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COMPARISON OF AGILE AND WATERFALL PROJECT MANAGEMENT METHODOLOGY: ADVANTAGES AND DISADVANTAGES

A project management model is a methodology or approach that defines the main stages, their sequence, and practices that will be applied throughout the project. This model is guide that helps the project manager and team effectively plan, implement, control and complete the project in accordance with the goals and customer requirements.

Waterfall is one of the first development methodologies, based on a rigid sequence of the development process. In this structure, the next stage begins only after the completion of the previous one; during the process, everything that happens is documented in detail. Once the terms of reference and requirements have been approved, the client does not interfere in the process. The quality of documentation directly affects the result.

Like any methodology, the cascade method also has its disadvantages. Firstly, this is an inflexible process - all requirements should be determined in advance. This methodology is also characterized by its inertia - in the first stages, the forecast of time and financial costs may change upward, but it is impossible to change the project in the direction of cost optimization, changes in functionality or concept before the release of the finished product. Such a structure additionally carries an increased risk to the final product. The classic testing system involves separately testing each of the project components, including in interaction with others, while when using Waterfall the finished product is tested. The disadvantage for the customer is that he will only be able to see the result at the end of the project. The client doesn’t comment on mockups or prototypes prior to the development and testing process. When designing, it needs to be taken into account all possible

scenarios and eliminate errors. Any change must be agreed upon with the customer. And an insufficient level of elaboration of requirements entails an increase in the budget and project timescales, which are quite difficult to estimate.

Among the advantages of the methodology are the following:

1. The team and individual specialists always know what to do. All work is described in detail and step by step.

2. The timing and budget of the project are always known.

3. Interchangeability of specialists. Thanks to detailed documentation, the project can be implemented by any competent team.

4. Clear and simple structure of the development process - this reduces the barrier to entry for teams

5. Convenient reporting - you can easily track resources, risks, time spent and finances thanks to the strict phasing of the development process and detailed project documentation

6. Stability of tasks - the tasks facing the product are clear to the team from the very beginning of development, and remain unchanged throughout the entire process

7. Assessment of the cost and timing of the project - the timing of the release of the finished product, as well as its final cost, can be calculated before the start of development.

8. The model ensures strict quality control and a transparent process, and the result is a complete product, and not some working module or part.

Agile is another modern project management methodology, and specifically it is distinguished by its flexibility. The essence of flexible management is that it is based not on rules, but on the principles that guide the team in making decisions. Agile has a plan, but no strict internal structure, and development occurs in short cycles. Each iteration allows you to make a miniature project, test and evaluate its capabilities. And even though not every iteration allows to release a full-fledged new version, they still provide the opportunity to quickly adapt and implement new technical specifications. Agile creates a changeable, flexible product that is constantly

in the process of improvement, which helps make it strong and competitive, but such a race will continue endlessly.

The disadvantages of Agile are very different from those of Waterfall, further emphasizing that they are methodologies based on opposing principles.

Encouraging constant changes to a project, which may initially seem like a great opportunity, may result in it never reaching the final version.

Inconsistency and working with different parts of the project inconsistently also lead to increased demands on the qualifications and experience of the team. In addition to directly creating the product, the team must analyze possible ways to improve the efficiency of its own work, continuously exchange information on the project, and be motivated and self-organized.

From the financial side, Agile is more problematic because due to constant changes, it becomes difficult to calculate the total amount of work, since it can change depending on resources.

Among the advantages of Agile methodology are the following:

1. Short and clear iterations - development cycles last from 2 weeks to 2 months, at the end of which the customer receives a working version of the product

2. High degree of involvement of project performers, organizers and customers. The methodology emphasizes meeting the client's needs through regular demonstrations of the work product and active interaction with the client throughout the development process.

3. The approach allows you to quickly respond to changing client requirements or external factors, thanks to frequent iterations and the ability to adjust the project plan during its implementation.

4. Through constant feedback and testing at every iteration, Agile helps detect and eliminate defects early in development, which ultimately improves the quality of the final product.

5. Get products to market faster with an iterative approach that allows you to create and update products in the shortest possible time

In the modern world of project management, project management is faced with a variety of methodologies, and one of the main questions is the choice between Agile and Waterfall. In real practice, there are often projects with a hybrid approach, where the best practices from different management models are combined.

The main difference between Waterfall and Agile is the flexibility of the approach. Agile is ideal for IT products, startups and projects that operate in an uncertain, dynamic environment. On the other hand, Waterfall is great for small projects with clearly defined requirements and goals. Waterfall is especially suitable for projects with fixed deadlines and budgets, where there is time to prepare and minimize risks. On the other hand, Agile is easier to maneuver and change along the way. In a waterfall project, meeting product deadlines is key, while in an agile project, it is important to create a high quality product in accordance with the client's vision. Agile is suitable for cross-functional teams where the expertise of all members is a key success factor, while Waterfall is suitable for both experienced professionals and beginners.

In conclusion, there is no universal rule about which approach is the best. The choice between Agile and Waterfall depends on the specific requirements and characteristics of the project, as well as the preferences and experience of the team.