employee group." A partnership is a long-lasting bidirectional association where confidential data regarding future plans and schemes are shared willingly with each other.¹⁵

Outsourcing partnership is an indispensable measure of today's business success because it overpassing the conventional old-style organizational boundaries.⁸ In this type of relationship, organizations develop mutually beneficial policies and plans and openly share risk, opportunities, rewards, and workload.¹⁶ It lets client and vendor organizations to focus on their resources in the right track.¹⁵ In the article at hand, SOP is defined in this way "a long-lasting bidirectional risk and reward sharing mutually beneficial relationship between clients and their overseas vendors based on mutual trust resulting in a process of shifting the responsibility of developing a software for a particular business function from an employee group to a non-employee group including transfer of assets such as personnel".^{8,15}

1.2 | Research objective

The aim of this study is to fill the gap between the researchers and practitioners in the context of outsourcing contract renovation or SOP formation. The objective of this empirical paper is to find and analyse the barriers that are meticulous obstacles for vendors in the renovation or upgradation of their ongoing contractual outsourcing relationship into a partnership. To achieve our objectives, we have executed an empirical survey based on the initial findings of SLR. We had analysed the barriers found through SLR and empirical survey based on three variables such as expert role, their level of expertise (experience), and affiliation. Further, we classify barriers from client-vendor perspective. Finally, the outcomes of the two methodologies were compared to find significant differences between the barriers identified through the literature and real-world practice.

The following research questions were addressed:

- RQ1: What are the critical barriers, as identified in the literature, which restricts outsourcing client to promote the existing contract-based client-vendor relationship into outsourcing partnership?
- RQ2: What are the critical barriers, as identified in the real-world practice, which restricts outsourcing client to promote the existing contract-based client-vendor relationship into outsourcing partnership?
- RQ3: Do the identified barriers vary across different types of experts?

RQ4: Do the identified barriers vary across different levels of experts?

RQ5: Are there significant differences in the distribution of the identified barriers from client-vendor perspective?

RQ6: How can the identified barriers be classified into a conceptual model based on the client-vendor perspective using a robust reference framework?

RQ7: Are there significant differences between the barriers identified through the literature and real-world practice?

We have presented the SLR protocol with initial results in a conference paper.¹⁷ In this paper, we revise the SLR results and present the novel results based on the empirical survey. For this purpose, we have extended our team by adding one more primary (third author) and secondary reviewer (fifth author). They contributed to this research study in general and finalizing the grouping and revising the study sample in particular, as a result, the final sample of publications is extended from 65 to 106. In a conference paper, we have only published the SLR results based on (RQ1).¹⁷ This is an extended version of the conference paper in which we have revised and validated the SLR results by adding various analyses. Further, some novel results based on the empirical survey from RQ2 to RQ7 are also presented in this paper. Specifically, in this paper, we have extended our work by adding the following details:

- In response to RQ1—based on the SLR, complete results with comprehensive explanation are presented in Section 4.2.
- In response to RQ2 to RQ4—based on the SLR results, a questionnaire survey was executed. We present the results and analysis based on the empirical survey from Sections 4.4 to 4.6.
- In response to RQ5 and RQ6—based on the results of a questionnaire survey, a model for conceptual mapping of barriers was developed. We present the distribution and classification of barriers based on the conceptual mapping using a robust framework in Section 4.7.
- In response to RQ7, we have compared the results found through SLR and empirical survey in Section 4.8.

The overarching objective of our research is to develop a barrier classification framework for SDO organizations. This framework will assist SDO organizations in measuring and improving their outsourcing readiness prior to starting outsourcing partnership formation or contract renewal activities.

1.3 | Paper outline

The paper is organized as follow: Section 2 presents background and motivation. Section 3 describes the research methodologies. Section 4 presents the results. Section 5 summarizes and discusses the results. Section 6 discusses the limitations of the study. Sections 7 discuss contribution while Section 8 concludes the paper by presenting future work.

2 | BACKGROUND AND MOTIVATION

In the passage of past two decades, in order to stay in the market competition, outsourcing partnerships have arisen as one of the important mechanism for growing organizations.^{15,18} Partnerships can benefit organization to carry on competing by increasing competences,¹⁸ developing innovative products,¹⁵ connecting to new markets,¹⁹ and gaining access to new resource pool.²⁰ At present, numerous new companies get involved in the global outsourcing of products and services.¹⁵ For instance, to increase benefits and overcome problems, many organizations have established partnerships. These include Universal Postal Service and Motorola,²¹ Kodak and digital equipment corporation, and IBM,²²

SDO project, which completely failed because of the problems with meeting expectations of the client on schedule, budget, and quality. Bamford et al⁷ and Piltan et al²⁹ report the failure ratio of outsourcing partnerships from 30% to 70%. Several risks for partnership formation have been reported in the academic literature, with most concentration on the vendor opportunism, service disagreement, extreme dependency on a vendor, financial loss, and erosion of capabilities like core skills, personnel, and innovative capabilities.³⁶

Several studies have identified risk in outsourcing partnership such as Tuten and Urban,³⁷ Susarla,³⁸ Verner et al,³⁶ Chou and Pramudawardhani,³⁹ Aundhe and Mathew,⁴⁰ Kinnula et al,⁸ Ren et al,⁴¹ and Abdullah and Verner.³⁵ A summary of the few of these is presented as follows:

Tuten and Urban³⁷ find the risk factors like poor communication, lack of upfront planning, lack of relationship management, diverse goals, unsatisfactory performance signs indication, and lack of trust. Various others reported causes by other scholar are changing of a partner in the middle of the relationship and other corporate-related causes of an individual or mutually.^{8,39}

Abdullah and Verner³⁵ have suggested a theoretical risk framework for the outsourcing of information technology (IT) system development based on the literature from the client's perspective. They mentioned risk factors, like customization and integration, inadequate requirements, technical complexity, ill-defined project, contract in favour of vendor and vendor overstated claims, conflict between client and vendor, loss of client's competencies, vendor lack of expertise and experience with the outsourcing tasks, lack of cooperation and commitment, communication problems, client's imperfect commitment, scope, objectives and requirement creeping, poor audit and control, quality mishaps, poor estimation of required resources and schedule, poor governance and control, project management defections, lack of change management policy, poor leadership, lack of project planning, and management issues.

Verner et al³⁶ have recognized risk like poor infrastructure, vendor country instability, communication gap between client and vendor, cultural and language barriers, vendors behave opportunistically, vendor incompatibility with a client, lack of protection for intellectual property, and vendors' inflexibility.

Chou and Pramudawardhani³⁹ consider unstable government, poor decision-making process, nationalization or expropriation of assets, strong political opposition, lack of support from government, improper contract, immature juristic system, public opposition to project, market demand change, unfavourable geotechnical conditions, delay in project approvals, poor quality workmanship, coordination risk, inadequate distribution of authority and responsibilities, staff crises, differences in working methods, competition, and lack of commitment as a risk factor in outsourcing.

Aundhe and Mathew⁴⁰ identifies the risks factors like bad government policy, loss due to exchange rate, changes in client's corporate structure, client's lack of experience in offshore outsourcing, schedule and budget management, knowledge transfer, incompatible client culture, requirements capture, client expectations management, and asset specificity.

2.1 | Study motivation

A number of study on outsourcing risk is conducted, but most of them focus on the IS or IT perspective,³⁵⁻⁴⁴ only a few of them have study risk from the SDO perspective.³⁶ Moreover, numerous research works on outsourcing partnership are restricted to onshore model rather than offshore outsourcing.³⁶ In most of the study, researcher keeps study unit to organization level only, merely, a narrow quantity of literature has explored outsourcing partnership taking experts is a study unit.⁴⁵ Furthermore, an integer part of them is conducted from the client's perspective only.⁴⁶ Additionally, a plentiful amount of studies are conducted on the issue related to partner selection.³⁶ Partnership provides assistance to an organization to enhance their performance in plenteous means.⁴⁷

Kinnula et al⁸ argue that previous research does not report how a partnership is formed. According to Ren et al,⁴¹ preceding literature on outsourcing partnerships has used social theories of commitment and trust to explain the relationship phenomenon. However, only few studies have examined the determinants of partnerships. Further, preceding researchers fail to recognize the importance of pre-implementation stage, which may determine partnership quality.

Additionally, in the existing studies, no SLR process has been used in order to identify barriers from the literature before those barriers can be used in the surveys. In addition, no SLR is conducted to find out barriers from a vendor's perspective for the formation of SOP or renovation of enduring contract. Our results have complimented the study conducted up to date in the partnership and outsourcing domain. Further, no sufficiently broad SDO partnership framework for the establishment and ongoing management and execution of an outsourcing partnership can be found in the relevant literature. This empirical study takes the issue from a vendor's angle and targets to fill a particular gap by identifying and analysing the barriers from a vendor perspective.

3 | RESEARCH METHODOLOGY

We have chosen SLR and survey-based research methods for the identification of barriers to SOP formation. To address the first research question, we have executed SLR while the rest are addressed based on the data from an empirical survey. Firstly, the existing literature has been reviewed through SLR, and as a result, we had identified critical barriers to SOP formation. Secondly, to validate our SLR findings, based on the



KEYWORDS_ABSTRACT_TITLE

((Partnership OR "Joint-venture" OR "Outsourcing partnership" OR collaboration OR GSD OR "Global Software Development" OR alliance) AND ("Software outsourcing" OR "information systems outsourcing" OR "information technology outsourcing" OR "IS-outsourcing" OR "IT-outsourcing" OR "distributed software development") AND (barriers OR risks OR challenges OR "Negative impacts" OR hurdles OR obstacles OR upgrade OR promotes OR convert OR leads OR transfer OR establish OR Enter OR builds) AND (vendors OR clients OR "Service-provider" OR "service receiver" OR developer OR customer OR outsourcer OR buyer OR consumer))

2. Inclusion/exclusion criteria and quality checklist

Publication selections are done based on inclusion, exclusion, and quality assessment criteria.

The inclusion criteria are listed below:

- The article/paper is written in English only.
- The article/paper is available in full text.
- Research papers that are relevant to our research questions.
- Research work that describes barriers, risk, challenges in IS/IT/software outsourcing.
- Research work that describes barriers, risk, challenges in IS/IT/software outsourcing partnership.

The exclusion criteria are listed below:

- The articles/papers of size less than five pages.
- The articles/papers that are duplicated across different libraries.
- The articles/papers that do not obey any of the inclusion/exclusion criteria.

P blica i>n ali a e men : The main drive of quality evaluation is to check and assess the quality of finally selected papers:

- QC1: Is the objective of the research is clearly defined?
- QC2: Is the research methodology appropriate to address the defined objectives of the research?
- QC3: Is the outcome of the research is connected to the objective of the research?
- QC4: Is it clear how the barriers were identified?
- QC5: Do the articles have stated the barrier to outsourcing in the development of SOP?
- QC6: Do the articles explain how results were validated or reports limitations?

Every checklist will be coded as, Yes or No or Partial. We will calculate a score for each paper; any paper, which did not get 50% score, will be dropped.

3. Data extraction process

The review was undertaken by a team composed of five investigators, ie, three students (two PhD and one postdoctoral) and two professors (one from China and one from Pakistan). Two students and one professor work as a primary reviewer (first, third, and fourth authors) while one student and one professor become checker/secondary reviewers (second and fifth authors). The three primary reviewers independently extract the data and then compared the outcomes with each other. In case of disagreement, the secondary reviewers were approached. To reduce subjectivity and to unprejudiced the SLR process, inter-rater reliability tests were performed at all phases of the SLR. The inter-rater agreement analysis is presented in Section 4.1.

3.2 | Data collection via a questionnaire survey

To validate the outcomes of our prior SLR study, we have conducted an empirical investigation through an online survey using the online survey tool, i.e. Google Drive, in the software outsourcing industry. The reason why we choose a survey to validate our finding is that our study is both qualitative and quantitative, and questionnaire survey is the most common method for both qualitative and quantitative research.⁵³ Survey inquiry

is deliberated a suitable method of gathering tacit qualitative and quantitative data.⁵⁴ A survey design provides a quantitative or numeric description of trends or opinions of a population by studying a sample of that population. From sample results, the researcher generalizes or makes claims about the population.

Questionnaire assessment is also considered quantitative because it is a suitable method for gathering and assessing quantitative data. It gives opportunities for exploration and conversation of new themes that arise in the course of data collection. The purpose of qualitative research is to obtain a general idea of a multifaceted area by exploring it.⁵⁴ In the below sub-sections, we describe the process of designing, data gathering, and analysis.

3.2.1 | Designing an online questionnaire survey

Based on the findings of SLR, we design a questionnaire. The design of a questionnaire survey normally comprises of two phases, sampling and contents. Identifying and inviting suitable experts to participate in the questionnaire-based survey is known as sampling.⁵³ The contents phase consists of a set of questions for the sample (contributors) to be answered by them. Both are described briefly in the below subsections.

Sampling

We have two choices for sampling: (A) methodical approach and (B) non-methodical approach.⁵³ Using the first approach, samples are obtained directly from the available population with the help of certain statistics. While approach (B) is used when the entire population is difficult to list.⁵³ We have used approach (B) because in our survey, it was impossible to list all software house involved in outsourcing. Other scholars like Khan et al,¹ Cox et al,⁵⁵ and Niazi et al⁵⁶ used a similar approach.

Input to the questionnaire

SLR outcomes were taken as an input to the questionnaire.

Parts

It is divided into three dissimilar sections, which are demography, a list of 27 barriers to be evaluated by 7-point Likert scale, and submission hints.

Question type

We have incorporated a mixture of open-ended and close-ended questions.

Evaluation scale

Seven-point Likert scale, ie, 7-ED (Strongly Disagree), 6-MD (Moderately Disagree), 5-SD (Slightly Disagree), 4-NS (Neutral), 3-SA (Slightly Agree), 2-MA (Moderately Agree), and 1-EA (Strongly Agree). Besides this, an open-ended question like mention a factor, which is not listed is also provided.

Testing

The questionnaire design was tested through six members of our laboratory.

3.2.2 | Data gathering

The purpose of the survey is twofold: (a) to validate the SLR outcomes and (b) to gain the opinion of the experienced professionals working at the industry in the background of SOP using their expertise.

Questionnaire surveys give substantial autonomy to the investigator in prearrangement of inquiries. The question of the questionnaire is of two types. Open-ended also called subjective and close-ended called objective. The subjective question allows a variety of answer from the responded side while for objective, only the choice can be chosen from the available choice. This method of data gathering assists in reducing the threat of bias connecting to the investigator's prejudices. It encourages the contributor to give her/his own view regarding a specific question.^{53,54}

Questionnaire procedures

Prior to a questionnaire, each participant was sent an invitation letter. This letter outlined the main themes to be covered during the questionnaire survey, the expected duration, and measures which could be taken to ensure privacy and confidentiality.

Executing survey

We invite 101 professionals/experts through email for participation in the questionnaire survey. We also invited the writers of the industrial articles through emails, to participate in our survey. These industry-oriented articles were selected during the SLR phase.

3.2.3 | Data analysis strategy

The final collection of 50 completed questionnaires were then analysed further based on “respondent role,” their “level of experience,” and “affiliation.” Further, barriers were classified into client-vendor.

4 | RESULTS

In this section, we present the outcome of SLR and empirical survey.

4.1 | Systematic literature review findings

By using major search string on the selected publisher sites as listed in Table 1, we found 3303 papers. The outcome of the primary selection and final selection is presented in Table 1. Only 110 out of 3303 articles pass the inclusion/exclusion measures. Finally, the duplication was removed by excluding four articles from the final sample of articles, which appears in more than one sources. We get a final sum of 106 articles as shown in Table 1. To decrease the primary reviewers' bias, the inter-rater reliability was checked by taking 20 randomly selected papers from the primarily selected papers. The two secondary reviewers apply inclusion/exclusion and quality criteria to make the final selection. Likewise, the two secondary reviewers also selected 20 articles retrieved through different sources, and an initial selection was made based on title, keyword, and abstract.

We used the nonparametric Kendall's coefficient of concordance (W) to evaluate the inter-rater agreement between primary and secondary reviewers. Kendall's W ranges from Zero (complete disagreement) to one (complete agreement).⁵⁷ The agreement in the initial selection phase was $W = 0.85$ with $P = 0.006$ while agreement in the final selection phase was $W = 0.79$ with $P = 0.008$, which show a strong agreement between the two groups of reviewers.

After getting the final sample, we extract the data from these papers, at the last stage of the data extraction phase; we extract a list of quotes from the final sample of 106 articles. Each primary investigator in discussion with the corresponding secondary investigators goes through these quotes to classify these barriers into different groups. A qualitative coding approach based on Grounded theory⁵⁸ was adopted to reach an initial category of barriers, and as a result, a list of 34 groups was formed. These groups were further analysed by external collaborator, and some groups were combined. Finally, we came up with a list of 27 barriers as illustrated in Table 2. More details of the SLR process can be found in our previously published conference paper.¹⁷

4.2 | Barriers identified via SLR (RQ1)

Twenty-seven barriers were identified as a result of our SLR study as listed in Table 2. In Table 2, a high percentage of a barrier shows its popularity and acknowledgment in the literature. These barriers might restrict outsourcing allies from the renovation of their existing contractual outsourcing association into an outsourcing partnership.

“Vendor opportunism and low mutual trust” is a top-reported barrier in our study with 82% citation. Opportunism refers to the “lack of candour or honesty in trading, to include self-interest pursuing with deceit [59].” More generally, the distorted or incomplete disclosure of information, especially to intended efforts to distort, misleads, obfuscate, confuse, or disguise.⁵⁹ Vendor opportunism in outsourcing association may take

TABLE 1 Study sources and results found

Source	IEEE	SD	ACM	GS	SPL	CS
Total results retrieved	592	759	401	1343	177	137
Exclusion based on title and abstract	432	521	258	1090	53	117
Primary selection	80	114	66	119	56	09
Exclusion based On full text	73	86	60	109	54	06
Final selection	07	38	17	25	14	05
Total exclusion	585	721	384	1318	163	132
Overall selection:	106					
Overall exclusion:	3303					

TABLE 2 Barriers identified through SLR

Code	Name of barrier	F	%
B1	Vendor opportunism and low mutual trust	87	82
B2	Communication gap and poor client-vendor coordination	81	76
B3	Relational risk and poor relationship management	78	74
B4	Insufficient quality of technical capability	77	73
B5	Poor infrastructure and reluctance to change it	77	73
B6	Poor quality of service and lack of co-monitoring	75	71
B7	Weak organizational proximity and work dispersion	73	69
B8	Hidden cost and high anticipated switching cost	68	64
B9	Lack of psychological contract and poor contract management	64	60
B10	Poor knowledge sharing and cooperation between partners	62	59
B11	Insufficient knowledge of the client activities and lack of domain training	62	59
B12	Volatile requirements and poor requirement change control	52	49
B13	Strategic inflexibility and otiose dispute resolution mechanism	51	48
B14	Poor estimation and lack of capacity to deliver product under strict time schedules	46	43
B15	Geopolitical risk and country instability	45	43
B16	Misaligned goal, idiosyncratic objective and asymmetric power	45	43
B17	Sign of uncertainty and lack of uncertainty absorption mechanism	45	43
B18	Organization inertia and lack of human capital management expertise	44	42
B19	Poor project management and lack of co-management infrastructure	44	42
B20	Information leakage and lack of IPR protection	37	35
B21	Integration and diffusion risk and lack of inter-firm adaptation	36	34
B22	Vendor financial instability and no relation specific investment	36	34
B23	Loss of capability and lack of control over project sent to offshore	30	28
B24	Problems stemming from organizational re-structuring	27	26
B25	Poor leadership and lack of top executive support	27	26
B26	Weak social capital and lack of social networking	27	26
B27	Client concentration and other client specific risks	13	12

several forms, for example breaching of obligations and promises, debasement of service quality in product development or service provision, distorting or withholding information regarding the project.⁵⁹ Two kinds of vendor opportunism are exposed in offshore software development (OSD), misappropriation of information assets (MIA) and shirking.⁶⁰ Trust can be define as “one party's inclination to be exposed to another party based on the faith that the later party is concerned, reliable, open, and competent”.⁶¹ An agent having trust when he or she exposes himself/herself to the risk of opportunism by others and when he or she has no reason to believe that others will exploit this occasion.⁶²

“Communication gap and poor client-vendor coordination” (76%) is the second most reported barrier in our study. Communication is the interchange of unambiguous and complete information while coordination is “the act of integrating each task with each organizational unit so that the unit contributes to the overall objective”.⁶¹ Two people have a coordination problem whenever they have common interests, or goals, and each person's actions depend on the actions of the other.⁶¹ Language and culture barriers are well-known “communication barrier”.⁶³ Other barriers may include poor collaboration and communication infrastructure, the communication gap between client and vendors, lack of training on communication tools, and lack of synchronous communication and face-to-face meetings.⁶⁴ Various dispersion dimensions such as temporal, geographical, and work are connected with different sets of coordination challenges.⁶⁵ Both formal and informal communication between outsourcing associates is considered vital for the productive relationship.⁶⁶

In our SLR, 74% of the authors have stated “relational risk and poor relationship management” as a critical barrier for partnership formation. Relational risks obstruct client-vendor collaboration and thus inhibiting them from performing their responsibilities efficiently and effectively for the attainment of mutual goals.⁶⁷ This may include lack of amenability with the contract by the vendor, deterioration of service performance, quality mishaps, service deficiencies, cost overruns, and not meeting the agreed deadlines.⁶⁸⁻⁷⁰ Poor relationship management may be due to lack of personnel with the capability to manage a partnership.⁶⁹ Relational risk can be tackled by better management of the ongoing relationship.⁷¹ Relationship management has a strong role in the success of software outsourcing projects.⁷²

Likewise, it was found that 73% of the included articles in our SLR study have declared “insufficient quality of technical capability” and “poor technological infrastructure” as potential hurdles for SOP. “Technical barrier” includes task complexity, poor professional skills, lack of familiarity with the outsourced technology, and lack of research and innovative ability while “technological barrier” may be due to organization outdated technology, lack of legacy and new system integration, and reluctance to use new technology.^{35,36,73} Failure to develop competence in the technology leads vendor to a deterioration of operational capabilities and services, which results in unsatisfaction of the performance expectation of its client.⁷⁴ This unsatisfaction leads to relationship failure.⁷⁴

The sixth high-quoted barrier (71% occurrence) in our SLR is “poor quality of service and lack of co-monitoring.” Monitoring and control are “the process of abiding by policies, standards, goals, or quality levels.”⁶¹ Without effective monitoring in outsourcing, vendors may behave opportunistically and make choices, which will increase their benefit at the cost of the client.⁶⁰ Those clients who have anticipated undesirable consequence will invest constantly in monitoring and controlling the vendor's software development process and the quality of software.⁷³ In some circumstances, organizations' proficiency is unacceptably decreased up to half of the development efforts consumed by outflows such as communication for coordination and information exchange.⁶⁴ Nowadays' organizations not only do outsourcing to utilize the cost advantages but to benefit from the improved quality that offshore vendors provide.⁵⁰

Likewise “weak organizational proximity and work dispersion” is mentioned by 69% of the SLR sample to be an important barrier. Global Sourcing Partnership (GSP) possesses some specific complications like culture and language differences, time zone, and work dispersion.¹⁶ Work dispersion can be conceptually stated as differences in the development process, experience and expertise, working environment, development tools, standards and practices, and CMMi level of organization involved.⁵⁰ Language dissimilarities between organizations can result in a wrong interpretation of the conveyed information.⁵¹ While cultural dissimilarities create misunderstandings due to cultural bias.⁷⁵ Cultural favouritism may be more problematic when outsourcing stakeholders consider their own values and norms as complete and disregarded the other's cultural norms and value.^{36,50}

“Hidden cost and high anticipated switching cost” is claimed by 64% of the authors in our SLR as an opposing barrier for SOP formation. Switching cost is an important factor for managerial decisions to continue or terminate an outsourcing association.⁷⁶ Hidden costs are those costs that are not estimated or foreseen in the various phases of strategic decision making.⁷⁷ Hidden costs in offshore outsourcing include the cost of vendor selection, the cost of layoffs, the cost of a changeover, the cost of ramping up, the cultural cost, and the cost of managing an offshore contract.⁷⁷ Hidden cost may include the costs of knowledge transfer, training, contract amendments, disputes resolution, service debasement, cost escalation, currency exchange fluctuation, and costs associated with monitoring and coordination.⁷⁸

Similarly, 52% of the included research papers reported “lack of psychological contract and poor contract management” as an important barrier. By poor contract management, we mean rigid, fixed prices, inadequate, or incomplete contracting. A contract will be incomplete, if it neglects post outsourcing phase and failed to specify appropriate measure like non-performance penalty.³⁵ Wei et al⁷⁹ suggest a psychological contract for outsourcing. The psychological contract refers to a set of expectation concerning mutual obligations between two trading partners that are not put into black and white.⁷⁹ The use of inflexible and incomplete contract created further risk for both organizations.⁶⁵ Poor contract management, insufficient contracting abilities, liability outside the contract, and poor management of the relationship on specified contractual terms may lead relationship towards failure.²

“Poor knowledge sharing management (KSM) and cooperation between partners” got 59% recognition in our SLR study. “Poor KSM and cooperation between partners” means lack of information flow because of non-willingness to share knowledge. The problems may be due to different levels of knowledge or problems faced in knowledge distribution.⁸⁰ The barrier is more severe when GSP involves downsizing because of resistance by the employees of the foreign client, especially to knowledge transfer.^{16,40} GSP can be an effective approach to gain access to global knowledge and reduce costs; however, researcher reports contradictory results regarding its performance effectiveness.⁸¹ SDO is a knowledge-exhaustive activity with high-task dependency, which may require the integration of tacit knowledge concerning vendor and client. Intensive communications and interactions will consume most of the software engineers' effort and times. Therefore, it is necessary to properly managed knowledge sharing.⁸⁰

“Insufficient knowledge of the client activities and lack of domain training” is the last barrier in our SLR, which qualifies the criteria of criticality with 59% citation. ‘By this barrier, we mean ‘lack of detailed understanding of the project sends to offshore, lack of contingency plan, lack of organisational learning, and lack of training in collaboration and communication tools and functional domain. Functional knowledge is the understanding, experience, and expertise in the functional domain.³⁶ In partnership formation merging phase might create several risks for both parties.⁸² Therefore, formal planning should be done to cope with these emerging problems and to properly calculated return on investment. Functional knowledge changed from country to country. This is critical in the situation when a client has the impression that software specifications are well understood by the offshore vendor, while the vendor does not give any feedback about their lack of understanding.⁸¹ In most of the cases in OSD projects, software specifications are ambiguous or incomplete; therefore, domain training is necessary to cope with such issues.⁸⁰

Besides the eleven CBs, we have also listed 16 barriers such as “strategic inflexibility and otiose dispute resolution mechanism” and “poor estimation and lack of capacity to deliver product under strict time schedules” that have a negative role in the SOP formation as shown in Table 2.

4.3 | Questionnaire survey findings

Based on the findings of SLR, we design a questionnaire. Prior to the questionnaire distribution, we wrote an open invitation letter to give a short summary of the work. We have posted an invitation to the relevant groups on the LinkedIn (India outsourcing, outsourcing and offshoring, alliances and channels, outsourcing to India, partnership with CROs, partnership for global projects, and partnership for European projects), Facebook (software outsourcing companies and outsourcers), and Yahoo (SERG_UOM). We also send an invitation to selected companies from Pakistan software board (www.pseb.org.com). We also invited the writers of the industrial articles through email, to participate in our survey. These industry-oriented articles were selected during our SLR study. In response to these invitations, a sum of 101 industrial whizzes agreed for support. After getting their inclination, the survey form weblink was directed to these whizzes. To avoid any possible channel bias that might occur, the questionnaire was distributed using both online and onsite. This was done through Skype, Emails, WeChat, Twitter, QQ, and Instant Messengers. During predecided time-bound, we acknowledged 58 filled questionnaires. We had received a rapid response to our survey request from some participants. To increase the response rate, we also sent an email reminder to the participants. This reminder helped significantly.

4.4 | Barriers identified via empirical study (RQ2)

Barriers identified through our empirical study are shown in Table 3. Table 3 has been divided into two main columns, i.e., “barriers” and experts observation. The barriers' column lists down all the barriers, and the “Experts' Observation” column records experts' experiences about each barrier, which are further divided into three columns, ie, “Positive,” “Negative,” and “Neutral.” For analysis purpose, we grouped the responses into three groups X, Y, and Z, as shown in Table 3. Group X counts the frequency of the positive responses (slightly agree, moderately agree, and strongly agree); group Y counts the frequency of the neutral or not sure responses while group Z counts the frequency of the responses responded (strongly disagree, moderately disagree, and slightly disagree). We would be remiss if we do not define “negative impact,” which is as follows: “by a negative impact, we mean the extent to which a certain barrier is perceived by practitioners to restrict the promotion of outsourcing partnership formation.”

This is worth noting that out of 50 experts, majority agrees that all the 27 barriers do have a negative impact on the outsourcing partnership formation. This is evident from the “Positive” column, where most of the values are above 70% except the few, but none is below 58%. “Poor quality of service and lack of co-monitoring” is the most agreed barrier in our study, i.e., 92%. The results also reveal that “insufficient quality of technical capability” and “poor infrastructure” both are the second-highest positively endorsed barriers by 90% of the experts. “Weak organizational proximity and work dispersion” and “communication gap and poor client-vendor coordination” (88%) both are the third most important barriers to be addressed by the SDO. We also found “poor project management and lack of co-management infrastructure,” “poor estimation and lack of capacity to deliver product under strict time schedules,” “relational risk and poor relationship management”—86% as fourth and “information leakage and lack of IPR protection” and “geopolitical risk and country instability” as the fifth most significant barriers in our study (i.e., 84%).

Other barriers cited in our positive column are “insufficient knowledge of the client activities and lack of domain training” and “poor contract management”—82%, “opportunistic behaviour and low mutual trust”—80%, “hidden cost and high anticipated switching cost”—78%, “lack of control over project” and “poor knowledge sharing management and cooperation between partner”—74%, “strategic inflexibility and otiose dispute resolution mechanism” and “volatile requirements and poor requirements change control”—72%, and “poor leadership and lack of top executive support”—70%, “integration and diffusion risk and lack of inter-firm adaptation,” “organization inertia and lack of human capital management expertise,” and “problems stemming from organizational re-structuring”—68%, “misaligned goals, and power difference”—66%, “sign of uncertainty and lack of uncertainty absorption mechanism”—64%, “vendor financial instability and no relation specific investment”—62%, “weak social capital and lack of social networking”—60%, and “client concentration and other client specific risks”—62%.

Analysing the percentage values in the “Negative,” column of Table 3, we can see that most of the values are below 22% except for the “vendor financial instability and no relation specific-investment”—22%. This shows that the majority of the experts had experienced the negative impact of these barriers. Similarly, in the “Neutral” column, most values are below 22% except for “client concentration,” which is a relatively new concept in outsourcing. Most of the respondent seems unaware of this new phenomenon.

4.5 | Barriers in the opinions of different types of experts (RQ3)

To answer RQ3, we have categorized the participants into four groups based on their position/role. These groups are developers, managers, decision makers, and academicians. Developer's group consists of front-end and back-end developers. Manager's group consists of managers, analysts, and team leader. By decision maker, we mean senior manager, negotiator, and facilitator while by academician, we mean academic researcher, academic staff member, and master and PhD students having the knowledge or previous experience of software outsourcing. In our survey, 10 participants were developers, 20 were managers, 16 were decision makers, and only four were academicians as shown in Table 9. This type of experts' grouping was adopted from Niazi et al.⁵⁶ In Appendix A, we have reflected the experts' experiences according to their role as mentioned above. The distribution of critical barriers refers to all these four groups of experts are given in Table 9.

TABLE 3 Summary of the barriers from experts' perspective

Barriers	Experts' Observation (n = 50)											
	Positive					Neutral		Negative				
	EA	MA	SA	X	%age	Y	%age	SD	MD	ED	Z	%age
Vendor opportunism and low mutual trust	8	15	17	40	80	4	8	3	2	1	6	12
Communication gap and poor client-vendor coordination	27	14	3	44	88	3	6	3	0	0	3	6
Relational risk and poor relationship management	27	15	1	43	86	4	8	3	0	0	3	6
Insufficient quality of technical capability	37	4	4	45	90	5	10	0	0	0	0	0
Poor infrastructure and reluctance to change it	38	4	3	45	90	5	10	0	0	0	0	0
Poor quality of service and lack of co-monitoring	38	4	4	46	92	2	4	2	0	0	2	4
Weak organizational proximity and work dispersion	19	15	10	44	88	1	2	5	0	0	5	10
Hidden cost and high anticipated switching cost	15	14	10	39	78	2	4	6	2	1	9	18
Lack of psychological contract and poor contract management	22	17	2	41	82	4	8	5	0	0	5	10
Poor knowledge sharing and cooperation between partner	14	11	12	37	74	6	12	4	3	0	7	14
Insufficient knowledge of the client activities and lack of domain training	16	14	11	41	82	4	8	4	1	0	5	10
Volatile requirements and poor requirement change control	18	10	8	36	72	6	12	7	1	0	8	16
Strategic inflexibility and otiose dispute resolution mechanism	6	15	15	36	72	5	10	6	2	1	9	18
Poor estimation and lack of capacity to deliver product under strict time schedules	16	14	13	43	86	4	8	3	0	0	3	6
Geopolitical risk and country instability	23	13	6	42	84	4	8	4	0	0	4	8
Misaligned goal, and power difference	10	11	12	33	66	11	22	5	1	0	6	12
Sign of uncertainty and lack of uncertainty absorption mechanism	12	11	9	32	64	11	22	6	1	0	7	14
Organization inertia and lack of human capital management expertise	13	12	9	34	68	8	16	7	1	0	8	16
Poor project management and lack of co-management infrastructure	28	12	3	43	86	3	6	4	0	0	4	8
Information leakage and lack of intellectual property right protection	19	16	7	42	84	4	8	4	0	0	4	8
Integration and diffusion risk and lack of inter-firm adaptation	10	14	10	34	68	8	16	8	0	0	8	16
Vendor financial instability and no relation specific investment	9	12	10	31	62	8	16	8	3	0	11	22
Loss of capability and lack of control over project sent to offshore	20	13	4	37	74	3	6	8	2	0	10	20
Problems stemming from organizational re-structuring	11	14	9	34	68	8	16	6	2	0	8	16
Poor leadership and lack of top executive support	9	16	10	35	70	8	16	7	0	0	7	14
Weak social capital and lack of social networking	6	13	11	30	60	9	18	9	2	0	11	22
Client concentration and other client specific risks	3	13	13	29	58	17	34	4	0	0	4	8

The developers, described in Appendix A, indicated strong agreement on the 27 barriers we included in the survey. Amongst these 27 barriers, four barriers, i.e., “insufficient quality of technical capability—80%,” “poor infrastructure—70%” “poor quality of service and lack of co-monitoring”—70%, and “volatile requirements and poor requirement change control”—60% have been cited by 50% or more experts from the developer category in the “Strongly Agree” list. We found two barriers as the least significant (“Disagree”) in the views of developers. These barriers are “hidden cost and high anticipated switching cost” and “vendor opportunism and low mutual trust,” which have 10% of occurrences in the “Disagree” list.

Four barriers have been strongly agreed by greater than or equal to 50% of managers: “poor project management and lack of co-management infrastructure”—80%, “poor quality of service and lack of co-monitoring”—80%, “communication gap and poor client-vendor coordination”—75%, and “insufficient quality of technical capability”—75%, and “poor infrastructure”—75%. Our results indicate that five barriers have been quoted in greater than or equal to 50% of the sample of “Strongly Agree” of decision makers—“relational risk and poor relationship management” and “poor infrastructure”—81% “poor quality of service and lack of co-monitoring”—75%, “insufficient quality of technical capability”—75%, “geopolitical risk and country instability”—69%.

For academic researchers' dataset, eight barriers have been “Strongly Agreed” by greater than or equal to 50% of the experts—“weak organizational proximity and work dispersion”—100%, “lack of psychological contract and poor contract management”—100%, “geopolitical risk and country instability”—75%, “poor infrastructure”—75%, “poor quality of service and lack of co-monitoring”—75%, “information leakage and lack of IPR protection”—75%, “insufficient quality of technical capability,” and “hidden cost and high anticipated switching cost”—50%.

Table 4 presents the distribution of most common barriers strongly agreed by these groups of experts:

TABLE 4 Summary of common barriers across different groups of experts

Critical Challenges	Developers (n = 10)	Managers (n = 20)	Decision Makers (n = 16)	Academics (n = 04)
	% of Strongly Agree	% of Strongly Agree	% of Strongly Agree	% of Strongly Agree
Insufficient quality of technical capability	80	75	75	50
Poor infrastructure and reluctance to change it	70	75	81	75
Poor quality of service and lack of co-monitoring	70	80	75	75
Communication gap and poor client-vendor coordination	(40)	75	(44)	50
Relational risk and poor relationship management	(40)	(45)	81	50

- “Poor infrastructure,” “insufficient quality of technical capability,” and “poor quality of service and lack of co-monitoring” were strongly agreed by greater than or equal to 50% of experts in all four groups of experts.
- “Communication gap and poor client-vendor coordination” was strongly endorsed by greater than or equal to 50% of the manager and academic researcher.
- “Relational risk and poor relationship management” was quoted as strongly agreed by greater than or equal to 50% of the decision maker and academic researcher.

We found three barriers as the most common barriers in the *Strongly Agree* list of the experts from all the four types of experts (developers, managers, decision makers, and academicians) as shown in Table 4.

4.6 | Barriers in the opinions of senior, intermediate, and level experts (RQ4)

A total of 50 SDO experts have taken part in this research. Upon their experience, we have grouped these experts into three distinct groups. These groups are senior-level experts having 11 years and above experience, intermediate level experts having experience range of 6 to 10 years, and junior level experts having experience range of 1 to 5 years. For the grouping of experts based on their industrial experience, we have followed Khan and Niazi.¹ In our survey, 15 participants were seniors, 18 were intermediate, while the rest 17 were junior-level experts as shown in Table 10. In Appendix B, we have reflected the experts' experiences according to their category as mentioned above. The distribution of critical barriers refers to all these three groups of experts are given in Table 10.

Five barriers have been *Strongly agreed* by greater than or equal to 50% of the senior experts. The barriers “poor quality of service and lack of co-monitoring” achieved 100% endorsement by senior experts. “Poor infrastructure” and “insufficient quality of technical capability” have the second (93%) and third (80%) highest occurrence in this category. Similarly “volatile requirements” is the fourth most critical barrier to be address having 67% occurrence. Strategic inflexibility and otiose dispute resolution mechanism got ranked fifth and are quoted by half (50%) of the senior-level experts. In the *Strongly disagree* list of senior experts, we found only one barrier “strategic inflexibility and otiose dispute resolution mechanism.” However, the barrier has a frequency of only one as shown in the Appendix B. Our results confirm the results found by Khan and Niazi.¹

For intermediate level experts, amongst the 27 identified barriers, six barriers have been *Strongly agreed* by greater than or equal to 50% of the intermediate level experts. The barrier “poor infrastructure” has the highest percentage (89%) of occurrence among the intermediate level experts. “Communication gap and poor client-vendor coordination” (78%) got the second rank while “relational risk and poor relationship management” and “insufficient quality of technical capability” both shared the third rank with (72%) *Strongly* endorsement by the intermediate level experts. “Poor project management and lack of co-management infrastructure” (67%) and “loss of capability and lack of control over project sent to offshore” (50%) are the fifth and sixth in the opinion of intermediate level experts. We did not find any barrier in the strongly disagree list of intermediate level experts.

For junior-level experts, amongst the 27 identified barriers, four barriers have been strongly agreed by greater than or equal to 50% of the junior-level experts. It is worth noting that “poor quality of service and lack of co-monitoring” has the highest percentage (88%) in the category of junior level experts. “Insufficient quality of technical capability” (71%) is the secondly high recognized barrier while “volatile requirements and poor requirement change control” (53%) and “poor project management and lack of co-management infrastructure” (53%) both share rank three. Other highly recognized barriers by the junior-level experts are “communication gap and poor client-vendor coordination,” “poor infrastructure,” and “geopolitical risk and country instability” (47%). We found only two barriers strongly disagree by junior level experts, i.e., vendor opportunism and low mutual trust and “hidden cost and high anticipated switching cost.” However, the barrier has a frequency of only one as shown in Appendix B.

Table 5 presents the distribution of most common barriers strongly agreed by these groups of experts:

- “Insufficient quality of technical capability” was strongly agreed by greater than or equal to 50% of experts in all three groups of experts.
- Poor infrastructure was quoted as strongly agreed in greater than or equal to 50% in the category of intermediate and senior-level experts.

- “Poor project management and lack of co-management infrastructure” was strongly endorsed by greater than or equal to 50% of junior and intermediate level experts.
- “Poor quality of service and lack of co-monitoring” and “

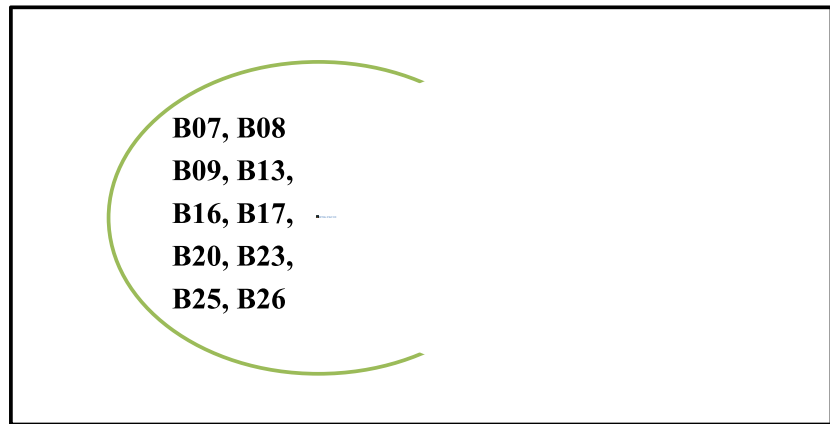


FIGURE 2 Venn diagram of barrier distribution

From the “vendor” perspective, we found six barriers as shown in Table 11, which are critical to the vendors only. Poor infrastructure—87%, insufficient quality of technical capability—84%, poor project management and lack of co-management infrastructure—61%, communication gap and poor client-vendor coordination—58%, relational risk and poor relationship management—58%, and geopolitical risk and country instability—50%.

We found only one common barrier (i.e., poor quality of service and lack of co-monitoring) critical to both client and vendor organization as shown in Table 6. The percentage of “poor quality of service and lack of co-monitoring” is very high (83%) in the “Client” group while it is low (74%) in the vendor. According to Hagel and Brown,⁸⁶ organizations have to consider taking advantage of outsourcing strategies, not only to utilize the cost advantages but also to benefit from the improved quality that offshore vendors provide. Today, “quality production” is the top priority of clients for outsourcing. Most of the world’s outsourcing projects go to India because India is the leading quality software provider.⁸⁷

We found 10 barriers, which are considered not critical from both client and vendor perspectives. These barriers are

- Vendor opportunism and low mutual trust (8%, 18%)
- Poor knowledge sharing and cooperation between partners (25%, 29%)
- Insufficient knowledge of the client activities and lack of domain training (25%, 34%)
- Volatile requirements and poor requirement change control (33%, 37%)
- Poor estimation and lack of capacity to deliver product under strict time schedules (0%, 42%)
- Organization inertia and lack of human capital management expertise (0%, 34%)
- Integration and diffusion risk and lack of interfirm adaptation (8%, 24%)
- Vendor financial instability and no relation specific investment (17%, 18%)
- Problems stemming from organizational restructuring (8%, 26%)
- Client concentration and other client specific risks (0%, 8%)

4.7.2 | Classification of the barriers into either client or vendors only (RQ6)

In response to RQ6, in order to classify the identified 27 barriers into either client or vendor based on a robust reference model, we classify the barriers as it belongs to client’s only or vendor’s only group. For classification purpose, similar to Table 3, we grouped the responses into three groups X, Y, and Z, as shown in Appendix C. Group X counts the frequency of the positive responses (slightly agree, moderately agree, and strongly agree); group Y counts the frequency of the neutral or not sure responses while group Z counts the frequency of the negative responses (strongly disagree, moderately disagree, and slightly disagree). For the classification of barriers, we have followed the previous works.^{52,88,89} Similar to Khan et al,⁵² in order to evaluate the importance of the barriers to client-vendor organizations, we also incorporate the reference model developed by Prikladnicki et al.⁸⁵ This model assists us in the distribution of barriers.

Based on the positive responses, barriers that were significant from client's viewpoints are grouped into "client" perspective while barriers important from vendor's viewpoint are counted into "vendor" perspective. To decide the significance of the barriers from the client-vendor perspective, we compared the percentage of positive responses (column X) of both client and vendor in Appendix C. For example, 75% of the client organizations considered "vendor opportunism and low mutual trust" (B01) as a barrier to contract renewal or upgradation, i.e., SOP formation. However, this barrier was significant to 82% of the vendor organizations. Therefore, B01 was allocated to the vendor organizations group. Based on the positive percentage (column X in Table 14), the distributions of the barriers are illustrated in Figure 3.

4.8 | Comparison of barriers across two data sets (SLR vs Questionnaire survey) (RQ7)

In this section, a comparative analysis of barriers as identified through the SLR and questionnaire survey is presented. Such comparative analysis is a good tool to identify similarities and differences between the outcomes of the two data sets. Table 7 and Figure 4 summarized the barriers identified through SLR and questionnaire survey. The SLR data have not been exposed to any kind of categorization. However, in the questionnaire data, the responses of the participants are grouped into three groups X, Y, and Z, as shown in Table 3. During the questionnaire design, for obtaining tacit knowledge on the barriers, we ask to mention any new barrier apart from the listed one. However, no new barrier was identified in the survey, and this is the reason that we do not notice any difference in the number of barriers found in the two data sets mentioned in Table 7.

It is also clear from the empirical findings, shown in Table 7, that no barrier has zero frequency in the survey. We noticed up and down in the ranking of these barriers across the two data sets, eg, B1 (vendor opportunism and low mutual trust) was ranked as the most important barrier in the SLR data set, whereas it was ranked as the 13th most important barrier in the questionnaire survey data set. Although, the ranking of these barriers in the two data sets is not exactly the same; however, the differences are less than similarities as shown in Table 7.

Since a questionnaire survey does not hold normality assumption, therefore Spearman rank-order correlation test was used to compute the significant association in the barriers identified via the SLR and empirical survey. Spearman correlation test is a widely adopted non-parametric test for finding a significant association between variables. To proceed for Spearman correlation test, first, its two assumptions were checked. The first assumption was already holding because the barriers were exposed to the questionnaire survey using 7-point scales from "Strongly agree" to "Strongly Disagree." For checking the second assumption, Scatter Plot was obtained as shown in Figure 5.

The relationship shown in Figure 5 is surely monotonic; thus, the second assumption also holds. The next step is to prepare data to be used into SPSS. We have ranked the data obtained using excel rank function.

In response to the RQ5, in order to compare these two data sets, Table 7 is build taking only %age of X (positive response in the survey) from Table 3. It is worth noting that in Table 7, the maximum %age of X is given the lowest ranks. When two or more barriers have the same %age, then they will share the same rank and the rank of the next barrier will be adjusted accordingly. For example, in Table 7, both barrier four "insufficient quality of technical capability" and five "poor infrastructure" have the same occurrence in the SLR, ie, 73%. Thus, they share ranks four and five, and both receive rank fourth while the next barrier B6 (poor quality of service and lack of co-monitoring) receive rank sixth because both rank fourth and fifth have been used.

It is clear from Table 8 that Spearman rank correlation coefficient is 0.714 at significant level $\rho = 0.00$. Since Spearman coefficient (r_s) is close to one that signifies the strong positive correlation between the outcome of SLR and survey i.e. when the %age or frequencies of the barriers in one data set increases then the %age or frequencies of the barriers in other will also increase and vice versa.

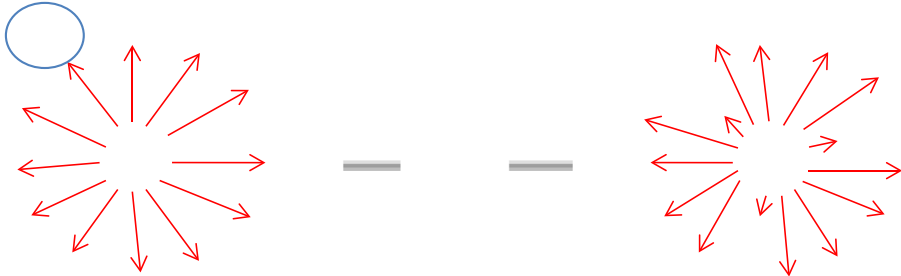
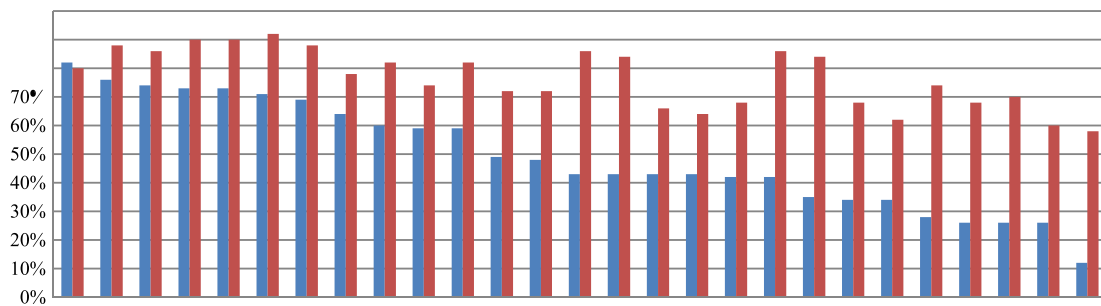


TABLE 7 Comparison of the barriers identified through SLR and questionnaire survey

Code	SLR Freq. n = 106		Survey Freq. n = 50		Average Rank
	%	Rank	%	Rank	
B1	82	1	80	13	7
B2	76	2	88	4	3
B3	74	3	86	6	5
B4	73	4	90	2	3
B5	73	4	90	2	3
B6	71	6	92	1	4
B7	69	7	88	4	6
B8	64	8	78	14	11
B9	60	9	82	11	10
B10	59	10	74	15	13
B11	59	10	82	11	11
B12	49	12	72	17	15
B13	48	13	72	17	15
B14	43	14	86	6	10
B15	43	14	84	9	12
B16	43	14	66	23	19
B17	43	14	64	24	19
B18	42	18	68	20	19
B19	42	18	86	6	12
B20	35	20	84	9	15
B21	34	21	68	20	21
B22	34	21	62	25	23
B23	28	23	74	15	19
B24	26	24	68	20	22
B25	26	24	70	19	22
B26	26	24	60	26	25
B27	12	27	58	27	27



5 | SUMMARY AND DISCUSSIONS

We have identified 27 barriers for SOP stakeholder in total via SLR and empirical survey. These barriers have a negative impact on outsourcing clients in renewing or promoting their present contractual outsourcing relationship into a partnership with vendor organization. Our long-term research goal is to provide SDO practitioners with a guiding model with rich assistance in the form of barriers that can support them to plan

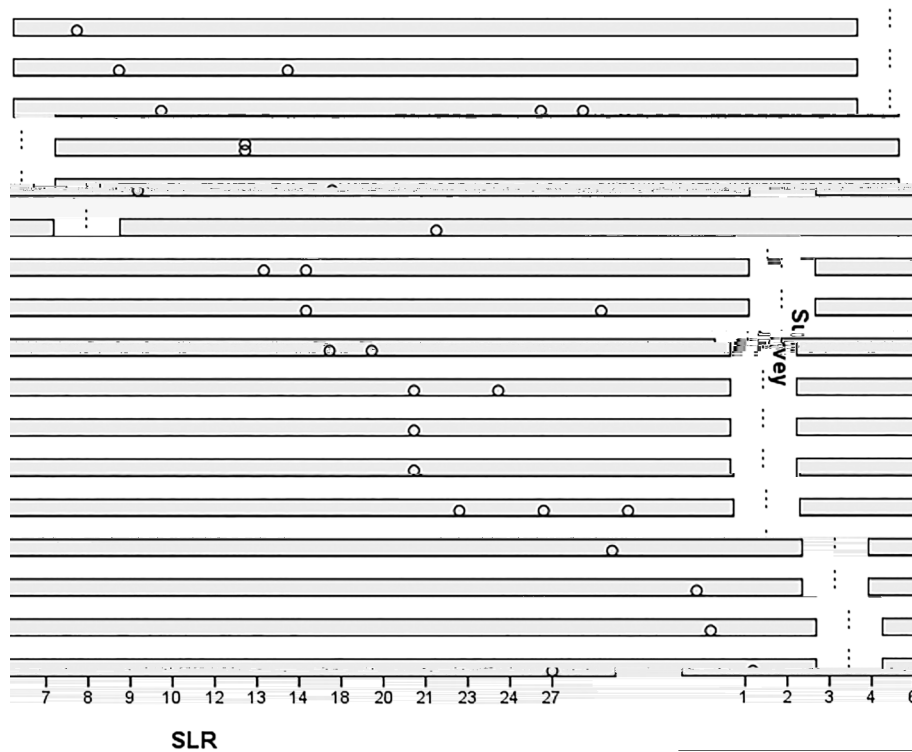


FIGURE 5 Scatter plot Systematic Literature Review (SLR) versus survey

TABLE 8 Spearman rank-order correlations

		Correlation	Survey	SLR
Spearman rho	SLR	Correlation Coefficient	1.000	0.714**
		Sig. (two-tailed)		.000
		N	27	27
	Survey	Correlation Coefficient	0.714**	1.000
		Sig. (two-tailed)	0.000	
		N	27	27

**Correlation is significant at the 0.01 level (two-tailed).

and implement successful outsourcing endeavours. The present study contributes to one component of the stated model, ie, the identification and analysis of barriers through an empirical survey. On the bases of our findings, we recommend that vendors should focus on all of the reported barriers as mentioned in Table 2 especially those mentioned with high strongly agree frequency in Table 3. Barriers signify some of the critical areas, where management should focus their attention to better design SOP initiatives. To decide the criticality of barriers in this exploratory study, the below-mentioned criterion will be used:

If a barrier is quoted in the SLR sample with greater than or equal to 50% or answered as a strongly agree in the questionnaire with a frequency/percentage of more than or equal to 50%, then that barrier will be considered as a critical barrier (CB) in this exploratory study.

The same criterion was also incorporated in our previous studies.^{1,10} A study was conducted by Niazi et al⁴⁹ in which they have enlisted key factors in software process improvement (SPI) with the criterion greater than or equal to 50%. According to them, if a factor is reported in the literature with greater than or equal to 50%, then that factor should be considered critical in SPI efforts. A comparable criterion has also been used by some other researchers.⁵⁰⁻⁵² However, SDO practitioners and researcher may also delineate their own criterion to plump the criticality of the identified barriers.

To answer RQ1 in light of the aforementioned criterion, 11 barriers are considered CBs as listed with code B1 to B11 in Table 2. These CBs play a negative role in the renovation or promotion of existing outsourcing relationship to a partnership.

The results are align with other surveys in the relevant domain such as Niazi et al,⁴⁹ Gopal et al,⁹⁰ Delen et al,⁶⁴ Abdullah and Verner,³⁵ Samantra et al,⁹¹ Verner,³⁶ Tsai et al,⁷⁴ Delen et al,⁶⁴ S oderberg et al,⁷⁶ Teo and Bhattacharjee,⁸⁰ Shahin et al,⁹² Khan et al,¹ Kinnula et al,⁸ Lahiri and Kedia,⁹³ Khan and Azeem,⁵¹ and some other researchers.^{2,49-52}

TABLE 9 Distribution of critical barriers across various types of experts

Experts' Group	Total Number of Barriers Quoted as "Strongly Agree"	No. of Critical Barriers (cited by 50% or more experts in "Strongly Agree" list)
Developers (n = 10)	26	The following four critical barriers have been identified. <ul style="list-style-type: none"> • "Insufficient quality of technical capability"—80% • "Poor infrastructure"—75% • "Poor quality of service and lack of co-monitoring"—70% and • "Volatile requirements and poor requirement change control"—60%
Managers (n = 20)	26	The following five critical barriers have been identified. <ul style="list-style-type: none"> • "Poor project management and lack of co-management infrastructure"—80% • "Poor quality of service and lack of co-monitoring"—80% • "Communication gap and poor client-vendor coordination"—75%, and • "Insufficient quality of technical capability"—75% and • "Poor infrastructure"—75%
Decision makers (n = 16)	27	The following five critical barriers have been identified. <ul style="list-style-type: none"> • "Relational risk and poor relationship management"—81% • "Poor infrastructure"—81% • "Poor quality of service and lack of co-monitoring"—75% • "Insufficient quality of technical capability"—75% and • "Geopolitical risk and country instability"—69%.
Academic researcher (n = 04)	27	The following eight critical barriers have been identified. <ul style="list-style-type: none"> • "Weak organizational proximity and work dispersion"—100%, • "Lack of psychological and poor contract management"—100% • "Geopolitical risk and country instability"—75%, • "Poor quality of service and lack of co-monitoring"—75%, • "Information leakage and lack of IPR protections"—75% • "poor infrastructure"—75% • "Insufficient quality of technical capability"—50%, and • "Hidden cost and high anticipated switching cost"—50%

TABLE 10 Distribution of the critical barriers across various levels of experts

Experts' Experience Level	Total Number of Barriers Quoted as "Strongly Agree"	No. of Critical Barriers (cited by 50% or more experts in "Strongly Agree" list)
Senior (n = 15)	27	The following five critical barriers have been identified. <ul style="list-style-type: none"> • Poor quality of service and lack of co-monitoring (100%) • Poor infrastructure (93%) • Insufficient quality of technical capability (80%) • Volatile requirements and poor requirement change control (67%) • Strategic inflexibility and otiose dispute resolution mechanism (50%)
Intermediate (n = 18)	27	The following six critical barriers have been identified. <ul style="list-style-type: none"> • Poor infrastructure (89%) • Communication gap and poor client-vendor coordination (78%) • Relational risk and poor relationship management (72%) • Insufficient quality of technical capability (72%) • Poor project management and lack of co-management infrastructure (67%) • Loss of capability and lack of control over project sent to offshore (50%)
Junior (n = 17)	27	The following four critical barriers have been identified. <ul style="list-style-type: none"> • Poor quality of service and lack of co-monitoring (88%) • Insufficient quality of technical capability (71%) • Volatile requirements and poor requirement change control (53%) • Poor project management and lack of co-management infrastructure (53%)

- Niazi et al⁴⁹ confirms the positive impact of trust in the formation of software outsourcing alliance between vendor and client organizations.
- The findings of Wang⁷³ suggest that, as compared with other collaboration models, the offshore was more susceptible to issues of communication and coordination.
- In view of Dhar and Balakrishnan,⁶⁶ both formal and informal communication between outsourcing associates are deliberated vigorous for the productive relationship.

- According to Delen et al,⁶⁴ the reasons why outsourcing relationship fails are somehow linked to barriers such as pitiable communication, lack of capability, lack of trust, divergent goals, and poor relationship management.
- Mathew and Chen⁶⁰ suggest that OSD arrangement should be made successful by avoiding relational risks like debasement of service performance and quality mishaps.
- In view of Verner,³⁶ vendor's lack of technical capability and experience can result in failure.
- In view of Herath and Kishore,⁴² lack of technical synchronization between the client and vendor can have an adversative effect on the outsourcing association.
- According to Verner et al,³⁶ weak organizational proximity and work dispersion cause problems between vendor and client.
- Sørderberg et al⁷⁶ suggest employing staff who have established cross-cultural understanding and capable of accurately and rapidly sensing, interpreting, and responding to problematic situations due to cross-cultural differences.
- In view of Teo and Bhattacharjee,⁸⁰ software development projects require significant investments in knowledge gaining and distribution, such as giving domain-specific training to vendor staff, to be aware of client's corporate trade and manoeuvre. Such investments may have no or very little value in case of contract termination in a short run.
- According to Samantra et al,⁹¹ high hidden and switching cost may result in potential loss and disappointment, especially when there is no strategy specifically defined to focus on cost reduction.
- In view of Khan and Khan,² poor contract management, insufficient contracting abilities, liability outside the contract, and poor management of the relationship on specified contractual terms may lead relationship towards failure.
- According to Verner et al,³⁶ functional knowledge is the understanding, experience, and expertise in the functional domain.
- According to Teo and Bhattacharjee,⁸⁰ in OSD projects, software specifications in most of the cases are ambiguous or incomplete. Therefore, to get familiar with the client's trade and to get functional domain knowledge, domain training is obligatory.

“Poor quality of service and lack of co-monitoring” is the most agreed barrier in our study, ie, 92%. We suggest that in order to compete in an international outsourcing market vendor(s), companies must improve the quality of their services and process. Literature reveals that the Indian software industry is the proven leader in high-quality provision,⁹⁴ which makes India a dominant country in quality software production in the international market.⁹⁵

- In view of Liu et al,⁷³ those clients who have anticipated undesirable consequence will invest constantly in monitoring and controlling the vendor's software development process and the quality of software.
- According to Delen et al,⁶⁴ in some circumstances, organizations proficiency is deplorably decreased up to half of the development effort consumed by outflows such as communication for coordination and information exchange.
- In view of Nguyen-Duc,⁵⁰ nowadays' organizations not only do outsourcing to utilize the cost advantages but to benefit from the improved quality that offshore vendors provide.

Without effective monitoring in outsourcing, vendors may behave opportunistically and make choices, which will increase their benefit at the cost of clients.⁶⁰

The results also reveal that “insufficient quality of technical capability” and “poor infrastructure” both are the second highest positively endorsed barriers by 90% of the experts.

- Abdullah and Verner³⁵ mentioned experimenting a new technology that has not been cast off in the preceding projects as a potential technical and technological risk.
- Samantra et al⁹¹ lead a study on risk assessment in IT outsourcing, they considered technical and technological risk as the most significant risk factor amongst all perceived risks factors.
- In view of Verner,³⁵ vendor's insufficient quality of technical capability and experience can result in failure.
- In view of Herath and Kishore,⁴² lacks of technical synchronization between the client and vendor can have an adversative effect on the outsourcing association. Failure to develop competence in the technology leads vendor to a deterioration of operational capabilities and services, which results in unsatisfaction of the performance expectation of its client.⁷⁴
- According to Tsai et al,⁷⁴ this unsatisfaction leads to relationship failure. Vendor capability risk is directly propositional to the effect of process control on performance and inversely proportional to the effectiveness of outcome control.²⁵

“Weak organizational proximity and work dispersion” and “communication gap and poor client-vendor coordination” (88%) both are the third most important barriers to be addressed by the SDO. In the current decade, a lot of companies in the United Kingdom and the United States have outsourced their software development work to other countries such as China, India, Malaysia, and Russia, where English is not the first language.⁹⁶ In addition to language differences, these countries have a different culture than in the United Kingdom and the United States. The following publish literature confirms the impact of cultural and language differences on outsourcing strategy:

- Sahay et al⁹⁷ discussed different problems related to the transfer of the UK culture to India. They also described the role of power and control during the outsourcing business.
- Nicholson⁹⁸ identified cultural and political issues in the globalization of software development.
- Tsuji et al⁹⁹ conclude that vendor property such as communication and relationship management capabilities have a positive impact on the results of outsourced development.

Because of weak proximity and work dispersion between outsourcing organizations in outsourcing venture, it is also possible that a message is misunderstood by either of the outsourcing partners. Furthermore, owing to the geographical dispersion in outsourcing trade, a direct head-on meeting is not possible, where one can clear up any misapprehension. The most commonly used communication methods in the outsourcing venture are fax, email, and phone. However, a vendor may adopt video conferencing as a common communication tool to minimize this barrier. We also found “poor project management and lack of co-management infrastructure,” “poor estimation and lack of capacity to deliver product under strict time schedules” “relational risk and poor relationship management”—86% as fourth and “information leakage and lack of IPR protection” and “geopolitical risk and country instability” as the fifth most significant barriers in our study (ie, 84%).

- Erickson³³ has described the case of one SDO project, which completely failed because of the problems with meeting expectations of the client on schedule, budget, and quality.

- Mukherjee et al¹⁰⁰ advise that client must take into account Intellectual property regulations in offshore outsourcing arrangements. Author further states that it is very surprising that, the most well-known offshoring destinations like China, India, the Philippines, and Russia have mal-adroit legal systems and poor IPR protections.¹⁰⁰
- Mukherjee et al¹⁰⁰ report offshoring gives birth to this unique challenge due to geographic distance and political conditions of the partner location. Integration and diffusion risk is specific to GSP and may occur due to transfer of assets including employees.

Other barriers cited in our positive column are “insufficient knowledge of the client activities and lack of domain training” and “poor contract management”—82%, “opportunistic behaviour and low mutual trust”—80%, “hidden cost and high anticipated switching cost”—78%, “lack of control over project,” and “poor knowledge sharing management and cooperation between partner”—74%, “strategic inflexibility and otiose dispute resolution mechanism,” and “volatile requirements and poor requirement change control”—72% and “poor leadership and lack of top executive support”—70%, “integration and diffusion risk and lack of interfirm adaptation,” “organization inertia and lack of human capital management expertise,” and “problems stemming from organizational restructuring”—68%, “misaligned goal, and power difference”—66%, “sign of uncertainty and lack of uncertainty absorption mechanism”—64%, “vendor financial instability and no relation specific investment”—62%, “weak social capital and lack of social networking”—60%, and “client concentration and other client specific risks”—62%.

We suggest that outsourcing organization should focus on these barriers to gain a partner position in the outsourcing venture for future projects. Analysing the percentage values in the “Negative,” column of Table 3, we can see that most of the values are below 22% except for the “vendor financial instability and no relation specific-investment”—22%. This shows that the majority of the experts had experienced the negative impact of these barriers. Similarly, in the “Neutral” column, most values are below 22% except for “client concentration,” which is a relatively new concept in outsourcing. Most of the respondent seems unaware of this new phenomenon.

In order to answer RQ3, the results are summarized in Table 9 “Poor infrastructure,” “insufficient quality of technical capability,” and “poor quality of service and lack of co-monitoring” were strongly agreed by greater than or equal to 50% of experts in all four groups of experts as shown in Table 9. The summary of our findings for RQ4 is given in Table 10. “Insufficient quality of technical capability” was found commonly critical in all three levels of experts. Our results confirm the results found by Khan and Niazi.¹ Different studies have also described the importance of “technical capability” factor:

- According to Hagel and Brown,⁸⁶ organizations have to consider taking advantage of outsourcing strategies, not only to utilize the cost advantages but also to benefit from the improved quality that offshore vendors provide.
- In view of Sangaiah and Thangavelu, today, “quality production” is the top priority of clients for outsourcing. Most of the world's outsourcing projects go to India because India is the leading quality software provider.⁸⁷
- Nguyen-Duc,⁵⁰ often a client firm, is enthusiastic to know the technical capability of vendor firms.⁸³
- Erickson³³

In order to answer RQ7, it is clear from the statistical analysis that both data sets have more differences than similarities. Table 8 shows that both data sets have a strong positive correlation (.714) with perfect significance 0.00. Using Table 7, it is argued that a total of 27 barriers including 11 CBs are cited by both data sets. Furthermore, all the five critical barriers (based on the criteria of strongly agreed by $\geq 50\%$ of experts) are also critical in the SLR data set. Conversely, all the 11 CBs in SLR have %age > 50% as shown in Table 7.

6 | LIMITATION

This study firstly finds barriers from a sample of 106 papers, and then, an empirical survey was conducted to analyse its significance and applicability to SOP formation. Thus, the empirical survey was based on the results of SLR; this two-phase framework ensures content validity. Construct validity is concerned with measurement scale whether the measurement scales represent the attributes being measured. The attributes of this research study were taken from a considerable amount of previous research^{2,49,51,52} and experiencing a systematic literature review.¹⁰ The respondent confirms the relevance of the attributes selected. Further, the inner reliability of survey responses was assessed using Cronbach's alpha coefficient, which is 0.89 (>0.70) that demonstrates the reliability of data and scale. To internal validity, the SLR findings were used as input for the design of the empirical questionnaire.

The empirical study part of this research engaged participants mainly from the Asian countries only. This is because this research project was conducted and sponsored in the context of Asia. However, to lessen population prejudice, contributors from other countries such as North America were also invited to include diverse perspectives. Fifty experts voluntarily partook in this exploratory study, and there was no previous bond between the participants and researchers. Contributors were informed that their participation is entirely voluntarily, and they can withdraw at any time and any stage they want. However, to ensure external validity and to diminish any possible bias, the 50 contributors were chosen from 20 different countries. Besides, most of the participant had worked in a range of small, medium, and large multinational organizations. Moreover, the participant had worked on diverse outsourcing projects from onshore to nearshore and from nearshore to offshore. Although, we cannot claim that all the contributors from these 20 countries would agree with us; however, we believe that they provide a descriptive sample. In empirical survey-based research, it is hard or impossible to obtain a fully representative sample and to deal them in an entirely objective fashion.¹⁰¹ To overcome these limitations, only those participant were included who are involved in outsourcing. The claim of the participant was verified through some open-ended questions, which were difficult to answer by an ordinary developer or manager etc. The situation might create difficulties when contributor's judgements may be inaccurate or when outsourcing barrier supposed as significant for renewal or up gradation may not, in fact, be significant at all. However, similar to other opinion-based empirical research studies,^{1,38,52,56} we have full confidence that the findings of this research are based on the data that have been collected from the relevant participants, who have been involved and have vastly diversified experience in SDO.

7 | ACADEMIC AND INDUSTRIAL IMPLICATIONS

This study has both research and practical implications. Based on the literature review and empirical study, this study provides a prioritized set of barriers, which serves as a knowledge base for both researchers and practitioners. This study provides the state-of-the-art review and practitioner view in the context of SOP formation, which is considered a valuable contribution in both academia and industry. Furthermore, the present work contributes in demonstrating the potential of the empirical research by employing a qualitative methodology for identifying and analysing various barriers, which collectively restrict the SDO vendors from renewing or upgrading their relationship with their overseas client. Like other researchers,^{2,50-52} in the published literature on the qualitative barriers, the present study tries to fill some of the research gaps and give a concise overview. Unlike earlier researchers, the present study firstly carried out a proper SLR study and identifies 27 barriers to SOP formation from a sample of 106 papers. The SLR results were then verified through a questionnaire survey performed with 50 experts from 20 different countries. Other researchers can follow the present study structure and methodology to conduct other studies in the relevant domain.

Prioritization of barriers is important for researchers so that they can focus and direct their energy on further research in the high-priority areas. It is also expected that the prioritized SOP barriers based on the practitioners roles, levels, and affiliation can be helpful to outsourcing manager, etc., for developing outsourcing policies and strategies for specific group of practitioners (developer, manager, etc.) in order to better guide them towards strategic formation of outsourcing partnership for future projects. It is common in practice to prioritize the strategic initiatives and barriers since not all of them are important and critical for all types of stakeholders (client-vendor). The prioritized barriers will guide the high ups in investment decisions in critical and high priority areas. Thus, a systematic review and empirical study-based results reported in this paper will help the practitioners to consider critical (high priority) barriers first when assessing, investing, and adopting their readiness towards partnership formation for outsourcing. The outsourcing client and vendors may enhance or develop new features to address the high priority barriers. In nutshell, this paper provided a consolidated knowledge base of literature and empirical study, which has not been done before.

The barriers identified in the present study will serve as a knowledge base for researchers and practitioners. The distribution of the barriers based on different variables provides a robust framework to facilitate the specific group of practitioners (developer, manager, and decision maker)

as well as an academician to concentration on the most critical areas relevant to their role, level of expertise, and company affiliation. For instance, if any practitioners or academicians who are interested to know the experiences of developers, managers, and senior managers, then they should

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APPENDIX A

DISTRIBUTION OF EXPERT OPINION BASED ON EXPERT'S ROLE

Code	Expert's Role																											
	Developers (n = 10)							Managers (n = 20)							Decision Makers (n = 16)							Academician (n = 4)						
	EA	MA	SA	NS	SD	MD	ED	EA	MA	SA	NS	SD	MD	ED	EA	MA	SA	NS	SD	MD	ED	EA	MA	SA	NS	SD	MD	ED
B1	1	3	1	3	0	1	1	3	6	9	1	0	0	0	3	5	5	0	2	1	0	1	1	2	0	0	0	
B2	4	4	1	3	0	1	1	15	2	2	0	1	0	0	7	7	0	1	1	0	0	1	1	0	1	1	0	0
B3	4	3	0	1	0	0	0	9	9	0	1	1	0	0	13	2	1	0	0	0	0	1	1	0	1	1	0	0
B4	8	1	1	2	1	0	0	15	1	2	2	0	0	0	12	1	1	2	0	0	0	2	1	0	1	0	0	0
B5	7	2	1	2	1	0	0	15	1	2	2	0	0	0	13	1	0	2	0	0	0	3	0	0	1	0	0	0
B6	7	1	1	0	1	0	0	16	2	2	0	0	0	0	12	1	1	1	1	0	0	3	0	0	1	0	0	0
B7	4	4	1	0	0	0	0	6	6	5	0	3	0	0	5	5	4	0	2	0	0	4	0	0	0	0	0	0
B8	1	2	2	1	0	0	0	9	8	0	0	2	1	0	3	4	8	0	1	0	0	2	0	0	1	1	0	0
B9	4	3	0	1	2	1	1	9	7	0	1	3	0	0	5	7	2	0	2	0	0	4	0	0	0	0	0	0
B10	2	2	2	3	0	0	0	4	3	7	2	2	2	0	7	5	2	1	1	0	0	1	1	1	1	0	0	0
B11	4	3	3	2	1	1	0	8	5	4	1	1	1	0	3	5	4	2	2	0	0	1	1	0	1	1	0	0
B12	6	1	1	0	0	0	0	8	6	4	1	1	0	0	3	2	3	3	4	1	0	1	1	0	1	1	0	0
B13	1	2	4	1	1	0	0	3	7	4	2	2	1	1	1	4	7	3	4	1	0	1	2	0	0	0	0	0
B14	4	3	3	0	3	0	0	6	6	5	1	2	0	0	5	5	5	1	0	0	0	1	0	0	2	1	0	0
B15	4	3	1	0	0	0	0	6	4	4	3	3	0	0	11	5	0	0	0	0	0	3	1	0	0	0	0	0
B16	1	2	3	1	1	0	0	2	4	6	4	3	1	0	6	4	3	2	1	0	0	1	1	0	1	1	0	0
B17	3	2	2	4	0	0	0	3	5	4	4	3	1	0	5	3	3	4	1	0	0	1	1	0	1	1	0	0
B18	2	2	2	2	1	0	0	6	4	2	0	0	0	0	4	4	4	2	2	0	0	1	2	1	0	0	0	0
B19	4	2	1	2	2	0	0	16	2	2	0	0	0	0	7	7	0	1	1	0	0	1	1	0	1	1	0	0
B20	3	3	2	1	2	0	0	6	5	4	1	4	0	0	7	7	1	1	0	0	0	3	1	0	0	0	0	0
B21	1	2	2	2	0	0	0	3	7	6	2	2	0	0	5	4	2	2	3	0	0	1	1	0	1	1	0	0
B22	1	2	3	3	2	0	0	2	5	2	4	4	3	0	5	4	4	2	1	0	0	1	1	1	0	1	0	0
B23	4	2	0	2	2	0	0	9	4	1	1	3	2	0	6	5	2	1	2	0	0	1	2	1	0	0	0	0
B24	2	4	1	1	3	0	0	7	5	4	2	2	0	0	1	4	3	3	3	2	0	1	1	1	1	0	0	0
B25	1	3	1	2	1	0	0	3	5	4	3	5	0	0	4	6	4	2	0	0	0	1	2	1	0	0	0	0
B26	1	2	2	3	2	0	0	1	5	3	4	6	1	0	3	4	5	2	1	1	0	1	2	1	0	1	0	0
B27	0	2	2	3	2	0	0	0	4	3	9	4	0	0	2	5	7	2	0	0	0	1	2	1	0	0	0	0

APPENDIX B

DISTRIBUTION OF EXPERT OPINION BASED ON EXPERT'S LEVEL

Barrier Code	Expert's Level																				
	Junior (n = 17) (1-5) years' experience							Intermediate (n = 18) (6-10) years' experience							Senior (n = 15) (11+) years' experience						
	EA	MA	SA	NS	SD	MD	ED	EA	MA	SA	NS	SD	MD	ED	EA	MA	SA	NS	SD	MD	ED
B1	2	3	6	2	2	1	1	2	6	6	2	1	1	0	4	6	5	0	0	0	0
B2	8	4	0	2	3	0	0	14	4	0	0	0	0	0	5	6	3	1	0	0	0
B3	7	6	0	2	2	0	0	13	5	0	0	0	0	0	7	4	1	2	1	0	0
B4	12	1	4	0	0	0	0	13	2	0	3	0	0	0	12	1	0	2	0	0	0
B5	8	2	3	4	0	0	0	16	1	0	1	0	0	0	14	1	0	0	0	0	0
B6	15	0	1	1	0	0	0	8	4	3	1	2	0	0	15	0	0	0	0	0	0
B7	4	6	3	1	3	0	0	8	5	3	0	2	0	0	7	4	4	0	0	0	0
B8	5	1	6	1	3	0	1	5	5	2	1	3	2	0	5	8	2	0	0	0	0
B9	6	6	0	2	3	0	0	6	6	2	2	2	0	0	10	5	0	0	0	0	0
B10	3	0	6	4	1	3	0	3	4	6	2	3	0	0	8	7	0	0	0	0	0
B11	7	1	9	0	0	0	0	4	10	2	1	1	0	0	5	3	0	3	3	1	0
B12	9	2	5	1	0	0	0	5	5	2	3	3	0	0	4	3	1	2	4	1	0
B13	2	7	7	1	0	0	0	2	5	5	3	3	0	0	2	3	3	1	3	2	1
B14	5	6	6	0	0	0	0	6	3	3	3	3	0	0	5	5	4	1	0	0	0
B15	8	1	5	2	1	0	0	8	6	0	1	3	0	0	7	6	1	1	0	0	0
B16	3	2	5	4	2	1	0	4	5	5	3	1	0	0	3	4	2	4	2	0	0
B17	2	5	4	4	2	0	0	6	4	3	3	2	0	0	4	2	2	4	2	1	0
B18	2	5	2	2	5	1	0	8	3	4	2	1	0	0	3	4	3	4	1	0	0
B19	9	4	1	1	2	0	0	12	4	2	0	0	0	0	7	4	0	2	2	0	0
B20	4	6	2	2	3	0	0	8	4	3	2	1	0	0	7	6	2	0	0	0	0
B21	2	6	4	2	3	0	0	3	6	4	2	3	0	0	5	2	2	4	2	0	0
B22	2	6	5	3	0	1	0	2	2	3	3	6	2	0	5	4	2	2	2	0	0
B23	5	9	3	0	0	0	0	9	2	1	2	2	2	0	6	2	0	1	6	0	0
B24	3	7	5	2	0	0	0	7	5	2	2	2	0	0	1	2	2	4	4	2	0
B25	2	8	6	1	0	0	0	3	5	3	3	4	0	0	4	3	1	4	3	0	0
B26	2	7	6	2	0	0	0	1	4	3	4	6	0	0	3	2	2	3	3	2	0
B27	1	6	4	6	0	0	0	1	5	5	5	2	0	0	1	2	4	6	2	0	0

APPENDIX C

CLIENT-VENDOR DISTRIBUTION OF RESPONSES

Barrier Code	Expert's Organizational Affiliation																					
	Client (n = 12)										Vendor (n = 38)											
	EA	%	MA	SA	X	%	NS	SD	MD	ED	Z	EA	%	MA	SA	X	%	NS	SD	MD	ED	Z
B1	1	8	6	2	9	75%	1	2	0	0	2	7	18	9	15	31	82	3	1	2	1	4
B2	5	42	2	1	8	67%	2	2	0	0	2	22	58	12	2	36	95	1	1	0	0	1
B3	5	42	7	0	12	100%	0	0	0	0	0	22	58	8	1	31	82	4	3	0	0	3
B4	5	42	3	2	10	83%	2	0	0	0	0	32	84	1	2	35	92	3	0	0	0	0



APPENDIX C (Continued)

Barrier Code	Expert's Organizational Affiliation																					
	Client (n = 12)											Vendor (n = 38)										
	EA	%	MA	SA	X	%	NS	SD	MD	ED	Z	EA	%	MA	SA	X	%	NS	SD	MD	ED	Z
B5	5	42	4	1	10	83%	2	0	0	0	0	33	87	0	3	35	92	3	0	0	0	0
B6	10	83	2	0	12	100%	0	0	0	0	0	28	74	2	4	34	89	2	2	0	0	2
B7	6	50	6	0	12	100%	0	0	0	0	0	13	34	9	10	32	84	1	5	0	0	5
B8	10	83	1	1	12	100%	0	0	0	0	0	5	13	13	9	27	71	2	6	2	1	9
B9	6	50	3	1	10	83%	1	1	0	0	1	16	42	14	1	31	82	3	4	0	0	4
B10	3	25	3	1	7	58%	2	1	1	0	2	11	29	8	11	30	79	4	2	2	0	4
B11	3	25	4	2	9	75%	2	1	0	0	1	13	34	10	9	32	84	2	3	1	0	4
B12	4	33	2	2	8	67%	2	1	1	0	2	14	37	8	6	28	74	4	6	0	0	6
B13	6	50	3	2	11	92%	1	0	0	0	0	0	0	12	13	25	66	4	6	2	1	9
B14	0	0	1	4	5	42%	4	3	0	0	3	16	42	13	9	38	100	0	0	0	0	0
B15	4	33	3	2	9	75%	2	1	0	0	1	19	50	10	4	33	87	2	3	0	0	3
B16	6	50	3	1	10	83%	2	0	0	0	0	4	11	8	11	23	61	9	5	1	0	6
B17	7	58	3	0	10	83%	1	1	0	0	1	5	13	8	9	22	58	10	5	1	0	6
B18	0	0	2	1	3	25%	7	2	0	0	2	13	34	10	8	31	82	1	5	1	0	6
B19	5	42	3	1	9	75%	1	2	0	0	2	23	61	9	2	34	89	2	2	0	0	2
B20	8	67	3	0	11	92%	1	0	0	0	0	11	29	13	7	31	82	3	4	0	0	4
B21	1	8	2	4	7	58%	5	0	0	0	0	9	24	12	4	25	66	5	8	0	0	8
B22	2	17	3	2	7	58%	3	1	1	0	2	7	18	9	8	24	63	5	7	2	0	9
B23	9	75	2	0	11	92%	1	0	0	0	0	11	29	11	4	26	68	2	8	2	0	10
B24	1	8	4	2	7	58%	4	1	0	0	1	10	26	10	7	27	71	4	5	2	0	7
B25	6	50	4	1	11	92%	1	0	0	0	0	3	8	12	9	24	63	7	7	0	0	7
B26	6	50	2	0	8	67%	4	0	0	0	0	0	0	11	11	22	58	5	9	2	0	11
B27	0	0	1	1	2	17%	7	3	0	0	3	3	8	12	12	27	71	10	1	0	0	1

APPENDIX D

BACKGROUND OF THE SURVEY PARTICIPANTS

Respondent ID	Position in the company	Classification	Respondent Job Location	Experience in years	Classification	Company Scope	Company Size	Organization type
#1	Chief Executive Officer	Decision Maker	India	11+ years	Senior	Multinational	Large	Vendor
#2	Chief Executive Officer	Decision Maker	Ireland	7 years	Intermediate	Multinational	Medium	Client
#3	Senior System Analyst	Decision Maker	Pakistan	11+ years	Senior	Multinational	Large	Vendor
#4	Project Coordinator	Manager	China	8 years	Intermediate	Both	Medium	Vendor
#5	Professor	Academic Researcher	Pakistan	11+ years	Senior	National	Large	Client
#6	Software Engineer	Developer	China	2 years	Junior	Multinational	Large	Vendor
#7	Software Developer	Developer	Malaysia	4 years	Junior	Both	Medium	Vendor
#8	Professor	Academic Researcher	Indonesia	12.8 years	Senior	National	Large	Client
#9	Negotiator	Decision Maker	China	7 years	Intermediate	Multinational	Large	Vendor
#10	Application Developer	Developer	China	2 year	Junior	Multinational	Large	Vendor
#11	Technical Manager	Manager	China	12 years	Senior	National	Medium	Vendor

APPENDIX D (Continued)

Respondent ID	Position in the company	Classification	Respondent Job Location	Experience in years	Classification	Company Scope	Company Size	Organization type
#12	Programmer	Developer	Pakistan	8 years	Intermediate	National	Medium	Vendor
#13	Senior Analyst	Decision Maker	China	5+ years	Intermediate	National	Small	Vendor
#14	Technical Lead	Decision Maker	China	12 years	Senior	Multinational	Medium	Vendor
#15	Web Developer	Developer	Pakistan	3 years	Junior	Multinational	Small	Vendor
#16	Senior Outsourcing Manager	Decision Maker	Canada	5+ years	Intermediate	Multinational	Medium	Vendor
#17	Senior Analyst	Decision Maker	India	11+ years	Senior	Multinational	Large	Vendor
#18	Senior Contract Manager	Decision Maker	Pakistan	5+ years	Intermediate	Multinational	Large	Vendor
#19	Senior System Analyst	Decision Maker	China	3 years	Junior	Multinational	Large	Vendor
#20	Application Developer	Developer	China	1.2 years	Junior	National	Small	Vendor
#21	Software Engineer	Developer	UK	7 years	Intermediate	National	Small	Client
#22	IT Manager	Manager	China	13 year	Senior	Multinational	Large	Client
#23	Requirement Manager	Manager	Pakistan	7 years	Intermediate	Multinational	Medium	Vendor
#24	Development Manager	Manager	China	4 years	Junior	National	Medium	Vendor
#25	Assistant Professor	Academic Researcher	Pakistan	7 years	Intermediate	National	Large	Vendor
#26	System Manager	Manager	Pakistan	2 year	Junior	National	Medium	Vendor
#27	Senior Software Engineer	Decision Maker	China	5+ years	Intermediate	Multinational	Large	Vendor
#28	Project Coordinator	Manager	China	5+ years	Intermediate	Multinational	Medium	Vendor
#29	Development Manager	Manager	USA	1.6 years	Junior	National	Medium	Client
#30	IT Manager	Manager	Nigeria	4.6 years	Junior	National	Medium	Client
#31	Quality assurance Manager	Manager	India	8 years	Intermediate	Multinational	Large	Vendor
#32	Project Manager	Manager	Pakistan	1 year	Junior	National	Small	Vendor
#33	Full Stack Developer	Developer	China	2 years	Junior	National	Small	Vendor
#34	Project Manager	Manager	China	11+ years	Senior	Both	Medium	Vendor
#35	President	Decision Maker	China	22 years	Senior	Multinational	Medium	Vendor
#36	Chief Executive Officer	Decision Maker	Pakistan	20 years	Senior	Multinational	Large	Vendor
#37	Senior Manager	Decision Maker	Saudi Arabia	7+ years	Intermediate	Multinational	Large	Vendor
#38	Outsourcing Analyst	Decision Maker	Saudi Arabia	3 years	Junior	Multinational	Large	Vendor
#39	PhD. Student	Academic Researcher	Saudi Arabia	4 years	Junior	National	Large	Vendor
#40	Senior Outsourcing Manager	Decision Maker	Finland	11 years	Senior	National	Small	Client
#41	Junior Manager	Manager	Yemen	1 years	Junior	National	Small	Client
#42	Project Manager	Manager	Jordan	4 years	Junior	National	Small	Vendor
#43	Project Coordinator Manager	Manager	Jordan	7 years	Intermediate	Multinational	Large	Vendor
#44	Software Designer	Developer	Haiti	4 years	Junior	National	Small	Vendor
#45	Test Case Manger	Manager	Australia	5+ years	Intermediate	National	Large	Client
#46	Project Coordinator	Manager	Korea	14 years	Senior	Multinational	Large	Client
#47	Distributed Team Leader	Manager	Russia	12 years	Senior	Multinational	Medium	Vendor
#48	Project Coordinator	Manager	Japan	10 years	Intermediate	National	Medium	Client
#49	Test Manager	Manager	Malaysia	9+ years	Intermediate	Multinational	Large	Vendor
#50	Chief Executive Officer	Decision Maker	Malaysia	11+ years	Senior	Multinational	Large	Vendor

Section Two

Evaluation of barriers identified through Systematic Literature Review

The objective of this section is to rank the impact with which the barriers have a negative impact in building or converting existing outsourcing relationship to software development outsourcing Partnership.

We have identified the following 27 barriers through systematic literature review (SLR). However, they are listed in the table in random order i.e. listed without any ranking.

Please give tick the appropriate radio button based on your experience.

Barriers