The Agile Methods: An Analytical Comparison of Five Agile Methods and an Investigation of Their Target Environment

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Abstract

This study defines the systems development methodologies named agile methods and investigates the environmental conditions where agile methods are most suitable.

A definition of agile methods was developed using an analytical comparative framework to investigate five of the earliest published agile methods; Dynamic Systems Development Method, Extreme Programming, Scrum, Adaptive Software Development, and Crystal Methods. The framework decomposed each method into its component parts; philosophy, models, techniques, tools, scope, outputs, practice, and the extent to which the method may be adapted to a situation. Based on this analysis and a literature review, a theoretical model of the target environment for agile methods was developed. This theoretical model is a proposed set of organisation, people, project, technology, and domain factors that relate to the successful use of an agile method.

A mixed method research methodology was used. A qualitative design, consisting of positivist case studies, was used to test the theoretical model. Data was gathered from nine software development projects, both agile and non-agile, using questionnaires and interviews of project leaders. Then cross-case analysis was carried out on each project factor in the theoretical model. The relationship between environmental factors and agile method usage was investigated using non-parametric quantitative data analysis. This led to a revised model of the target environment for agile methods. The empirical data showed that specific organisational culture factors correlate with effective use of an agile method. These include the organisational characteristics of feedback and learning, teamwork, empowerment of people, collaboration, leadership, loyalty, and a results-oriented culture that values entrepreneurship, innovation and risk taking.

This research is significant for method users, those carrying out empirical research into agile methods, and those carrying out studies of systems development methodologies.
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