



UNIVERSITY OF GOTHENBURG

Agile outsourcing

A Case Study

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Bachelor of Applied Information Technology Thesis

Report No. 2010:010

ISSN: 1651-4769

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Agile Outsourcing – A Case Study

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Abstract

In recent years outsourcing has become a major factor in IT and can no longer be ignored. Companies are outsourcing some or even whole part of their development. Cutting costs is an obvious reason for outsourcing but it could also be for flexibility or the usage of expert knowledge. It is possible to save a lot of money but there are many obstacles for the companies to overcome before they can be successful in outsourcing. Agile development is another area that is increasing and is being used in a successful way. This case study has been conducted to explore if it would be beneficial to run an outsourcing project using an agile model. The main focus will be a small pilot project that was conducted at a consultant company to test their new model developed mainly for outsource projects.

1 Introduction

Global software outsourcing (GSO) has been around for 50 years in IT development and it has continue to grow since then [1, 11]. In 1996 the Outsource Institute estimated that companies will spend \$40 billion on GSO in US alone and they also predicted that in the year of 2000 it has reached a level of \$282 billion. India, one of the largest countries in GSO, has had more than 40 percent annual escalation over the last decade [2]. The main reason for hiring GSO staff is obviously to cut costs and one example of this is that companies can save e.g. on a project manager up to \$2000 a month. Another reason for outsourcing could be that the company would like to get expert knowledge in a particular area or increase the company's flexibility. This means that the company can continue to focus on their core area to get

advantages and use outsource companies as a knowledge buffer [7].

Although there are successes stories, there are many issues that need to be considered before a company starts becoming successful in outsourcing, because only 56 % of companies GSO decisions achieved predicted cost savings [2, 5]. The article The Risks Of Outsourcing IT Michel J identifies 11 different risks that could arise within a GSO project [3]. The most common issue is by far communication, since it is very easy to misunderstand or interpret something in the wrong way because of e.g. culture or language difficulty.

Many of the above issues have been encountered by the company where this case study has been conducted. The company's name will be sheltered and therefore only be mentioned as "the company". The company has been using outsourcing as a part of their development strategy for many years. The company has developed a new process model and it consists of best practices taken from other known models (such as SCRUM, ROPES, RUP and XP) combined with their own experience gathered from many years of GSO development.

The purpose of this paper is to examine whether or not there are benefits to run a GSO project in an agile manner. Meaning, if a combination between the benefits of agile models (e.g. XP has in a web project an "average increase of 66.3% new lines of code produced 302, 1% increase in the number of new methods developed" [4]) and GSO could make future outsourcings projects more successful [6]. Another reason is that both GSO and agile development continues to increase in use and there are not much research done in combining the two [4]. One additional reason for conducting this research is that the company wanted someone from the outside to review their new model and come up with new strategies or suggestions to improve it.

The research question that will be investigated in this case study is: What benefits can be

identified from using a mature agile development process model in an outsource project?

This article is divided into the following sections: chapter 2 goes through the theoretical background, chapter 3 will describe the research context, chapter 4 will explain the method used in this article, chapter 5 takes up the findings, chapter 6 discuss the different interesting topics during this study and last chapter 7 the conclusions drawn from this study will be outlined.

2 Theoretical Background

Below is a description of the theoretical background of this article.

2.1 Outsourcing

The word outsourcing is not explicit to Information Systems (IS) when the meaning is hiring outside working force to perform tasks for the company [11]. However, there are some authors who define it as:

"... turning over to a vendor some or all of the IS functions..." [14]

"...the organizational decision to turn over part or all of an organization's IS functions to external service provider(s) in order for an organization to be able to achieve its goals" [15]

"...the third party provision of IT products and services" [16]

From the beginning outsourcing was a fundamental task conducted by a single offshore company for one client [11]. One example of this is when the offshore company has an operational control over a client's products in e.g. a data center. This simple arrangement has evolved to complex solutions with several offshore companies and clients sharing both benefits and risks.

There are several reasons for a company to outsource, part for cutting costs. One would be to get hold of a particular expertise in areas where it can be difficult or expensive to hire consultants [7]. It could also be to increase the company's flexibility, because it is possible to

use technical expertise only when needed. It could also be difficult for companies to keep those experts in the company if it is not there core area and this would harm the company's reputation. To have employees who are not working within the core area will also mean competing with firms which have this as their main area.

Another benefit with outsourcing compared with using consultants is that long term contracts will be beneficial and would increase understanding between the companies in areas such as communication, standards and cultural differences [2].

2.2 Agile development

Old process models such as the Waterfall model starts with gathering of "all" requirements. Thereafter an architectural design is created based on the gathered requirements followed by the actual implementation [17]. It has proved to be almost impossible to get everything right from the beginning and it is also difficult for the customer to make late changes. This highlighted the need for new models where it can be possible to make late changes and that it is possible to check with customer if the development of the software is on the right track. Agile development is increasing the whole time and one reason for this is that it has proven to be effective [4].

"The word agile by itself means that something is flexible and responsive, so agile methods implies its ability to survive in an atmosphere of constant change and emerge with success" [18]. There are many different agile models such as XP, SCRUM, RUP and Feature Driven Development, but what distinguish them from other models?

Abrahamson (et. al) has identified four different aspects that will make the process model agile [4]. 1) The model should be incremental with short cycles with small deliveries each time, 2) the customer should be closely involved in the project and communication should be frequent, 3) the actual model should be easy to understand and to a large extent documented, 4) it should be possible to make last minutes changes to the project.

2.3 Related research

Joachim Sauer tries to explain how agile best practices are suited for offshore development using other case studies and related documentation [6]. Heeks (et. al) shows several figures of how much money is estimated to be spent on GSO and potential cost savings for using offshore companies [2]. They also give examples of good and bad relations and gives example of why this could happen. Jens Dibbern (et al.) has done a huge literature study and a survey where they explore the IS literature [11]. They highlight what has been done so far, how this work fits together and tries to predict the future.

Klack and Bryne explain in an internal document from the company, how the model works and gives information about the case [9].

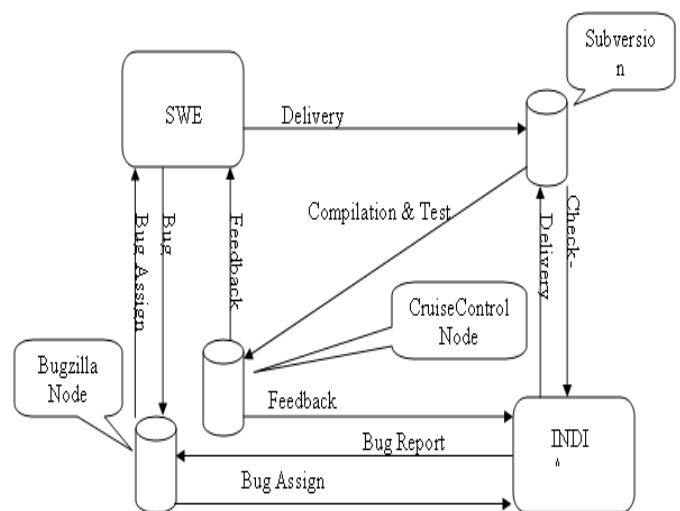
3 Research Context

This new process models is designed to run agile outsource projects using Test Driven Development (TDD) and its focus will be on the next feature to be developed [9]. It consists of best practices taken from several known agile models such as RUP, SCRUM and ROPES. This together with the company's own experiences from previous outsource projects has been the base for this new model. The company themselves says that the purpose of this model is *"using a global delivery where it is possible. Guaranteeing that no architectural rules are broken and thereby have a product with good quality"* [9]. It is also important to mention that nothing is totally set, this means that it is possible to make changes in any part of the model to best fit the project.

One of the ideas in this model is to have the customer very close involved in the development of the program. This is done by using frequent deliveries on to a server from where it is possible for the customer to download the latest release. This does obviously demand that the customer has some technical experience and is willing to participate in the development process to some extent. However the benefit will be that if the customer is not satisfied, the feedback could be very quick from either feedback meetings or from the error handling system. If the customer does not want

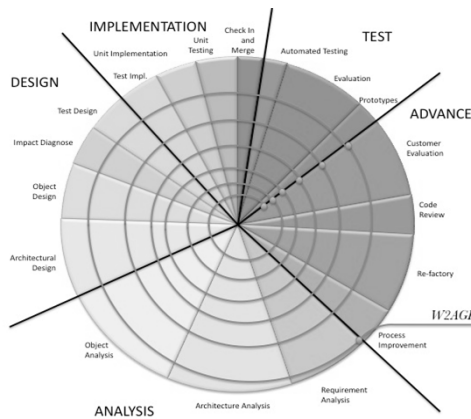
to participate an employee will act as a customer and try to put himself in customer position.

How the infrastructure was build up can be seen in figure below. The first thing that will happen is that the people at the company will upload a test framework on to a server. This can then be checked out by the outsource company and then they can start implementing immediately. After that the outsource company (INDIA) should check in the program again each day even if there still are some errors, this because it would be easy for both customer and company to follow the progress. Bugzilla is used as bug-tracking system to keep track of the different bugs and to be able to prioritize among them. If the customer desire, they can also get access to Bugzilla which means that they can go in and decide which bugs that should be prioritized.



3.1 Process Model

Before a new project can start it is necessary to decide which development company that is most suitable for this project and set up necessary development environment. This can be done by e.g. evaluating CV, conducting interviews and training session. This model consists of five different stages which will all be conducted during short increments during a 2-3 week period of time or even as short as a couple of days (see figure below).



The first phase is the Analysis and the purpose of this phase is to capture customer's requirements of the program, the model promote that both programmer and customer attend these meetings (and obviously the project managers). The most difficult in gathering requirements is not to understand what the user says that they want. It is instead *"the effort of helping users figure out what they 'need' that can be successfully provided within the cost and schedule parameters available to the development team"* [9].

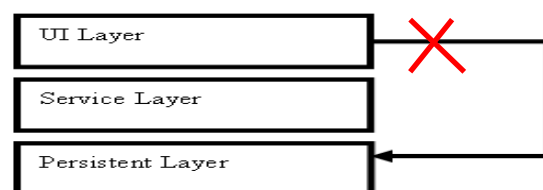
In second phase (Design) is where the design of the program as well as the tests will be conducted based on the gathered requirements. It is also in this phase where the Architectural Design is constructed or suggestions to modifications to the all ready existing architecture. Tests are considered very important and therefore some time will be spent on setting up the automated tests, so that it will be possible to conduct quick and effective test. The framework will then be uploaded to the server and Use Case diagrams will be sent down to offshore company to describe how the program should be used. It is important to make sure that the programmers understand how this diagrams work even though the company is using standards [2]. To make sure that they have understood correctly they have to send back a Sequence Diagram before the implementation can start. When the Sequence Diagram is correct the actual implementation of the program together with unit testing can start. Since the model is TDD it is important to finish the test implementation before the feature implementation. The last thing that will happen in this phase is to upload and merge all the developed components.

After the components have been uploaded and merged together the whole program will be tested using the automated tests. An evaluation of the different test is also conducted and a new prototype is possible to download. During the last phase a code review will be performed as well as an evaluation with the customer on how the project is progressing according to them. This phase also gives some room for reflecting on the process, if it e.g. needs to be improved or changed in any way before a new lap around the model starts again. The Advance phase does also include a customer validation of the software.

3.2 The Case

This case is a small outsourced pilot project that has been developed by the company to test their new agile outsource model [9]. The program is a so called order application where some of the main features are storing retail parts, handling customers and system users, finding register order, administrating customer, creating new customers and administrating system users. The program is developed in Java and is considered to be a user intensive application, therefore usability has been one of the most important requirements. They also wanted the system to be easy to extend, hence modularity and scalability was also considered to be important requirements. The last requirement that was considered very important was testability, this because they wanted to ensure good quality and that the architectural rules was followed.

The project's application is divided into several layers, to make the program easy to extend. It is important that the architectural rules were followed. To make sure of this the company has developed a new framework which contains interfaces and rules for communication between the layers. The developers have to register each new service in the service layer with correct access, the framework will then make sure that no access to the persistent layer is possible (see figure below).



4 Method

To deal with the research question a single case study will be conducted using a qualitative research approach. According to Creswell a case study is *“a strategy of inquiry in which the researcher explores in depth a program, event, activity, process, or one or more individuals”* [13]. Creswell also mentions that a case study is restricted by time and that the researchers collect different kind of information during that restricted time. When it comes to qualitative research Creswell states that it is *“means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem”* [13].

As research method to collect data for investigating the research question, three semi-structured face-to-face interviews will be conducted lasting 60-90 minutes. The interview persons will be project managers, developer and customer all employees at the company. Because this project is only a pilot project and only uses a made up customer. The participant's name in these interviews will also be protected and they will instead be mentioned by their profession. The article will be based on a qualitative analysis of the collected data from both interviews, read articles and questioner [13].

4.1 Research Process

The general idea for a process plan to carry out this study is mainly gathered from Creswell's *The Inductive Logic of Research in a Quality Study* [13]. Even though everything has not been followed in chronological order, all steps in the process plan have been included to produce this article, such as gather information, analyze data and try to look for patterns.

4.2 Data collection

The first thing that was done was to study related literature about outsourcing and other related topics e.g. Agile, TDD and ROPES. To obtain good and reliable research articles the search engines Google Scholar and IEEE Xplore have been used. The next step was to read up on internal articles from the company that describes the case and the new model before starting with the interviews.

Three interviews were conducted in the order of project manager, made-up customer and last two project managers. The idea from the beginning was to have an interview with a developer after interview with customer. Unfortunately the company had stopped working with that subcontractor, so this was not possible. However the company had an extensive questionnaire from three developers who had worked in this project [21]. This gave some insight to what they thought about both the project and the new model.

4.3 Data Analysis

The first articles that were read gave a broad understanding of the different topics. The most relevant information was summarized and put into different categories, this information then served as a base for the interviews.

The first interview with project manager gave more overall understanding of the whole project and a better base for continue both research and interviews. The second interview with customer was conducted to get an understanding of how it was for a customer to be so closely involved in a software project. Earlier data collection and interviews gave a higher understanding of the area. This made it possible to ask more direct questions regarding the project during the last interview with two project managers about the case, process model and how they thought it was to work in an agile outsource project. All interviews were recorded for later transcription and the material was then analyzed and also put in categories. Then all summarized material was analyzed to see if it could be any patterns or categories between related articles and materials from interviews as well as the questionnaire from developers.

5 Findings

The most interesting and challenging findings from the analyzed data will be outlined in this section.

5.1 Communication

As mentioned in the introduction communication is the most common difficulty when it comes to GSO [6]. On a direct question regarding the biggest trouble in GSO to project manager the

answer comes quickly, *“without a doubt communication”* [20]. This does not only apply for agile model, but since working with an agile model means iterate and check with customer many times communication will play an important role. This was also the biggest issue in this case where a misunderstanding regarding the implementation occurred [9].

There is nothing in today’s modern technology that can be as effective as face-to-face communication [2, 8, 20]. Small misunderstandings can lead to huge troubles over poor video/telephone links especially when there are language difficulties as well [10].

One way to solve this difficulty is discussed in the article XP Expanded where they suggests, *“Have a local expert in remote conditions to resolve misunderstandings in either direction”* [8]. This would ease the communication since the local representative could much easier interpret the remote group. One successful example of this is in the article Synching or Sinking when developers from GSO Company in India gathered the requirements directly from customer, this way of working was considered more successful [2]. If face-to-face communication is not possible the article suggests using as many communications channels as possible such as video, telephone, email and VNC.

During the development of the project no face-to-face communication took place. Therefore they had to rely totally on virtual communication, this proved to be not so easy. One of the developers conform these issues and a solution for it as well in a questionnaire, *“Sometimes jitters and bad voice lines/connections used to create troubles understanding the words and sentences of the other party, hence we use to clarify them in the mails”* [21].

One of the ideas with this model is to have daily meetings and this proves to be a good strategy, since it gave the developers the opportunity to ask any questions and get rapid feedback. On a question regarding morning meetings a developer says, *“It is better to have daily meeting so that the two global teams are on the same page and in will sync up”* [21]. He also says

that it was no trouble to raise any questions and the feedback was quick and easy to understand. The issues that occurred during communication could be discovered early because of working in an agile model. The project manager explains, *“It was also through the model’s short increments that the difficulty could be discovered so early, even if we lost a lot of time it was no disaster for us and without short iterations it could jeopardize the whole project in the end”* [20].

5.2 Eternal Triangle

Some years ago a new role was created to mediate between customer and the developers who were going to implement the program, but this only caused more confusion [3]. This was no trouble in this model since the pretended customer was in the building and very technically skilled. However on a question to project manager how they will solve it in the future if the customer does not want to participate in the development of the program and go to weekly meetings. He says that it is a dilemma, but we will always try to find someone who is technically skilled and willing to participate in the process [20]. Most of the time they are interested since the company are putting down a lot of money in to the project and then they will obviously that the program should be exactly as they want.

If this will happen the idea is that someone at the company will act as a customer but this is clearly not optimal. Project manager gives an explanation regarding another project, *“customer did not feel comfortable speaking English in a so important and technical meeting, so we considered hiring an interpreter. This is how important we consider this topic”* [20].

5.3 Soft Issues

When an offshore company or consulting firm tries to hire out employees or try to get a development project. They will obviously write the CV of the potential workers as good as possible. They might even exaggerate a bit just to get the project and if some knowledge is missing the employees will learn during development of the project. This was done to some extent in this project where some developers did not have all the knowledge that was stated in their CV [20]. This issue can be

solved by a work sample that can be done with the offshore team. Project manager explains *“If we should use an offshore team in a larger project we would conduct a work test on how to use the new model. This will show if they have necessary knowledge or not and if they do not have that they will have to learn or we will choose another team”* [20].

Today the company already has several offshore subcontractors and they might decide to educate some of them to improve their skills for a particular project. The article Agile Practices in Offshore Outsourcing claims that it could be difficult to train and time consuming to communicate architectural design to offshore teams [6]. This experience is not shared with the project managers at the company who says that they do not see any differences between offshore teams ability to learn compared with e.g. people in Sweden. However they do agree that offshore teams sometimes do not have necessary knowledge in architectural design, but once they had learned how to use the new framework it was no trouble in this case [20].

Even if it will take some time and effort to judge how technically skilled a team is, it is possible to some extent, but how do you judge soft issues? This could be issues like e.g. objectives or values which can differ between different employees and cultures. The article Synching or Sinking states *“perhaps not surprisingly, the limits centered on the soft issues”* [2]. In their case it was the offshore team’s unwillingness to change to new systems that was presented to them. In this case it was the offshore team’s unwillingness to upload what had been done on a daily basis. However this was detected quickly and broth up, since the project managers did not see any new code uploaded onto the server. After this minor incident the offshore company accepted the daily updates and the dilemma did not occur again.

5.4 Understanding the Client

As mention earlier communication is a big issue in GSO. One way to limit the chances of misunderstandings is to use standard forms [2]. This is however not enough because the offshore team will also need some explanation regarding these forms. The Synching or Sinking

article brings up this difficulty where a company uses a number of standard forms but this was not sufficient because, *“they incorporated a whole set of tacit assumptions and understandings that were not transferred”* [2]. This clearly shows that even though standard forms are used some explanation of how to use them is necessary.

In this case a similar dilemma occurred which is explained by one of the developers in the questionnaire. The question was, if it is possible to deliver on time? He types that, *“provided that you have correct design ready, developers know exactly what they have to do”* [21]. He also believes that there should not be any surprises during the implementation phase or any unanticipated difficulties. If all the above are taken care of, then it is possible to deliver on time. This also indicates that everything was not explained or understood enough by the offshore developers.

To start working with new offshore company with high expectations in a new big project where a large amount of the implementation will be done by the offshore company is the same as looking for trouble. Agile Practices in Offshore Outsourcing suggests that development should start in a small scale and then increase over time [6].

To establish a stabile way of working without put too much at stake and limit the risks could be to start the GSO development with a small and easy task, which is not very important. Then slowly increase with more and difficult tasks including more employees [2, 4]. This would not jeopardize the whole project if there would appear several misunderstandings during the beginning of the project. If a company would decide to start their new project like this it would be much more natural to work in an agile manner. Because it would be more natural for the offshore team to check frequently if they are on the right track or not, compare to working a more traditional way.

6 Discussion

Face-to-face is the best way when it comes to communication and understanding the client for

an offshore company, despite all electronic aids that exists today [6]. This was not used in this case and could be the reason for that a misunderstanding occurred. On the other hand this difficulty would not have been discovered at an early stage using a traditional model and might put the whole project in danger [20]. This highlights the need for agile models with short cycles, small deliveries and that the customers are closely involved like the model discussed in this article [4, 9]. When a company would like to start working with a new offshore company it would be beneficial to use the company's new model. Because the project managers e.g. in Sweden could just start the project with handing out a module with less importance, then increase with more work when the offshore team has understood the way of working [9].

There is nothing that indicates that this organization should be an obstacle for developing successful projects using offshore subcontractors. As discussed earlier in 2.1 Heeks (et. al) says that a company can benefit from long term contracts in outsourcing [2]. Since the company uses subcontractors they can benefit from these contracts and step by step increase the understanding in e.g. cultural differences, standards and also limit the need for face-to-face meetings. This way of writing contracts could also be used to build trust, since trust is a major success factor in GSO [10]. However it could be a setback if they feel to secure and forget to work on keeping the "we" feeling.

During this case study no issues regarding technology has showed that it could have major negative effect on future projects, such as new tools. However to get employees at offshore companies to use them or new process model could be [2, 20]. This was a dilemma in this case as well as one case from literature and this is very likely to happen in future projects as well. This can clearly be a difficulty in in-house projects as well but in offshore projects the culture differences will have to be considered as well. This case study also shows that it is important that developers have enough technology knowledge as well, but this is easier to detect [20].

The main reason for the company to outsource is by far to cut costs [20]. The company does not feel the need for turning to offshore companies to get some expert knowledge or increase flexibility. However they do state that without outsourcing it would not be possible to keep the prices so low.

Despite that some setbacks could occur the researcher believe that agile outsourcing is here to stay. Nevertheless there is no magic solution to solve all setbacks at once, instead it is hard work and carefully prepared planning that will provide the cost savings for your company.

As mention earlier in this article it is possible to assess employees from their CV or different tests, but how is it possible to assess the different group's ability to adapt to a new process models? According to Agile software development methods any resistance against a model could be enough to fail the whole project [4]. So it is a very important question, but it will probably also be very difficult to answer, because the potential offshore company will probably not reveal that they are against working in e.g. a new process model.

Another interesting area that during this investigation has not been seen that much research about is nearshoring [12]. Nearshoring means outsourcing to a country which is located much closer to where you are located, from Sweden this could be e.g. Estonia, Latvia and Lithuania. Obviously most of the arguments will be the same for nearshoring, but the interesting questions would be regarding the differences. If there are any and if there is which one are there? Part from the obvious time span what other benefit could be found and are there any major downside with nearshoring?

Agile software development methods mention several figures that highlight the benefits of agile development such as "282, 6% increase in the number of new classes implemented in a development effort" [4]. During the investigation of this article the researcher has not come across any similar numbers when it comes to the combination of outsourcing projects developed using some kind of agile method. It would be interesting to see if the numbers are the same in

outsourcing projects as well or if they differ and if they do in what way do they differ?

6 Conclusion

This case study cannot provide any suggestions for improvement or new strategies. To discover such improvements the researcher believes that a larger and more extensive study is necessary. The conclusions that could be drawn from this case study using the company's new agile model compared with a traditional model. Is that a misunderstanding can quicker be discovered. It is also easier to hand out a few small modules or features at a time to outsource company.

Acknowledgement

I would like to thank my industry contacts Stefan Bryne and Magnus Klack as well as my academic supervisor Rickard Lindgren, for their support and valuable discussions in finishing this article.

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