

Estimating, planning and managing Agile Web development projects under a value-based perspective [☆]



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ABSTRACT

Context: The processes of estimating, planning and managing are crucial for software development projects, since the results must be related to several business strategies. The broad expansion of the Internet and the global and interconnected economy make Web development projects be often characterized by expressions like delivering as soon as possible, reducing time to market and adapting to undefined requirements. In this kind of environment, traditional methodologies based on predictive techniques sometimes do not offer very satisfactory results. The rise of Agile methodologies and practices has provided some useful tools that, combined with Web Engineering techniques, can help to establish a framework to estimate, manage and plan Web development projects.

Objective: This paper presents a proposal for estimating, planning and managing Web projects, by combining some existing Agile techniques with Web Engineering principles, presenting them as an unified framework which uses the business value to guide the delivery of features.

Method: The proposal is analyzed by means of a case study, including a real-life project, in order to obtain relevant conclusions.

Results: The results achieved after using the framework in a development project are presented, including interesting results on project planning and estimation, as well as on team productivity throughout the project.

Conclusion: It is concluded that the framework can be useful in order to better manage Web-based projects, through a continuous value-based estimation and management process.

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1. Introduction

Starting a professional software development project soon raises some critical questions such as: How much will the project cost? When will it finish? How much effort must be invested in it? Will the investment be returned soon? What are the features our customers really need?

Being able to answer these questions and some others related to them is crucial for designing business strategies (e.g. financial or commercial, among others) from project results. The responses to the aforementioned questions must condition all decisions like starting one project or another, the type of product to develop and the money that must be invested in it.

It is well known that estimating and planning a development project is a compulsory and complex process [7,18,45]. To face this challenge, traditional estimation techniques focus on a predictive approach [1,12,13,37], which requires a stable and familiar environment. Essentially, these techniques begin with a strong initial requirements gathering phase to freeze user needs [53]. This approach makes these methods especially sensitive to uncertainties and changes of customer needs.

Nowadays, the rise of the Internet and the actual global and interconnected economy has increased the needs for quickly adaptation to changing customer needs. These events have emerged in parallel with the acceptance of Web Engineering as a discipline in Software Engineering [24]. Web Engineering can be defined as a set of methods, techniques and tools in Software Engineering that helps a development team build up systems on the Web. There are several characteristics that differentiate Web projects from the rest of software development projects [24,52]:

[☆] The views presented on this paper are those of their authors, and do not necessarily reflect those of their employers.

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- Complex navigational structure.
- Critical interface requirements (such as unknown users or availability, among others).
- Security aspects.
- Increase on maintenance efficiency, avoiding downtimes.
- Delivery as soon as possible.
- Reduction of “time-to-market”.
- Adaptation to quick-changing requirements.

It is important to highlight that some of the aforesaid characteristics are not exclusive of Web development projects and can also appear in non-Web projects. Nevertheless, the concurrence of all of them together at the same time can be identified as a Web project specificity.

In such environments, Agile software development methodologies, with constant monitoring and measurement, and frequent intervention mainly based on the use of empirical processes [61], are turning into a solid alternative for organizations developing software to plan and estimate Web projects [4]. These methodologies offer a suitable framework for the exposed Web development characteristics [55], like quick response to changes, adaptability and reduction of development time [31,50]. In addition, as it has been mentioned, the classical approach regarding up-front requirements gathering demands a stable environment, not being the case of Web projects, where requirements change quicker. The incremental and iterative way of processing Agile methods requirements [18,27] may better fit this particular case.

In contrast, the project management classical approach states that a project succeeds when it combines achieving the goals established on variables such as cost, schedule and scope [53]. Following these criteria, the Standish Group conducts the well-known CHAOS surveys to test the projects success [72]. They define a successful project as the one that is carried out on time, on budget and includes the originally specified features. Fig. 1 shows the projects success level depending on the type of methodology used [73].

As it can be noticed, the percentage of successful projects using Agile methods is significantly higher than that of projects using traditional approaches. These results can be associated with the improvements that Agile techniques bring to project management, for example, “just-in-time” planning, iterative requirements gathering or frequent collaboration. However, it has to be added that, in terms of the above definition concerning a project success, the classical approach leaves behind crucial aspects such as quality and delivered value to customers [33]. They are main issues to address on projects, since they are related to the functionality developed and the kind of process used. Thus, using techniques that allow us to better identify and measure the value delivered

to users will improve the results of our projects. For this purpose, we suggest some techniques to take into account these variables.

Lastly, it must be kept in mind that the number of unused functionality represents expended resources that rarely return to the development organization. A survey conducted by the Standish Group [35], covering 2000 projects carried out by 1000 organizations, showed that more than half of the functionality developed on a project is hardly ever or never used. Fig. 2 shows the results of that survey.

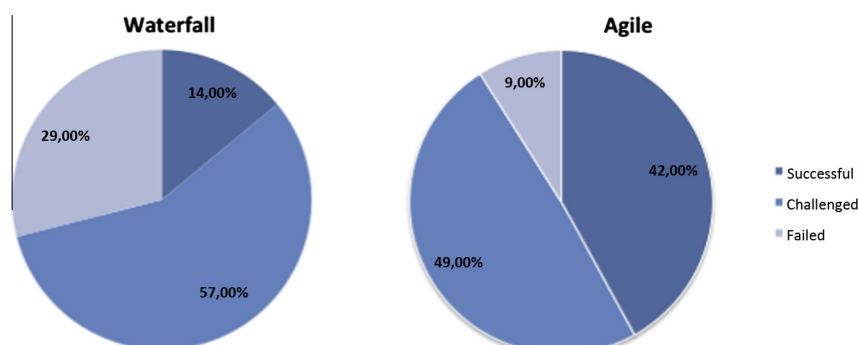
As before stated, the Agile iterative and incremental approach can better fit the special needs of Web projects in order to particularly identify what should be built and when it should be built. This approach will earlier identify these changes and will cope with them more properly to avoid designing unneeded features. It will allow a higher return on the projects investments. Based on the foregoing, this work aims to cover the following objectives:

- Proposing a framework, based on existing Agile methods, to estimate, plan and manage Web projects that, guided by the business value, will help to select what to build, estimating cost and adapting plans to a changing environment.
- Presenting the results obtained from a real experience dealing with applying the proposed framework to a project developed for a Spanish public administration office.
- Taking out the main lessons learned after applying the proposed framework, which will generalize successes and avoid failures as well as will present future lines of work.

This paper is organized into the following sections. Following this introduction, Section 2 presents the research scope, including also the research questions and methodology. Section 3 presents the related work, describing different approaches to estimate, plan and manage Web projects. Then, Section 4 provides an approach to the suggested framework to estimate, plan and manage Web projects based on Agile techniques, whereas Section 5 describes the experience of applying the proposed framework to a real project. To conclude, Section 6 states the conclusions taken out, interprets results and consequences and advances possible future lines of work.

2. Research questions, scope and method

The main question we will try to answer in order to achieve the objectives presented in the previous section is: “*Is it possible to define an Agile approach to estimate, plan and manage Web projects guided by business value?*” As it is very generic, we have tried to decompose it into the following research questions:



Source: The CHAOS Manifesto. The Standish Group. 2012

Fig. 1. Results of projects depending on the methodology used.

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