

# Offshore Software Development in small and midsize companies

Based on master thesis for Eindhoven University of Technology

Project title: "Offshore Software Development in small and midsize companies"

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## Abstract

*Offshore software development is a well investigated topic for large and multinational companies. For small to midsize companies, this is an underdeveloped area in the literature. The author conducted a qualitative research to uncover success factors with offshore software development. This research has been done with eight client cases offshoring to a partner company in India. Interviews have been conducted with software development managers from Dutch companies partnering with coMakeIT. Also, interviews have been held with employees in India. From this research, 6 co-ordination mechanisms are extracted which leverage success in the cases that have been researched. For different types of software development, different mechanisms can be advised.*

**Keywords:** *Software development, Offshore outsourcing, Small and midsize companies, Co-ordination mechanisms*

## Introduction

Offshore outsourcing is common practice in most companies. It is a trend to focus on the core activities of an organization and outsourcing other parts fits in this trend. IT functions are often a good candidate for organizations to outsource. Software development is a specific IT function which requires highly skilled employees which makes it difficult to outsource. A lot of research has been done in this field, mainly focusing on large companies. Companies are searching for more effective ways to operate their IT departments and outsourcing vendors are promoting their solutions to fix problems in these organizations. India has emerged as the number one global player in the IT outsourcing marketplace, capturing over 80% of the global IT outsourcing market (Khan et al. 2003).

The marketplace for offshore IT outsourcing is large. Nasscom (2009), which is the premier body of IT-BPO industries in India, calculated that the global IT outsourcing industry to India exceeds 50 billion dollar with an annual growth of over 21%. Newspapers and magazines constantly report about major multimillion dollar deals between large multinational clients and vendors. It seems large companies are outsourcing their IT on a very large scale and a big part of it is going to India. Thomas L. Friedman confirms this observation in the book "The world is flat: A Brief History of the Twenty-First Century" (2007).

Besides success stories, many projects fail to deliver on the high expectations. Increased transaction costs lead to a higher end price (Barthélemy 2001). Some researchers even find that in specific cases of total outsourcing, over 70% of the projects eventually go out of budget (Lacity and Willcocks 1998). The warning signs are all over

the place. Cultural differences play a large role in this. Overby (2003) strikingly states that Indian programmers have a hard time speaking up and offering suggestions. An American worker would say: "What you're asking for doesn't make sense, you idiot" while an India worker would think "This doesn't make sense, but this is the way the client wants it" (quoted CIO of GE Real Estate Hank Zupnick by Overby 2003, p. 7).

The process of software development is a complex task. It requires teams of skilled people and proper steering to be successful. Outsourcing this task comes in different forms. One approach is for engineers to do the analysis and high-level architecture work and provide the technical and functional specification. The programming and unit testing tasks are then subcontracted to an offshore partner. The opposite to this approach, the client only provides the high-level functional specification and relies on the vendor for all other tasks (both from Cusumano 2004). Between these extremes, other possibilities are possible. In this research, a different approach is investigated. This is the approach of dedicated teams. The client company has full control over the employees. The work is directly provided to the employees as if it were its own team. The vendor has a facilitating role. It takes care of the working environment, the salary appraisals, the hiring and firing of employees, hard- and software etc.

While large companies are outsourcing on a large scale, small and midsize companies are now joining in. This is the area where this research has taken place. This empirical research is aimed at finding success factors in offshore software development for small and midsize companies.

A number of researchers have tried to find success factors for offshore

outsourcing success. Gottschalk and Solli-Saether (2005) list 11 critical success factors based on 11 different theories. The authors however do not propose any practical implications to leverage these success factors. Bhalla et al. (2008) evaluated the extent of offshore IT outsourcing in relation to its success. The extent is measured with what a company is outsourcing: 1) software development, 2) business process outsourcing and 3) call centers. The authors conclude there is no relation to the depth of offshore IT outsourcing and the success rate. Of course, when the scope is narrowed down in business type as well as IT functions, you can identify factors that could leverage success. These previous researchers have limited their scope to large and multinational companies. This research is therefore aimed at finding qualities in offshore software development for small and midsize companies. This is an underdeveloped area in the academic literature.

## Methodology

This empirical study is done in the form of a qualitative research in finding factors that leverage success in offshore software development for small and midsize companies. The problem definition is stated next.

### ***Which factors lead to successful projects in offshore software development for small to mid size companies?***

To give an answer to the problem definition above, a case study research has been done at eight clients and one former client of the company coMakeIT. This company provides dedicated software development teams to Dutch companies. Seven out of the nine companies develop and market its own software product. From each company, two interviews have been conducted: one at the clients site with the responsible project

owner/manager and one interview in India at coMakeIT with the team lead. The team lead is responsible for the development process in India. For the creation of the interview protocol, the methodology of Emans (2002) was used.

The following companies have been researched (company names have been made anonymous):

- Company A: Company A is a small startup company which are making and marketing a single software product. The complete software development is done in India, the functional requirements are formed in the Netherlands.
- Company B: Company B is a midsize company which is producing and maintaining different software products. Most of their development is done in the Netherlands. In India, a small team is available.
- Company C: Company C is a non-software company which had an offshore software development process in the past.
- Company D: A midsize company focusing on a single software product. The company has doubled its development team size through offshoring with coMakeIT because capacity shortage.
- Company E: A startup company with a small team in India building a single software product.
- Company F: A midsize firm which produces multiple software packages in multiple sectors. It has software development teams in Europe and India.
- Company G: Company G is a midsize software company producing a single software product.
- Company H: Company H produces software on a project basis for its clients and has a small team in India.
- Company I: Company I was a consultancy firm. The company

was responsible for the project management for the software development project at Company C. Company I had a small team in India. This team was terminated.

- Company J: This company develops and markets its own software product with a team equally divided over the Netherlands and India.

For these nine companies (the case of companies C and I are regarded as one), three sources of data have been used:

1. Interview with offshore project manager
2. Interview with Indian Team Lead.
3. Historical data on team size and salary.

The interview protocols are based on a literature review done in the area of offshore IT outsourcing and offshore software development. These include the following topics: *Success factors, Advantages, Problems and Risks*.

The *success factors* were split into two categories: *considerations* and *project characteristics*. The considerations are the factors that play a role before the decision is made. The goals of the sourcing deal, the decision on total or selective sourcing (Lacity and Willcocks 1996), the considerations on offshore, nearshore or local and the wish to peruse a transactional relationship or strategic partnership. The characteristics are factors during the offshoring process. These include the type of software in development, the technology, the team size and the frequency and method of communication. These two factors formed the basis of the success factors in the interview protocol.

To achieve a qualitative measure on success, *advantages, problems* and *risks* have also been investigated. The Dutch interview candidates where presented a list and were asked to

state if they recognized the presented advantage, problem or risk. The interview candidates in India were asked to express their problems and risks with the client company and coMakeIT and their achievements.

## Results

From the empirical study, some surprising results have been found. First, the companies within this case study mainly choose for offshore software development due to capacity reasons (eight out of nine). Cost reduction was on a second level. This interesting finding was also recently recognized as trend by Lacity et al. (2008). The reason to outsource is shifting from cost reduction to quality and capacity reasons. The Dutch product software companies from this research had problems in finding enough qualified personnel to support the growth of the company. This is in contrast with the general finding in the field that offshore outsourcing is primarily for cost reduction.

Another observation was that technology was not a factor influencing possible success or failure. Different types of software in different technologies are being developed successfully.

Communication is found to be of importance and when teams are mixed (development teams consist of Dutch and Indian employees), communication is very important. This relation between coordination and communication is also found by research of Fabriek et al (2007). Almost all project managers and team leads mentioned the importance of communication in offshore software development. Some stated that this was critical to the success of their projects. This is supported by research by Jager et al on Controlling risk prior to offshore application development (2008), in which collaborative risks were indeed identified as the biggest influencer on success.

Another important factor in this research was the use of an iterative software development method. Two larger companies with a single software product in development (Company D and Company J) used Scrum as their development method. Three companies within this study used elements of Scrum, mainly because the team size was too small to cover all the roles within this methodology. Four companies did not use any formal methodology. The development was planned, tested and executed according to the project that was at hand. This method has been labeled ad-hoc.

Finally, the team formation has been found to be related to possible success. There are generally two options: *separated* or *mixed*. A separated team setup implies that the Indian team is viewed as independent from the existing team. The mixed approach treats all employees equally regarding their geographic location.

The following factors are influencing success as derived from this case study:

1. Team size.
2. Communication.
3. Software development methodology
4. Team formation

The most profitable advantage was, of course, the cost reduction. All Dutch interview candidates stated this. Also, the availability of skilled people was recognized many times. The top 3 of advantages that client companies experienced is:

1. Lower costs
2. Availability of skilled people
3. Faster development

Communication and opportunistic personnel were the most common problems within the companies. The Dutch clients felt that Indian employees were often too positive in estimating their own skills. Also, higher overhead costs were recognized. The top 3 list:

1. Communication
2. Opportunistic personnel
3. Higher overhead costs

## Analysis

For this analysis it is good to first consider the context of this project. The context of this research is software development in small to midsize software companies. Also, the case study mainly included product software companies. The goals these companies have are capacity related. These companies are trying to expand their development capacity through dedicated offshore teams. This analysis may not hold for all offshore software development in general.

The use of a software development method and the team formation are important characteristics influencing possible success. This is also a finding of Fabriek et al in a thesis and paper on reasons for success and failure of software development projects. (2008) These are combined into co-ordination mechanisms. There are in total 6 different types of co-ordination used

within the set of clients for this research. These co-ordination mechanisms are shown in table 1. The co-ordination mechanisms are based on the results of the empirical study. Because this study has an explorative and qualitative nature, the co-ordination mechanisms are therefore propositions and are not quantitatively tested.

The co-ordination mechanisms are formed from two results: the use of a software development methodology and the team formation as discussed in the previous section. The goal of these co-ordination mechanisms is to clarify the possibilities in team co-ordination when choosing offshore software development. It seems different types of companies and projects can best use a specific co-ordination mechanism to maximize potential success.

**Table 1: co-ordination mechanisms and their application**

Co-ordination mechanism	Application	Required
Mixed iterative	For large, single product software development teams in both the Netherlands and India.	Frequent communication at employee level, overlap between working hours.
Separated iterative	For large, multiple product software development teams in India and The Netherlands.	Give ownership to the Indian team.
Mixed methodological	Unknown	Unknown
Separated methodological	For small software development teams that cannot cover a full software development method.	Give ownership to the Indian team.
Mixed ad-hoc	For companies that work on multiple software products.	Frequent communication on project management level.
Separated ad-hoc	For companies which have dividable and predictable work, project based.	Frequent communication on project management level.

Companies which have a single software product in development and want to expand its capacity can be advised to choose for a *Mixed iterative* mechanism. One or several iterative teams could be set up consisting of domestic and offshore personnel. These employees work together in an iterative setup, possibly Scrum or another Agile software development method (Abrahamsson et al. 2002). This setup encourages cross-border team work so new employees learn from the existing ones. Important is to have some overlapping working hours to support real-time communication.

For smaller companies that do not have an own software development department, *Separated methodological* can be advised. In this setup, there is a single team of Indian employees who are controlled by the client organization. Due to the generally small size of these teams a full methodology often cannot be used. When the team grows, a shift can be made to *Separated iterative*.

When a company has multiple software products in development, the *Separated iterative* mechanism can also be used. Each team should get their own responsibility and ownership over the development of this product. Feedback from the market should be shared with the development team, so the employees feel responsible for the product. Working in this way requires a lot of trust in the Indian team and the vendor that provides the employees.

The overview of the co-ordination mechanisms is given in table 1. An overview of the advantages and disadvantages is given next.

### **Mixed iterative**

Advantages:

- New employees learn from existing ones.
- Fast team setup.

Disadvantage:

- Lots of communication and effort is needed.

### **Separated iterative**

Advantages:

- Each team can focus on own project.
- Less communication is needed on operational level.
- High productivity.

Disadvantage:

- Team does not learn from existing domestic employees.

### **Separated methodological**

Advantage:

- Possibility to setup small offshore teams.

Disadvantage:

- Not easy to maintain control over the team.

### **Mixed ad-hoc**

Advantages:

- Possibility for project oriented or multi product companies.
- New employees learn from existing ones.

Disadvantages:

- Lots of communication and effort is needed.
- Ad-hoc approach is rarely optimal.

### **Separated ad-hoc**

Advantage:

- Possibility for project oriented or multi product companies.

Disadvantages:

- Lots of communication and effort is needed.
- Not easy to maintain control over the team.
- Ad-hoc approach is rarely optimal.

## Conclusion

This study found qualities in offshore software development for small and midsize companies. This is done through an empirical study. In total, nine cases have been studied and two interviews for each case have been conducted.

The problem statement presented in the introduction can be answered. The co-ordination mechanisms seem to be the key element to predict future success or failure. Specific cases studied in this research support this finding. Choosing a proper co-ordination mechanism that fits the need of the organization can be factor that leads to a higher chance of success.

Organizations developing a single product with multiple teams could consider the Mixed iterative mechanism. This mechanism lets team members work together in globally separated teams. New employees learn about the product from the existing employees. Important is to enable communication. Overlapping

working hours and (internet) phone connection are important.

Companies without an own development team can choose for the Separated methodological or Separated iterative mechanism. Important is to give ownership and responsibility to the Indian development team.

## Future research

This research shows that there are opportunities for small and midsize companies in the field of offshore software development. Clients of coMakeIT are mostly in the business of producing their own software. It is interesting to test these findings in small to midsize companies where software development is not the core competence. Another interesting topic would be to see if the traditional model (specification done by the client, coding done by the offshore partner) fits the project oriented companies better than this model of dedicated teams.

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