Chapter 17
Agility in Software Development and Project Value:
An Empirical Investigation

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ABSTRACT

Agile Development Methods, considered as an alternative to the traditional plan-based methods, have received much attention since their inception. These practices have evolved and developed over time, culminating in 2001 with the Agile Manifesto. Since that time, preferred methodologies, implementations, and best practices have continued to evolve with a focus on doing what works best for the individual company or project. However, the concept of agility in software development has remained quite nebulous, lacking in clarity particularly about its underlying dimensions. In this research the authors conceive agility in terms of four distinct dimensions. Drawing from the theoretical perspective of holographic organization, they develop a model explaining how each of these underlying dimensions of agility contributes to project value in software teams. The authors test the model using survey data collected from industry practitioners and discuss findings.

INTRODUCTION

From wearable devices to cars and appliances, software pervades practically every aspect of our lives. With ever increasing reliance on software, it is imperative that we evolve appropriate means to build virtually defect-free applications in a timely manner. Furthermore, the software, once designed and deployed, should meet stated requirements while blending seamlessly into the context where it is being used. Agile software development (ASD) has become increasingly popular in industry, primarily because it uses a customer-engaged, evolutionary delivery model to continually deliver high-quality software. By all accounts, ASD has replaced traditional approaches that were dictated by a waterfall process model or some form of it (Dingsøyr, Nerur, Balijepally, & Moe, 2012; Torrecilla-Salinas, Sedeno, Escalona, & Mejias, 2015). Despite the fact that ASD is the most dominant approach in industry today, there exists little empirical evidence of its efficacy, particularly in terms of delivering business value.

Agile development seeks to limit software development strictly to activities that add business value for the customer (Conboy, 2009). With the exception of a few empirical papers ([e.g., (Balijepally, Sugumaran, De Hondt, & Nerur, 2014; Bonner, Teng, & Nerur, 2010; Grenning, 2001; Manhart & Schneider, 2004; Serrador & Pinto, 2015)] and some anecdotal accounts, the efficacy of Agile Development Methodology (ADM) has hardly been subjected to empirical scrutiny. Furthermore, there has been only modest effort to substantiate the claims that practices such as iterative development, self-organizing teams, process flexibility (e.g., interchangeable roles), and test-driven development deliver stakeholder value. This is partly attributable to the difficulty involved in conceptualizing and measuring software value which is partly subjective and is inherently multi-dimensional. Considering the widespread acceptance and adoption of ADM we need theoretically-grounded research that seeks to address the value proposition of ADM. Our study aims to fill this void. Specifically, this research seeks to examine the following main research question: what aspects of agility in software development methods contribute to project value? We use the theoretical perspective of holographic organization (Morgan, 1998; Nerur & Balijepally, 2007) to explicate the value proposition of agility in software teams and to derive the main hypotheses.

The data for this research were gathered from a survey of industry practitioners, conducted by Ambysoft, Inc. (Ambler, 2013). Respondents were from companies across the world representing varied IT roles including developers, Quality Assurance professionals, business analysts and subject matter experts, and project managers. We believe that this broad group of participants—including managerial and technical professionals, dispersed geographically across multiple organizations of varying sizes—will provide a better assessment of the overall business value that accrues to organizations using ASD.

The remainder of the paper is organized as follows. We first provide a brief description of Agile Software Development and related research. This is followed by an overview of the holographic principles of organizational design, which provides the theoretical rationale for the main hypotheses of the study. Subsequently, we outline the research method, followed by a presentation of the data analysis and the results of hypothesis testing. Finally, we discuss the implications of our research findings and suggest some directions for future research.

AGILE SOFTWARE DEVELOPMENT

Ambler (Ambler, 2012) defines agile development as "an iterative and incremental (evolutionary) approach to software development which is performed in a highly collaborative manner by self-organizing

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