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Exploring Early Warning Signs Of Failure In Offshore-Outsourced Software Development Projects At The Team Level

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EXPLORING EARLY WARNING SIGNS OF FAILURE IN OFFSHORE-OUTSOURCED SOFTWARE DEVELOPMENT PROJECTS AT THE TEAM LEVEL

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Abstract

Organizations face many challenges in executing offshore-outsourced software development (OOSD) projects involving several countries. In such contexts, complex software development efforts are exposed to a greater number of risks, which make OOSD projects prone to failures. We analyzed 19 cases of OOSD project failures to explore the concept of early warning signs (EWS) in OOSD projects at the team level. Using the grounded theory methodology, we studied the EWSs specific to OOSD project failures. We classified the EWSs of failure into early signals of failure and early warning issues in order to help project managers notice the early failing indications. Further, we identified and characterized EWSs of failure and divided them into six broad categories. An OOSD project failure model incorporating the EWSs of failure was developed to understand the initial stages of OOSD project failure. Our research has shed more light on project development failures in outsourcing, a rare topic of investigation in information systems research.

Keywords: Software development, offshoring, outsourcing, project failures, early warning signs

1 Introduction

In the past few decades, the world has become smaller in terms of trade and collaboration. Global IT outsourcing forms a constantly growing part of the global trade: its global market reached USD 450 billion per year in 2010, of which offshore outsourcing formed USD 60 billion (Willcocks, Cullen and Craig, 2010). While the IT outsourcing market is expected to grow at 5% to 8% per annum, offshore outsourcing will likely experience double-digit growth rate for the next 5 years (Lacity et al., 2010). Despite the national boundaries that organizations have to cross and the challenges they have to overcome in order to participate in the global IT outsourcing market, there seems to be no stopping the upward trend of global IT outsourcing in the foreseeable future.

Organizations in high-cost countries have been moving IT activities to low-cost countries like India and China primarily because of cost arbitrage. Although software development can be considered an ideal activity for global dispersion as it requires little customer contact or physical presence (Apte and Mason, 1995), it is also of such a complex nature that success is difficult to achieve even in conditions of co-location (Sahay, Nicholson and Krishna, 2003). Captive offshore development – that is, development at an extended arm of the organization in a low-cost country – has proven to be a costly variant for many organizations. By contrast, outsourcing the software development to a third-party organization saves the capital expenditure required in the case of captive outsourcing, and thus offshore-outsourced software development (OOSD) has established a compelling case for developing information systems in distant countries like India or Russia. However, OOSD projects are exposed to a greater number of risks than either onshore-outsourced or captive offshore projects, and thus are more prone to failure (Iacovou and Nakatsu, 2008). Many of these risks are offshore-specific, as they include cultural differences, linguistic differences, communication difficulties, and work practice differences (e.g., Beulen, Ribbers and Roos, 2006; Dibbern, Winkler and Heinzl, 2008).

A review of the literature on IT outsourcing shows that most research focuses on the decision processes and the management of IT outsourcing operations on the engagement level rather than on the project or operational level (Lacity et al., 2010; Wiener, Vogel and Amberg, 2010). Several academics and practitioners have reported on offshore software projects from the implementation perspective (e.g., Aron and Singh, 2005; Rottman and Lacity, 2008). However, there has been little in-depth research about team-level dynamics that cause project failures. Further, little research has been done on failures in IT outsourcing projects and software development projects.

Project failure remains a vague concept among practitioners and academics alike, and there seems to be no consensus regarding its definition (Pinto and Mantel 1990). Contracts provide the primary form of control for IT outsourcing engagements (Kern and Willcocks, 2000). Therefore, we consider the fulfillment of contractual obligations the basis of OOSD project success. In this study, we focus on software development processes in OOSD projects; in particular, we analyze instances of project abandonment or cancellation, which can be considered the extreme form of project failure. *Offshore software development project failure* is defined as the cancellation of an OOSD project resulting in the premature termination of contractual activities between clients and vendors before the information system becomes operational. This could include projects that were canceled due to e.g. the vendor's inability to implement the information system as well as projects in which the vendor was replaced or the offshore activity terminated.

Software projects continue to fail despite the body of knowledge accumulated over the decades. Although there exists "no silver bullet" (Brooks, 1987) for improving project performance, the post-mortem examination of failure has brought us the insight that significant early warning signs (EWS) are found in IT projects before actual project failure (Kappelman, McKeeman and Zhang, 2006). If project managers were to take note of a number of indicators, they might be able to perceive these

warning signs. For instance, heart patients prior to a heart attack experience early symptoms, such as high blood pressure or high cholesterol levels that are early signals of heart problems (Ward, 2003). However, symptoms like chest pain and numbness in the left arm can be viewed as late warning signs prior to a heart attack. In a manner analogous to the medical example, IT project managers could try to draw on the past experiences of other projects and organizations to elicit the EWSs of failure in OOSD projects; this could serve as a valuable tool in managing risks in the early project stages. The first 20 percent of a project's collaboration forms the critical period for recognizing issues and taking corrective measures to complete the project as originally planned. Since the client and vendor in an OOSD project may not work together in the first 20 percent of the project as calculated from the point at which the project is initiated at the client organization, we have adopted the following pragmatic definition of EWSs for this research: *EWS is a project state or indication that warns one about possible or impending problems or issues and that occurs in the first 20 percent of the project's cooperation or collaboration period between clients and vendors* (based on Kappelman, McKeeman and Zhang, 2006).

In order to analyze potentially failure-causing team-level dynamics involved in the early project stages of an OOSD project, this exploratory research will attempt to answer the following research questions: *What are the early warning signs specific to offshore-outsourced software development project failures that are related to the project team? How do the project managers perceive them?*

2 Theoretical background

In his seminal work on strategic issue management, the business economist Ansoff (1975) noted that sudden changes in an organization's environment affect the working environment, which is noticeable first as weak signals that become more specific and stronger with the passage of time. Ansoff's work in the area of corporate strategic management offered a framework for minimizing the surprise element by anticipating strategic risks. Ansoff and McDonnell (1990) further developed the initial idea of weak signals from Ansoff (1975) by explicitly defining weak and strong signals. Weak signals are defined as "imprecise, early indications about impending impactful events" and strong signals as issues that "will be sufficiently visible and concrete to permit the firm to compute their impact and to devise specific plans for response" (Ansoff and McDonnell, 1990, p. 20).

Nikander and Eloranta's (2001) study of EWSs in industrial construction projects found that most of the information about EWSs comes from within the project. They identified sixty-eight basic types and 11 main type groups of early warnings on the basis of interviews with 17 project professionals and four case projects, and argued that an observed event or indication could be interpreted as a warning, a problem, or a cause of the problem depending on the project conditions in the various project stages. The interviewees in the study indicated the possibility of utilizing EWS as a project management tool. Nikander and Eloranta (2001) further proposed an EWS framework that involves monitoring and analysis of early warnings, problems, and causes of problems. They found that information related to early warnings could help manage emerging risks and respond to them by finding and resolving the causes of the problem.

Havelka and Rajkumar (2006) analyzed the symptoms and causes of troubled information systems (IS) projects and found that many symptoms appeared as causes, which is consistent with the observations of Nikander and Eloranta (2001). They used the nominal group technique with four focus groups of 20 IS consultants and identified 108 symptoms of troubled software development projects. Among the eleven categories of identified symptoms, team symptoms were also elicited. Havelka and Rajkumar's (2006) work provides the most comprehensive list of symptoms in the area of software development to date.

In contrast to the studies on EWSs by Nikander and Eloranta (2001) and Havelka and Rajkumar (2006), which examined the whole project lifecycle, Kappelman et al. (2006) studied the first 20 percent of the project lifecycle. This work in the area of IT projects identified 53 EWSs in three risk categories, namely, social subsystem, project management, and technical subsystem. The study contained a survey of 157 experienced IT project management experts who rated the identified EWSs; the survey aimed to rank the 12 dominant EWSs of IT project failure. All the dominant 12 EWSs were social subsystem and project management risks; technical subsystem risks were not included among the dominant 12 EWSs. Though rating EWSs is helpful, Kappelman et al's (2006) study provides only limited help to practitioners, as the EWSs were elicited at the project level with little detailed information on how to recognize them concretely. In addition to the above works, our own previous research on EWSs in offshore software development projects (captive as well as outsourced) using a quantitative Delphi survey established the relevance of team level EWSs. Among the 21 EWSs of failure that we elicited, most had to do with team communication and coordination, which shows how important interaction among team members in OOSD projects is in avoiding project failures (Philip, Schwabe and Wende, 2010).

Klakegg et al.'s (2010) report for the Project Management Institute (PMI), based on interviews and eight case studies in Norway, the UK, and Australia, discussed EWSs from the project owners' or governance perspective as opposed to our project management perspective. They differentiated EWSs into two types: hard issues of a technical nature, measurable through project assessments, and soft issues related to people, identifiable through gut feelings. They recommended paying attention to both types in projects, and maintained that the way that EWSs are attended to also affects their detection.

The principal-agent theory explains why it is difficult to perceive EWSs in outsourced software projects. The vendor (agent) is assumed to have access to more private information than the client (principal); the consequent information asymmetries allow the agent to hide details and actions during the engagement (Baiman, 1990). Monitoring difficulties as well as the intangible nature of software development make software projects a case of an agency problem.

3 Research methodology

We adopted a qualitative research approach, using grounded theory methodology to explore EWSs specific to the OOSD environment that lead to failures (Corbin and Strauss, 2008). This was the most appropriate methodology to study failed OOSD projects, considering the sensitivity of outsourcing failures and the consequent difficulty of gaining access to project details. Semi-structured interviews were conducted with project managers at client and vendor companies based in Switzerland and India. Interviews, as a data collection method, allowed us to "obtain a rich, in-depth experiential account" of failed OOSD projects (Fontana and Frey, 2000). The incomplete script of the semi-structured interview type allowed us to improvise questions to obtain rich details of the unique aspects that caused failure (Myers and Newman, 2007).

Project managers (PM) involved in offshore projects at the major multinational organizations located in Switzerland were contacted as part of a larger study on failures in OOSD projects. They were further asked to recommend other PMs with possible experience of failed OOSD projects. PMs were chosen as the key informants since they were the "most knowledgeable and qualified" stakeholder involved in failed projects (Glick et al., 1990). Out of 42 interviews, 19 interviews (9 from clients and 10 from vendors) were used for this research. Twenty-three interviews were not used for the analysis, as the failures experienced by those PMs were not OOSD project failures.

The PMs narrated the details of a major OOSD project failure in their careers. They provided information about important project episodes and event chains that described the failure process. Each PM had at least two years of OOSD project management experience, and the average amount of experience was 7.22 years for client PMs and 6.11 years for vendor PMs. The client and vendor PMs

experienced 5.89 and 1.78 OOSD failures, respectively, in their careers, which could point to differences in the PMs' context.

On average, the interviews lasted approximately one hour. They were tape-recorded and transcribed, resulting in a total of 255 pages of text. MAXQDA 10 software was used to code and analyze the data. We employed open and axial coding schemes (Corbin and Strauss, 2008) to build data categories and understand the relationships between the emerging concepts and categories. Open coding was employed to delineate concepts from the data in the initial analysis. We then used axial coding to relate the concepts that emerged to each other, a total of 91 concepts. During the coding process, we applied inductive analysis in order to understand the patterns and relationships between concepts. According to Patton (2002, p. 390) in inductive analysis "the patterns, themes, and categories of analysis come from the data; they emerge out of the data rather than being imposed on them prior to data collection and analysis."

All projects involved India as the offshore destination, and this study can be considered India-specific. The industries represented in the sample include banking, air transport, power generation, public sector, insurance, and automotive industries. All projects were executed using the waterfall model, except project case Q[1], which used agile methodology. Typical project phases included requirement analysis, design, coding, and integration and testing. Most projects dragged on until the integration and testing phase, where the final decision to cancel the project was taken. Cancellation took place earlier only in cases F, M, and S, in which the project was canceled during the requirement and analysis phase; the lack of business benefits and project management capabilities were noticed early in the execution. All the project cancellations took place during the last 10 years and all involved multi-national organizations. Switzerland was the client country in most projects; other client nations included Germany, Singapore, USA, and Canada.

4 Analysis and discussion

The analysis of project episodes and event chains that led to failure shows that PMs can notice some EWSs of failure in the project directly and some indirectly. Analyzing the data showed that EWSs of failures are divided into early indications and issues perceivable directly and those perceivable indirectly. Project managers noted issues (Ansoff and McDonnell, 1990) in early project stages that warned them of potential problems in the project; we refer to these as *early warning issues* (EWI). *EWI is defined as an early project issue that requires attention in the first 20 percent of the project's cooperation or collaboration period between clients and vendors*. Nikander and Eloranta (2001) and Kappelman et al. (2006) have identified EWSs that fall under the category of EWI; these are difficult for PMs to notice during the project. The category of EWSs that offers more concrete warning signals that PMs could potentially identify during the project will be referred to as *early signals* of failure. *Early signal is defined as a project indication or situation that provides concrete information about the early warning issue of failure during the first 20 percent of the project's cooperation or collaboration period between clients and vendors.* Early signals of failure in OOSD projects appear as weak signals during the start of the project. Nikander and Eloranta (2001), Havelka and Rajkumar (2006) and Kappelman et al. (2006) have identified EWSs that are termed early signals in this work.

An EWS of failure manifests itself as a pair of EWI and early signals of failure, where the early signals could consist of more than one indicator. The presence of one or more early signals of failure can indicate the existence of EWIs of failure. Early signals of failure may point to the project state or condition that requires PMs to analyze whether any EWIs of failures have surfaced or can be identified. It should be noted that although the early signals are more concrete and easier to identify,

[1] We denote 19 anonymous project cases referred to in this paper using the letters A-S. Since we assured anonymity to project managers regarding the organizations involved, more details cannot be provided in this paper.

they may not point unambiguously to an EWI. For instance, the early signal of missing interaction between vendor offshore and onsite teams could indicate that the existence of the warning issue of a lack of collaboration between vendor teams. However, this signal could also mean that the vendor onshore team lacks the motivation to work with the vendor offshore team. The EWIs of failure may become distinct as the project progresses and the presence of other early signals helps the PMs to assign the early signals to a particular EWI of failure and thus clearly identify the EWS of failure.

We have analyzed the issue or signal chains and paired early signals with EWIs of failures from project cases. Below, we discuss the categories that emerged from this analysis briefly; a more extended discussion is precluded by space limitations. The six categories include project team building efforts, common project execution structures, awareness of shared work context, collaboration between teams, onshore-offshore team coordination capabilities, and team member competencies.

4.1 Project team building efforts

A virtual project team that understands its function and consequently makes the requisite effort to achieve efficient task fulfillment forms the basis for a successful collaboration. Timely face-to-face meetings between client and vendor members could improve the social ties between the offshore and onsite members and eventually lead to better rapport and trust. However, since travel between sites is expensive, face-to-face meetings remain restricted to a small part of the OOSD project life in order to benefit from the cost arbitrage. The project manager of case P recalled that ignoring team-building efforts was an early signal that resulted in an incoherent team and eventually led to cancellation: "At the expectation end, there was no need to build a team. By definition, there was no team charter. Then you have no contract or no rules being defined on how you will behave in presence of conflicts." Table 1 summarizes EWIs of failures regarding project team-building efforts and their early signals that emerged from failed projects. The project case is noted in brackets.

Early warning issues	**Early signals**
Missing trust between vendor and client teams [A, B, N, O]	-Efforts of the vendor offshore team not appreciated by the client team [O] -Opportunity for informal interaction lacking [N, O] -Expectation gaps in technical deliverables [A, B]
Lack of team-building exercises by client and vendor [D, K, N, P]	-Managers ignore team-building efforts [K, P] -Lack of project team kickoff meetings [D] -Lack of procedures to integrate new team members [N]

Table 1. Team-building efforts

4.2 Common project execution structures

A common understanding of the project framework is a prerequisite for executing offshore-outsourced projects. In contrast to structured processes like Capability Maturity Model (CMM), we found that having mutually accepted structures and expectations about the project management processes is crucial for the outcome (Rottman and Lacity, 2008). The project manager of case O remarked that missing project structures can lead to a deadlock: "…the lack of process or the key responsibility charged or responsibilities lead to the situation where people find no directions, whether they are supposed to do that or not." Table 2 summarizes EWIs of failures regarding project execution structures and their early signals that were found in failed projects.

Early warning issues	**Early signals**
Lack of common understanding about deliverables [A, J, L, P]	-Expectation gaps in deliverables [A, J, P] -Lack of explicitly agreed project outputs [L]
Vendor offshore team fails to honor	-Deadlines not met by vendor offshore team [I, J, L]

deadlines [A, I, J, L]	-Escalations not addressed promptly [A]
Lack of shared concepts for project execution [D, G, K, O]	-Vendor and client teams have different methodologies, documentation, and change management processes [D, O] -Lack of identical software and hardware versions at client and offshore sites [G, K]
Business requirements not understood properly by vendor team members [A, K, L, N, P]	-Expectation gaps in technical deliverables [A, N] -Ambiguous requirements with room for misinterpretations [K, L, N] -Requirement assumptions by vendors are not verified [P]

Table 2. Common project execution structures

4.3 Awareness of shared work context

Recognizing differences in the shared work context and the failure to adapt and communicate these differences has been identified as one of the EWSs of failure. Cramton (2001) found that virtual team members' lack of skill in detecting local contextual differences and constraints across locations and in sharing them with their counterparts caused problems in coordination as well as relationships. The organizational culture and work practices of virtual teams further complicate the emergence of a shared context between onshore and offshore teams (Cramton and Webber, 2005). The client PM of case C noted that the difficulty posed by different organizational cultures for collaboration between teams acted as an early signal of project failure: "And the reason is that I think that the teams over there are very hierarchical, they have their internal structure of importance and of the supervision and it's difficult to flatten that." Vendor offshore team members from the Indian organization did not talk openly in the presence of their superiors during a meeting or workshop because they followed Indian hierarchies and social structures. In this project case, the silence of some of the team members was first interpreted as normal, and the client realized only after the first delivery that the offshore team did not understand the requirements. Table 3 summarizes EWIs of failures and their early signals that emerged from failed projects regarding awareness of shared work context.

Early warning issues	**Early signals**
Escalations not taken seriously by vendor [A, B]	-Assurance of normality by vendor when issues are raised [B] -Repeated expectation gaps in deliverables [A]
Vendor onsite team lacks motivation to work with offshore team [O]	-Missing interaction between vendor offshore and onsite teams [O] -Vendor onsite team does not provide the requested information [O]
Lack of openness to discuss problems by vendor offshore team [A, I]	-Delays of deliverables not communicated in advance [A] -Non-admission of technical problems or mistakes [I]
Missing cultural intelligence among vendor and client teams [B, I, L, R]	-Vendor offshore team members do not challenge requirements [I, L] -Vendor offshore team members do not talk openly in meetings in the presence of superior [C, R] -Vendor offshore team members give equal importance to family matters as to work [B]

Table 3. Awareness of shared work context

4.4 Collaboration between teams

Collaboration between teams in the distributed offshore project environment requires team members to be aware of how their presence and context relate to those of other members (Dourish and Bellotti, 1992). This is because physical distance and cultural differences produce challenges for both formal and informal project activities. As the offshore client PM of case O noted with regard to the communication setup and collaboration in the project: "It [communication] was not to the level where it should have happened. Of course there was some communication, ad-hoc communication, but there was no formal team-based communication. So that was one of the reasons, which resulted in a situation where the offshore team was truly getting misaligned with the complete project objectives." An overview of EWIs of failures and their early signals that were identified in failed projects in regard to team collaboration is given in Table 4.

Early warning issues	**Early signals**
Lack of collaboration between vendor teams [B, N, O]	-Lack of regular meetings [B, N, O] -Missing interaction between vendor offshore and onsite teams [B, O] -Vendor offshore and onsite teams are part of independent organizations and both are not integrated into the project [B]
Lack of agreed communication structures between vendor and client teams [C, N, O]	-Communication paths are not clear for team members [C, N] -Lack of interactions between client and vendor teams [N, O]
Client team mistrusts vendor offshore team members [O]	-Client team member changes use cases without informing vendor offshore team [O] -Missing interaction between client and vendor offshore teams [O] -Vendor offshore team not respected or appreciated by client team [O]

Table 4. Collaboration between teams

4.5 Onshore-offshore team coordination capabilities

In the organizational setup where the vendor offshore team works as an extended arm of the vendor onsite team, it is imperative that both the client and vendor sides acquire the capability to coordinate the project team. Coordinating project resources so they can interact efficiently requires PMs who can handle the challenges implicit in the onshore-offshore environment. Project case Q was canceled because of lacking interaction between the vendor offshore and onshore teams and lacking knowledge feedback mechanisms. The PM noted: "…you need to have a kind of feedback to get clear on what needs to be done, why it needs to be done and whether something written in a requirement is a typo or that has truly been meant that way." Table 5 summarizes EWIs of failures and their early signals that emerged from the data regarding offshore project management capability.

Early warning issues	**Early signals**
Lack of onshore-offshore team coordination know-how by client and vendor [B, E, F, M, N, O, P]	-Neither vendor nor client project managers have experience of distributed or virtual projects [M, O, P] -Lack of a shared project plan [F] -Lack of an integrated organization chart with defined contact persons [F] -Vendor offshore managers manage large teams [B, N]

Vendor onsite team fails to transfer knowledge to offshore team properly [H, N]	-Knowledge feedback mechanism shows lack of understanding by vendor offshore team [H, N]
Vendor onsite team simply expects the offshore team to provide deliverables based on specifications [N, O, P, Q]	-Lack of regular meetings [N] -Lack of knowledge feedback mechanisms [P, Q] -Complex knowledge areas not identified [O] -Questions from vendor offshore team are blocked by vendor onsite team [N, P]

Table 5. Onshore-offshore team coordination capabilities

4.6 Team member competencies

Although the EWS category of team member competencies also applies to non-offshore projects, the dynamics of the offshore market – especially the Indian market – call for careful scrutiny of the project-related skills and competencies required of team members. Most vendor offshore teams in failed projects employed a combination of fresh graduates and senior members. The project manager of case A noted the lack of communication skills of offshore team members who had to be replaced: "There were two guys who were not very communicative. They were not used to like very open or very communicative, so they were keeping silent for most of the time, even on asynchronous communication." This business intelligence project further suffered because of the lack of domain-specific and technical skills required for its development. Table 6 outlines the EWIs of failures and their early signals that emerged from failed projects regarding team member competencies.

Early warning issues	**Early signals**
Vendor offshore team lacks domain-specific knowledge [B, K, Q]	-Knowledge feedback mechanism shows lack of adequate business knowledge [Q] -Lack of SME in the vendor offshore team [N, Q] -Key vendor offshore team members leave the project [B, K]
Project team cannot elicit business specifications thoroughly [E, I, Q]	-Lack of SME in the vendor onsite or offshore team involved in requirement analysis [E, Q] -Lack of team member with organization-specific knowledge involved in requirement analysis [I]
Vendor offshore team members lack communication competency [A, B]	-Offshore team members are non-communicative or silent [A, B]
Vendor team members lack required technical skills [A, B, C, K, H, Q]	-Bad quality of technical deliverables [A, C, Q] -Expectation gaps in technical deliverables [A, K, H] -Key vendor offshore team members leave the project [B]

Table 6. Competencies of team members

4.7 Towards a model of EWSs in project failure

The analysis of OOSD project failures provides insight into the initial stages as well as the failure process of OOSD projects. As early signals become stronger with improved state of knowledge (Ansoff and McDonnell, 1990), the EWI can be identified and the early warning signals determined. As opposed to Ansoff's (1975) focus on events, our model also considers project indications, situations and project states. The existence of causes of failure issues (which are project issues that eventually lead to project cancellation) will lead to an EWI and further to noticeable early signals. Lack of a monitoring mechanism causes PMs to not perceive EWSs. Figure 1 shows the EWSs of failure and the OOSD project failure model that emerged from our exploratory data.

The principal-agent theory explains why PMs perceive EWSs late in projects. Since vendors possess information that clients do not have access to, the state of knowledge will improve only with unfolding situations or events (Baiman, 1990). Clients will have to put more effort into reducing the information asymmetries. The differentiation of EWSs of failures into more noticeable early signals of failure and EWIs of failure forms the main contribution of this work to understanding the early stages of project failure. Imperfect monitoring posed by offshore-specific risks could explain why EWSs are found as a pair of early signals and EWI in OOSD projects.

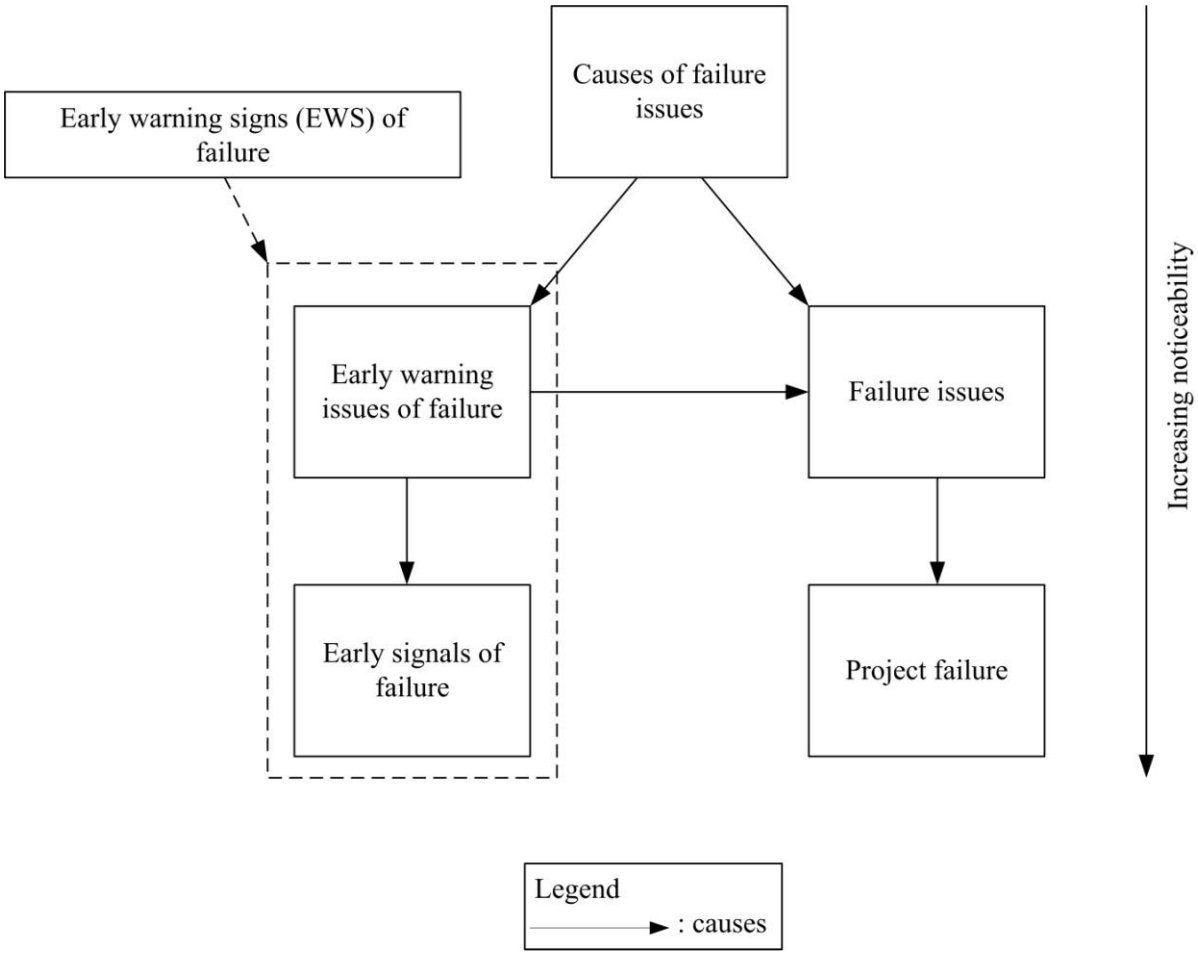

Figure 1. EWSs of failure and the OOSD project failure model

As a brief illustration of how one EWS of failure was involved in a project failure, let us take project case A. In that case, the EWI of the vendor team not honoring deadlines emitted an early signal of escalation not being promptly addressed. This eventually led to tensions between client and vendor teams that later resulted in failure issues such as non-functioning software coupled with slipping timelines and costs overshooting the approved budget. This scenario then led to project failure, i.e., cancellation. The root causes of the issues were the lack of offshore project management know-how and organizational cultural differences regarding time perception. Vendors considered fulfilling the tasks of primary importance, without giving due importance to the milestones.

Further, our analysis found most EWSs to be hard issues of a technical nature that are to a great extent measurable. Only four people-related soft issues involving attitudes and values were found among the EWSs of failure. They included EWIs like missing trust between vendor and client teams, lack of motivation by vendor onshore team to work with offshore team, lack of openness to discussing problems by vendor offshore team, and missing trust between client and vendor offshore teams.

Williams et al. (2012, p. 47) note that addressing soft issues requires PMs to possess "broad experience and a deep understanding of both objectives and culture."

5 Conclusions

We have attempted to identify the early warning signs (EWS) of failure that occur in offshore-outsourced software development (OOSD) projects and that are related to the team level; we have further sought to explain how they are perceived by project managers (PM). Our analysis of OOSD project failures points to the necessity of dyadic client-vendor team-level interactions and the appropriate responses to these if project failure is to be avoided. Especially the dynamics within the vendor onsite and vendor offshore teams were found to have an equal role, as opposed to the client and vendor offshore teams mainly found in the IS offshoring literature.

This research makes three main contributions to the IS failure and offshoring streams. Firstly, we have developed a causal model of OOSD project failure that incorporates EWSs of failure; this helped us understand the process of OOSD project failure. Practitioners could use our OOSD project failure model as a guideline for reducing offshore-specific risks. Research has found that risks are perceived differently by project managers on different continents, who have different cultural orientations (2001). Practitioners could also further address the EWSs in the categories of common project execution structures and team collaboration related to cultural values and practices. Secondly, we have distinguished the concept of EWSs found in the IS literature into early warning issues (EWI) and their easily identifiable early signals of failure. Early signals of failure helped us understand how PMs might be able to better perceive the EWSs of failures that surface in early project stages. Thirdly, we have identified and characterized the EWSs of failure in OOSD projects at the team level.

The main limitation of our research is its India-centricity, as that could point to bias in the data; however, a homogenous cultural sample involving a single vendor country enabled us to develop generalizations. We tried to ensure the accuracy of the data from the retrospective interviews by minimizing recollection errors (Glick et al., 1990) through focusing on major events in one failed and one successful project in PMs' careers. Lack of triangulation from the PM on the other side shows a bias in results. However, we believe to have shed more light on failures in IS projects, a rare topic of investigation. While further research ideally would involve case studies including both parties of a failure, such research remains highly sensitive. As an alternative, scholars could undertake surveys to validate the qualitative data offered in this work.

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