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Economic efficiency of agile methodologies in it project management: a comparative structural analysis

Abstract

This study is an attempt to compare the effectiveness of Agile (Scrum) and Waterfall methodologies in IT project management. The primary focus has been given to the Ukrainian software development framework. The investigation covers four weeks and two matched teams of 6-8 IT professionals. The selection is based on comparable skill levels and expertise. The task of identical software development was assigned under meticulous conditions. The Agile group tracked a Scrum framework, while the Waterfall group observed a linear phase model. Jira and Microsoft Project have been employed as tools of Project management, along with automated testing tools and standardized Likert-scale satisfaction surveys. The findings of the study reveal that the Agile team is more significant (mean = 20.14 days) compared to the Waterfall team (mean = 25.29 days; $p < 0.05$). Moreover, the satisfaction score of Agile is also reportedly higher alongside the production of software with fewer and less severe bugs (mean = 5.14 vs. 7.86; $p < 0.05$). Similarly, the outcomes of correlation analysis divulge strong associations between delivery time, team morale, and product quality. On the other side, qualitative ripostes further reinforced these outcomes. The findings offer worthwhile visions for Ukrainian information technology firms navigating a highly competitive and export-driven global market. Agile methodologies not only provide faster delivery and improve quality but also foster internal team cohesion. This study provides empirical evidence for organisational leaders to invest in Agile adoption and training as a strategic lever for performance enhancement and global competitiveness.

Keywords: agile methodology; digital economy; IT project management; economic efficiency; waterfall model.