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The RIGHT Model for Continuous Experimentation

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Abstract: Due to rapidly changing technologies and business contexts, many products and services are developed under high uncertainties. It is often impossible to predict customer behaviors and outcomes upfront. Therefore, product and service developers must continuously find out what customers want, requiring a more experimental mode of management and appropriate support for continuously conducting experiments. We have analytically derived an initial model for continuous experimentation from prior work and matched it against empirical case study findings from two startup companies. We examined the preconditions for setting up an experimentation system for continuous customer experiments. The resulting RIGHT model for Continuous Experimentation (Rapid Iterative value creation Gained through High-frequency Testing) illustrates the building blocks required for such a system and the necessary infrastructure. The major findings are that a suitable experimentation system requires the ability to design, manage, and conduct experiments, create so-called minimum viable products or features, link experiment results with a product roadmap, and manage a flexible business strategy. The main challenges are proper, rapid design of experiments, advanced instrumentation of software to collect, analyse, and store relevant data, and integration of experiment results in the product development cycle, software development process, and business strategy.

This summary refers to the article The RIGHT Model for Continuous Experimentation, published in the Journal of Systems and Software [Fa17].

Keywords: Continuous experimentation, Product development, Lean Startup, Software development process, Agile software development, Hypothesis-driven software development.

1 Introduction

A major challenge for companies is no longer primarily how to identify and solve technical problems, but rather how to solve problems which are relevant for customers and thereby deliver value. Finding solutions to this problem has often been haphazard and based on guesswork. Recently, a family of generic approaches has been proposed. For example, the Lean Startup methodology [Ri11] proposes a three-step cycle: build, measure, learn. However, a detailed framework for conducting systematic, experiment-based software development has not been elaborated. Our research question is: how can Continuous Experimentation with software-intensive products and services be organised in a systematic way? We give an answer to the research questions by validating an initial and widely

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analytically derived model [Fa14] against a series of case studies in which we implemented different parts of the model in cooperation with two startup companies.

2 Results

The result of our study is the RIGHT model for Continuous Experimentation. This model focuses on developing the right software, whereas the typical focus of software engineering in the past has been on developing the software right (e.g. in terms of technical quality). The model consists of repeated build-measure-learn blocks supported by an experimentation infrastructure. Each block results in learnings which are used as input for the next block. The blocks structure the activity of conducting experiments, and connect product vision, business strategy, and technological product development through experimentation. In other words, the requirements, design, implementation, testing, deployment, and maintenance phases of software development are integrated and aligned by empirical information gained through experimentation. Conceptually, the model can also be thought to apply beyond software development, to design and development of software-intensive products and services.

3 Conclusions

Integrating customer experiments with product development on business and technical levels is an emerging challenge. Empirical studies on continuous experimentation in software product development is a fruitful ground for further research. The following critical success factors were identified in our study: The organisation must be able to properly and rapidly design experiments, perform advanced instrumentation of software to collect, analyse, and store relevant data, and integrate experiment results in both the product development cycle and the software development process. Feedback loops must feed relevant information from experiments back into several parts of the organisation. A proper understanding of what to test and why must exist, and the organisation needs a workforce with the ability to collect and analyse qualitative and quantitative data. Also, it is crucial that the organisation has the ability to properly define data-driven decisions and act on them.

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