

Externalizing Business Process Knowledge in Global Offshore Software Development

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Abstract

Global offshore software development has been receiving attention as a new trend in the global software engineering field. The globalization of information technology (IT) and the improvement of telecommunication facilities have facilitated software development business processes worldwide. India, China, and Israel are now recognized as significant players in global offshore software development. Despite this increasingly popular trend, the initial expectations of the cost reductions of offshore outsourcing have not been realized. Many software development companies are facing difficulties caused by many hidden costs, including transition risks, learning needs, communication overheads, setup times, ramping up durations, scope creeps, etc. In this position paper, we clarify such difficulties and discuss how software business processes should be externalized and shared to realize better global offshore software development. We believe externalizing software business process will facilitate accountability and traceability.

1. Introduction

Global offshore software development [1] has been receiving attention as a new trend in the global software engineering field. The globalization of information technology (IT) and the improvement of telecommunication facilities have made it possible to facilitate software development business processes worldwide.

The main advantage of offshore software development is cost reduction. The other benefit of offshore has been discussed in the literature[1]. As much as possible, software companies move development tasks offshore to countries with a highly educated and cheap workforce. In particular, the advancement of IT and telecommunication facilities is pushing software development offshore. So naturally in the global world, tasks and decision making are distributed around the world, as predicted in [4]. Also, in Japan, offshoring is one of the most important software developing methodologies for surviving the competition of software development in the global world. However, based on several studies of general offshoring (including data entry, customer service, etc.), half of the organizations failed to generate the expected benefits [1].

Since R&D and product design have high operational risk compared with other simple tasks [1], offshoring software development should also have high operational risk. This is because much communication is necessary, and some implicit knowledge, concept, and information should be shared between both companies. Sharing precise information and knowledge about offshore business processes is the key for better offshoring.

Particularly in Japan, language differences cause more unexpected failures than anticipated. The failure of offshoring in Japan means that Japanese software development cannot gain a foothold outside of the country. As a result, almost all business empowered by software fails to follow the speed of global business. The language barrier also complicates knowledge and information sharing.

Thus, in this position paper, we focus on knowledge and information sharing methodologies that refine communication among developers and customers. Many researchers have pointed out that implicit and deep knowledge exist under surface information and knowledge. Malone called this deep process the under surface process. Also, Nonaka [5] described such implicit knowledge as tacit knowledge. We believe that for offshoring to succeed, all players must correctly share this implicit knowledge and information as much as possible. Further we believe that externalizing software business process will facilitate accountability and traceability.

This position paper proposes a methodology that realizes efficient sharing of implicit knowledge upon which to base advanced discussions. We utilize the Process Handbook published by the MIT Sloan School of Management. In this handbook, they built a massive repository with many cases of business processes and process ontologies based on three simple basic building blocks: flow, sharing, and fit processes. With the Process Handbook we represent "implicit" knowledge and information that often fail to be shared but must be for successful business.

After establishing a hierarchical business process model, we must evaluate the different levels of the process. We adopt Capability Maturity Model Integration (CMMI), a process improvement approach for evaluating the development process, and some extensions for evaluating the global

software development process.

2. Offshore Software Development

A typical offshore business process can be described as follows [2]: For the entire project period, a small developer team “invades” the client’s place and handles system integration, installation, and testing through direct communication with the client. Initial requirements are usually determined at the client site, and more detailed requirement specifications are conducted offshore. Next, after the project leader and senior designers assemble the core team, development begins. Once the software is ready, it is shipped to the onsite members, who integrate the components of the system and carry out acceptance testing. The interface between the client and the offshore team is managed using a variety of mechanisms such as information requests, resolution of open issues, changing specifications, and status review video/tele-conferences.

Even though a small team has ensconced itself at the client site, communication between the client and developer sites becomes difficult due to the distance and time differences, even if we use sophisticated IT technologies. In addition, language barriers add further complication.

We briefly introduce a typical failure. A. Nagai, a manager in a web software development department in a Japanese trading company, faced an offshore outsourcing problem between a small Japanese manufacturing company and an Indian venture software company. The Japanese company lacked knowledge about web software development. The Indian venture software company had many motivated and educated people, but it was just starting out.

After some days, failure clearly appeared imminent. Video conferencing was time-consuming because extra conversations had to be translated to catch the sensitive nuances of words. Such the sensitive nuances of words are required to share the tacit knowledge which is highly personal and hard to formalize, making it difficult to communicate or to share with others. This situation applied not only to the videoconferences but to all communication needs that often took three or more rounds to finish.

All players thought that offshoring would reduce development costs. However, the burden of communication was not what they expected. In addition, since the distance between Japan and India is large, one-to-one communication was quite difficult. For example, the client would speak to the system manager, who then speaks to the Japanese translator, who talks to the Indian developer. At least two or three extra steps are needed for all communications. This burden was unexpected.

Since communication and translation required time and money, the schedule was delayed. The additional tasks and negotiations caused by the delay created extra communication. The tacit knowledge could be here insights and visions which must be shared among the entire developing team.

The project itself is now back on course, but for A. Nagai, the experience was quite difficult. We omit the details due to space.

3. Adopting Process Ontology

Developers, clients, and coordinators need to share a business process model that defines as clearly as possible any language used for offshore communication.

A group in the MIT Sloan School of Management has built the Process Handbook [3], an online knowledge base that provides the basic ontology of business processes. The basic characteristic of the Process Handbook is its way to represent business processes. Its representation is based on simple dependency and specialization of process. Each process is represented by three basic process dependencies: flow, sharing, and fit. In specialization of process, it differentiates a process into its different type. These methods are simple and can be shared by people who speak different languages.

The Process Handbook includes a systematically structured library of more than five thousand activities, including basic business activity patterns, important variations, and interesting case examples. Offshore outsourcing between countries that speak different languages must have useful business patterns and cases, regardless whether they fail. We can create an offshore software development process from a general software development process.

4. Conclusion

In this position paper, we illustrate the importance and the difficulty of offshore outsourcing software development. For the US and Japan, offshore business processes must be improved because hidden difficulty remains before achievements can be harvested. We focused on the difficulty of communication for sharing important knowledge and information and proposed the adoption of process ontologies. We believe that externalizing software business process will facilitate accountability and traceability. Future work includes investigating cases of offshore software developments and investigating and constructing offshore business process repositories by utilizing process ontology.

References

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