1. Why is the “waterfall method” called by that name? What about the waterfall method might result in projects that take too long to complete? What about it might lead to projects that cost more than expected? What about it might lead to projects that deliver incomplete or incorrect functionality? What about agile is a response to the waterfall method?

Answer:

Waterfall method is one of software development life cycle methodologies that was very popular. The name waterfall comes from the metaphor of its linear and sequential stages. Every waterfall stage is assigned to a separate team and ensure the project control and schedule. It’s usually comprised of 4 stages, requirement analysis, technical design, coding and testing, client verification and launch. Since it’s sequential and linear, any stage can start only when previous stage finished. Waterfall is not in favor of change; and no go back for every stage. Any change could result all stages start from the beginning. Also, since it’s linear, waterfall costs much more time than agile since the total project time is longer. Since waterfall is not in favor of change; the projects could be easily going wrong or incomplete; any communication missing, or implementation error could result delivery incomplete or delay even more incorrect functionality.

Agile method instead embraces the changes. At every of each stage, the team will cope and adapt new ideas, new design from the outset. Which makes the change is quite easy. Also, Agile method emphasis the deliverable in every stage. This can help the project stakeholders to give feedback as early as possible.

Besides that; agile method is favor of using best practice like OOP, S.O.L.I.D and refactor. This makes building more robust and maintainable project.

1. You have been hired as a software development consultant by a new local food manufacturing startup. They will produce cell-cultured meats and vegan seafood to be sold at high-end grocery chains. (An example of their products will be “ground beef” grown in vats using stem cells from steers.)   
     
   They will have two groups of computing staff: one to support the scientists creating the products and one to support the non-scientific operations of the business. It is for this second group that your advice is needed. They plan to buy operational information systems when they can, but they know they will have to create some systems, too. They expect to have between 3 and 7 software development projects to do each year. All will be novel in nature—they will solve problems that are uncommon in business operations, all will require creativity, discovery of requirements, and experimentation.   
     
   The company plans to employ as many as 8 software developers to work on these projects. They don’t expect to have any problem hiring individuals with the skills needed.  
     
   As consultant, your problem is to give advice concerning how to set up a software development organization to handle the expected projects. Based on ideas from IST303 and any relevant other readings/sources, explain in detail how they could use the agile approach outlined in the Pilone & Miles text to handle their expected project load. How would a typical project be done (in detail)? Based on their situation—and assuming whatever other details must be assumed [state these clearly]—why would this agile approach be the preferred way of them getting the software they need?

Answer: This team need to deal with unclear requirement. Uncommon business operations and experiments. Also, as the team’s delivery; it must be delivered periodically and kept delivering that means possibly a lot of changes. The team size is expected as 8 developers that is not too big, all these suggest using agile development method.

The team can be separated into 2 teams or only 1 team; which depends on the project

size. According the description, they’re expected to have 3 to 7 projects each year. When the project becomes small; the team can be separated into two team to build 2 projects parallelly. If the project is big, they can form only 1 team.

The team should follow the project planning process before any project begins. In planning phase, team need to decide the deliverable and team size and project schedule according requirement. The size of project and milestone 1.0 deliverable can be decided with business people. Once the project estimation is done. The team size can be decided according the estimation. If 2 teams have been decided to be formed. Two different project estimation may follow the similar project schedule.

As the team working together. It could be two teams (if 2 team have been decided) to have one iteration to work on common library or tools, teams should share same CI/CD build process also along with same set of version control system. Since the company has decided to employed people have the skills, which means the team’s velocity is stable and predictable.

Team should choose typical 3 weeks or 1 months as one iteration. Which makes the business can verify the deliverable as soon as possible. In the beginning of every iteration, team should also have plan meeting to check the backlog along with the feedback of last iteration to decide the expected deliverable of the iteration. Also, iteration estimation will be done in the same meeting. Be aware since the project is highly unpredictable, so the team must consider not too high velocity. (possibly down to 0.5, commonly should be 0.7)

Regular daily stand-up(15 minutes) can help team member understand the progress and try to move the block.

With the times go by, more and more work will be finished. The maintenance work would become substantial enough not to be noticed. Every year, team could use some times to do some for the work that have done. This would significantly reduce the maintenance effort.

As the times goes by; many projects have been done. Any of change to old system must be guaranteed not breaking the old functions. Team must be spend effort to developing all kind of test to make sure no function broken when adding new features.