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**Theme:**

Traditional software development relies on the so-called waterfall model: requirements, design,test, distribute, maintain. Newer “agile”, methodologies suggest this is too strict. Compare and contrast.

**Introduction:**

“Software Development Methodology” (SDM) is a methodology which every professional hears and use it in software methodology. When software engineers need structure, plan and control the flow of process they use this methodology. They can choose either “Waterfall” or “Agile” methodology and how engineers implement this methodology plays important role in success or failure.

In modern world , numbers of projects and startups increase rapidly as a result of this number of failures also increase naturally. One of the biggest reason of that wrong approach to the projects. For example, customers always change their minds and want some additional features, requirements or functionalities and developers most of the time accept and implement it without questioning. The reason of that customers can not see or understand various concept such as business requirements, use-case analysis and design specification and so on. Developers without guidance of SDM most of the time hit the wall or projects fail. In addition to that, late delivery and over budget which is most important aspect of project will face with obstacles. Late delivery also means over budget because developer do not work for free and customers loose money because of late projects. As a result developing without SDM methodology, project will not meet end-user expectations.

If SDM implemented not properly, there will be several problems and these problems play obstacles role in life cycle of projects. Communication between customer and team manager is one example. When communication is poor result also will be poor when communication is good and without gap result will be satisfactory.

**What is Waterfall methodology?**

Waterfall is the methodology which focus on linear sequence in software development. In this methodology there are five main phase and all of them should handle consequently.

* **Requirements-** This phase is most important one. Because all of the project take momentum from this phase and because of the waterfall you can not go back and check it. In this phase documentation part play roles. Use-cases, scenarios, requirements and functionality will design and collected.
* **Design-** Requirement phase studied in this phase. Overall system design and project is compatible which hardware is also issue of this phase.
* **Testing-** After each phase all of the components or unit of work will tested. If there are no problems this units integrate from tester.**[2]**
* **Distribute-** It is also called deployments. After functional and non functional testing finish successfully project will go deployment phase.
* **Maintenance-** In every project there can be some issues at this moment customers will contact with support service and support service collect complaints (data) and bugs from customer (it can be screenshot or records) and tell to development team. Team solve this, in addition to that there can be some improvement or better version.

**Advantage of Waterfall methodology**

In the first phase and beginning of the cycle developer team, project manager and customers agrees on what they deliver and what they get and what they expect from each other. It makes process straightforward and there will not any problems in other phases. When team leader or project manager wants to measure progress waterfall makes it easy. After requirement phase process does not need customer because all documentation solved in requirement phase.**[2]** If project finish successfully it is excellent no need to extra code. Because sometime adding extra code can create some bugs. The reason behind this sometimes some new lines code can not fit to old code and it will be problematic. Testing phase control them.

**Disadvantage of Waterfall methodology**

Understanding customer is a big problem and in this methodology you can not go back that is why project manager should be sure about requirements. But some time customers do not know what they want or they can not visualize application form of document. Mockups are extremely helpful in this phase but some times after finishing project end user may not like project or GUI part.

Another disadvantage of Waterfall is strictness of this methodology. Customer can not change their mind if they change it will be most costly. Because deliverable based on requirement phase.

**What is Agile methodology?**

Agile is methodology of SDP and approaches project iterative and team-based. Most of the time teams are cross functional and it makes teams stronger. This is the rapid delivery of an applications with functional components. In agile methodology creating tasks and schedule time to these tasks is not an issue. Instead of time slot agile uses sprint which last several weeks. Project divided into smaller parts and each sprint handle one part of the project. If one sprint is not enough for one part of the project and team can not handle this part in this duration, the remaining part will be topic of next sprint. It makes Agile more flexible. When project finish it can be reviewed and evaluated by project manager, team member and customer. In Agile, customer involve project during whole process.

**Advantage of Agile methodology**

* Customer play important role in project from starting phase to the deployment. As a result of this customer immediately see result and ask for changing.
* Customer get comprehensive knowledge about project during life cycle of the project.
* Agile is more user-focused because customer always inform team.
* Transparency is another important issue in Agile. Everything is clear for customer and development team see customer as a member of a team.

**Disadvantage of Agile methodology**

Customer involve project very frequently, but customer may not want this. He/She can be busy and do not have enough time for this process. In this situation problems may occur.

One sprint may not enough for one part of project and as a result another sprint should handle this part of job. In means more money and extra budget. In addition, because of flexibility there is open door for some mistakes.

**Compare and contrast**

Waterfall model believes dividing project into massive part makes it easy on the other hand Agile divide project into smaller parts and deliver at defined time. Waterfall is old and traditional approach but agile is new and modern and more suitable for now. In Agile repetitive number of iteration is issue and it makes agile flexible but waterfall strict himself with only one cycle and it opens door for failure. Single iteration and single release carry tom much risks because at the end of project customer may not like result. And it is too late for going back requirement and it is not possible most of the time. It is the one of the most important reason why people call Waterfall “strict”. From the real life carrying big mass harder and to make it will be easy if we carry bite-sized section of project. In terms of planning scale Waterfall is long-term and Agile is short-term. Every project manager wants to decrease risk that is why “Risk Management” exists **[1]**. Using Agile methodology decrease risk and n this process customer helps team. But in Waterfall methodology customer involvement is limited and it increase risk of failure. When project finish waterfall start to testing it is hard to test entire system than parts. That is why Agile uses testing after every iteration. I want to emphasize that, Waterfall approach anticipate that there will not be any changes during project and it makes waterfall strict and more straightforward than Agile.

**Which is suitable for project? Which is better?**

If customer sure about project and everything clear for him and can illustrate it for team makes requirement phase stronger. In addition, after this phase customer do not want to involve project and he does not have enough time for involvement. Then Waterfall approach is suitable for project. For making agile suitable, customer should want to involve in project and loves feedback. Every iteration makes project perfect. In my point of view, customer is the key issue of Agile methodology and to decide which methodology is suitable for project. Customer plays important role.

***References:***

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