MAINTENANCE AND AGILE DEVELOPMENT: Challenges, opportunities and future directions

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How do agile methods deal with software entropy?

We have investigated different maintainability difficulties faced by Agile practitioners through an industrial case study, and reviewed the literature on the detection of code smells and refactoring.

Some of the challenges...

System and Integration Testing

Non-trivial refactorings are risky and time consuming due to the unstable characteristic of systems with software entropy. The lack of understanding of the effects of given code smells and refactorings makes this task very challenging, and has proven to impact the testing at different levels.

Program comprehension

Comprehension issues lead to a fear of changing the code, both for adding new features and for refactoring. The unclear internal structure creates a cognitive overload that is in practice generally avoided by code duplication. For new developers, it takes a long time before they actually become productive...

Opportunities for future research:

More empirical studies focusing on cost-benefits of refactorings, evaluation frameworks/criteria for evaluating refactoring tools, and requirements for tools supporting code smells detection/analysis and refactoring.