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# Offshore Software Project Development and Agile® Framework

Can there be a Confluence?

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## 1. Abstract

The core tenets of Agile® Framework of software development do not synchronize well with Off-shore Development methodologies. The Agile® Manifesto advocates for collocation in place of globally distributed teams, working software in place of huge documentation, and quick response for a change instead of following a concrete project plan. However, Off-shore Development model naturally has globally distributed teams and it follows a project plan for execution. Simultaneously, as Off-shore Development companies have adopted various models of Capability Maturity Model® – Integration (CMMI®), the development methodologies adopted are more in line with Waterfall or Iterative mode of development or some of its variants. This paper reviews the applicability of Agile® Framework in an Off-shore Software development environment and addresses the various possibilities of its implementations via a case study driven approach.

## 2. Introduction

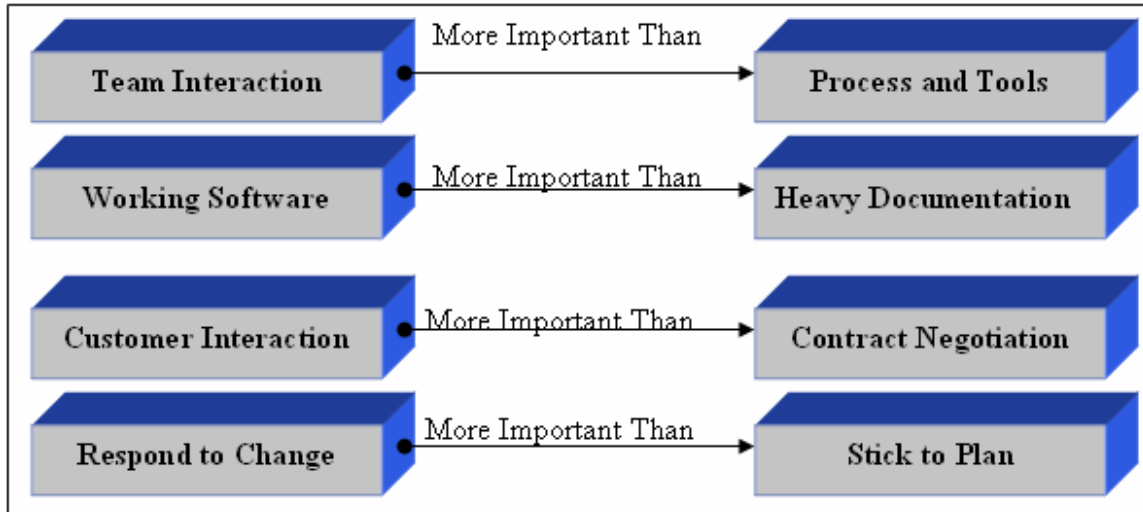
In this paper, first, the core concepts of Off-shore Software Project Development and Agile® Framework are presented. Then a case study driven approach is presented to check the viability of Agile® Framework with eXtreme Programming (XP®) as the development model in an Off-shore project development environment followed by information on organizations which can truly follow Agile® framework. Finally, a conclusion has been arrived on possible applicability of Agile® Framework in various Off-shore environments.

### 2.1. Offshore Software Project Development Model

By offshore development model, it is generally meant to be Offshore Services Companies which are present across the globe and they execute contracted work for other companies present in different time-zones or localities. Many of them are certified with various levels of CMMI® and they mostly follow Waterfall or Iterative model of software development. It must be noted that CMMI® does not prescribe any methodology for software development like Agile. CMMI® informs “on what to” rather than “how to do”.

## 2.2. The Agile® Framework

The Agile® manifesto primarily talks of 4 core things, which are depicted in the figure below.



**Figure – 1: Core Tenets of Agile® Development**

- **Individuals and interactions over processes and tools:**  
Personal and face-to-face communication is the most favoured over processes and tools. It means team members have to be co-located.
- **Working software over comprehensive documentation:**  
Documentation is not much favoured; rather it is about software which is working. Documentation is done on a need basis.
- **Customer collaboration over contract negotiation:**  
It means contract though present is less favoured and close collaboration with customer takes precedence.
- **Responding to change over following a plan:**  
Changes are quickly accepted and responded. A pre-approved plan of action is not followed.

## 3. A Case-study on Agile® in an Offshore Project Development Model

A case-study is presented to understand what can go possibly wrong with this kind of development model.

### 3.1 Case Study

The case study is with respect to a CMMI5® and PCMM5® level company from Asia Pacific, which follows an Off-shore development model. The contract for the project was awarded by a North American Original Equipment Manufacturer (OEM®) with strong product development background. There were 3 engineers from the OEM® and 4 engineers from the Off-shore company. An Agile® with XP® development methodology was adopted to deliver the project.

To appreciate the issues faced, the core differentiation between traditional Software Development Life Cycle (SDLC) with Waterfall or Iterative mode of development and Agile® Framework in XP® development environment is presented below.

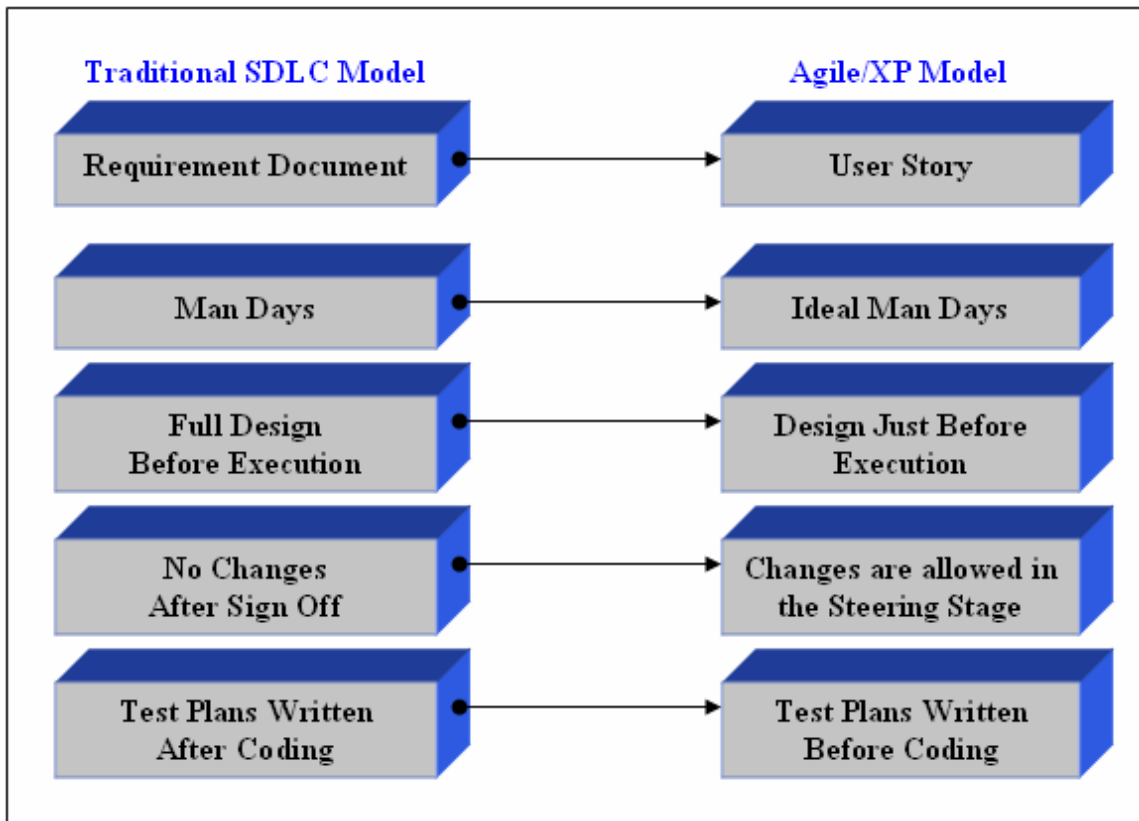


Figure – 2: Traditional SDLC Vs Agile®/XP® Model

#### 3.1.1 Issues Faced

##### Issue-1: Lack of Collocation or War Room Environment

There is a gap of 10 to 11 hours between time zones. The Agile® Model expects frequent interaction between team members as changes are made in quick succession and module dependencies between chunks of codes to deliver any feature remain high. This demanded frequent late night stay by team members and in long run it impacted the moral and productivity. Also, in a globally distributed team environment, daily stand-up meetings, sticky notes to User Stories (please refer Figure – 2) etc. which are needed in an Agile®/XP® environment were not possible.

### **Issue - 2: Conflict between Process Driven Framework (CMMI®) and Lack of Process (Agile®)**

The Offshore Company is highly process driven as they are following the CMMI® framework and documentation is valued tremendously. This also ensures that you are always on the right side of the contract and do not run into rough weather. However, the project involved over 150,000 Lines of Code (LOC) of code over a span of and significant contribution was desired from each member. Though documentation was important, it was very important.

This frequently resulted in a conflict between the core principles of a “CMMI® Environment” and an “Agile Environment”. In the former order is required, documentation is valued where as, in Agile, chaos normally thrive and though documentation is needed, it is not an absolute necessity.

### **Issue -3: Lack of Highly Skilled Professionals**

In a typical Off-shore development company, fresh engineering graduates form the bulk of the strength. In the Off-shore development company mentioned, it is over 70 percent. Simultaneously the productivity expected from a developer in a CMMI5® level company is around 110~150 LOC per day.

However, Agile® Development asks for highly skilled and experienced professionals in their domain so that they can respond to code changes frequently, and they can come up with innovative solutions. Though training was given to the fresh engineers, it was clearly evident that some members were overloaded with heavy work and some could not perform due to lack of skills.

### **Issue- 4: Lack of Control on Build Process**

Build was done at On-site location of the OEM® customer as it required a different level of partnership to entrust the build process to an Off-shore company. Generally, Technical Leaders and contributing Developers prefer to have control over build process so that they can check-in their codes and see the impact by making a test build. This helps to reduce the mistake in a real time testing environment and sometimes build breakages, which can delay the project by a day or two.

Also, the code being checked-in for was significant in number: close to 3Kilo to 4Kilo LOC by 7 developers in a day. Though On-site Co-ordinators were present from the Offshore Company at the customer location, build process was mostly ineffective considering work load of the coordinators and time-zone gap.

### **Issue - 5: Frequent Change in Requirements**

Requirements were changing frequently as expected in an XP® environment. Also, change in requirements during late development was accepted. (Refer Figure – 2). Simultaneously, traditional management tools such as MS Project 2007® do not have in-built templates to work in an Agile Environment and managing a number of churns in the project were mammoth tasks and hence could not be properly controlled.

### **Issue – 6: Strong Emphasis on Contract**

Traditionally, Off-shore companies follow Time and Material (T&M) contracts, which keep the risk of seller (Off-shore Company) low, though they may go for Cost Reimbursable (CR) or Fixed Price (FP) contracts depending on the requirements. Nevertheless, there is a strong emphasis on the contract of the project. The project being taken up was under T&M contract and the seller placed strong emphasis on it.

However, Agile is not about contract negotiation, rather it is more of working with customer in tandem to deliver the end product. Typically, a standard contract is formed and the project is executed.

### **Issue – 7: Issues with Projectized Environment**

Offshore companies work typically work in a Projectized environment where the project manager is normally the most experienced personnel. However, the Agile® framework is best suited in a Composite form as defined in Project Management Body of Knowledge (PMBOK®) Guide. PMBOK® defines a Composite Structure where a special team of people with high domain capability and technical knowledge are carved out to work on special projects. They can develop their own set of operating procedures and may operate outside the standard, formalized procedure of the organization.

### **3.1.2. Final Result:**

The aforementioned issues created a lot of misunderstandings and miscommunications. Above all, though the project was delivered by the Offshore Services Company, it was learning on its own – how to deliver software projects in an Agile® Environment.

## **4. Which Offshore Companies Can Actually Work with Agile® Framework?**

Generally, an offshore development company with a gap in time-zone and adopting CMMI® model for software maturity can not properly function in an Agile® software development environment. If they follow CMMI® principles, they also generally follow the Waterfall or Iterative development model. However, there have been success stories with Agile® development and we found out that they broadly belong to these categories.

### **4.1. Core Product Companies from Offshore Locations**

As they develop their own product with their own set of development team members, there is a high degree of cohesion among members, and they have the required domain expertise. Above all, they are co-located and work effectively when the churn in development is high. In fact, to build a product from scratch, one of the best applicable software development models can be the Agile® framework.

### **4.2. Product Companies with dedicated Development Centers at Offshore Locations**

The emphasis is on the keyword “dedicated”. This makes them work as one of the previous categories mentioned in our list.

### **4.3. Services Companies with Completely Outsourced Projects**

Services companies wishing to honour contracts in an Agile® development model should have complete ownership of the project. Also, to properly work in an Agile® environment, they need a team of dedicated and highly techno driven individuals.

## **5. Possible Confluence between Offshore Project Development and Agile® Framework:**

In globalized environment, the aforementioned 3 categories of organizations, which can truly follow Agile®, do not form the majority. In fact, most of the Off-shore companies still fall into a normal outsourced category where core work is performed by the buyers and repetitive work is executed by the Off-shore companies. To address such scenarios, one the following models can be adopted.

### **5.1. TSP – CMMI® Model**

While CMMI® gives examples of various processes and practices at the organizational level, it does not inform on the specifics for software developers and their teams. Here, the Team

Software Process (TSP®) as defined by Software Engineering Institute (SEI®), comes into play. TSP® implements most of the practices a software project team would have via CMMI-5® model.

TSP® informs the “how to do” part for the software development team. Also, a lot of principles from TSP® has sound resemblance with Agile® Principles: [v.i.z.] individuals being key to product quality and effective team interactions are necessary for success, team members can choose evolutionary lifecycle models to deliver early functionality, having a customer interface manager for sustaining customer contact, expecting changes and periodically re-planning and re-launching etc.

## **5.2. Hybrid Agile Model:**

As Agile® framework is difficult to apply completely by traditional Off-shore companies; they can develop their own model which will combine the best practices from CMMI®, Agile® Framework and various Agile® oriented software methodologies such as XP, Scrum, Test Driven Development (TDD) etc.

## **6. Conclusion**

Offshore companies who are CMMI® certified generally follow the Waterfall or Iterative mode of development as CMMI® is frequently applied to large, complex projects which often require detailed conceptual models before coding and it is often used as part of a formal acquisition process. However, Agile® framework is focussed on small to medium sized projects and it demands a higher level of customer trust as well as confidence on the supplier’s technical ability.

Hence, one of the three mentioned categories of companies (Refer Section – 4) can truly apply Agile® principles in the real world. For traditional Offshore companies (Refer Section – 2.1), they have to follow one of the models mentions in Section – 5 or can develop their own methodologies to apply the principles of Agile® to certain extent.

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