

"Agile X"—Inconsistent and Loosely Defined Terminology Hampers Fundamental Software Agility Research

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Abstract

Since the publication of the Agile Manifesto, software agility research has been done with variable and often loosely defined terminology. Moreover, there is lack of conceptualization with respect to agility concepts in general. In this ongoing critical literature review, we argue that such weaknesses hamper the advancement of rigorous software research towards fundamental knowledge of software agility.

Keywords

Agile software development, agility, software engineering terminology, critical review

1. Introduction

Consider the following questions: What is the current level and degree of agility of the organization? Is the company as agile as it should be? How do agile software development methods and practices affect company agility? Is the software team agile enough? Some researchers—and perhaps many practitioners—may find those kinds of questions confusing. However, it depends on how one defines the terms “agile” and “agility” in the context.

Since the publication of the Manifesto for Agile Software Development in 2001, “Agile” (noun, typically written with a capital ‘A’) has evolved to mean a wide range of concepts in software development processes and organizations. A label “agile” is nowadays attached to almost every area of software engineering and its management (e.g., agile project management, agile requirements engineering) in some way or another. Furthermore, the initial team-level focus has been scaled up and extended beyond software. Consequently, some “agile” is nowadays prevalent in practically all software-intensive organizations—even without stating so explicitly.

Notably, there is a more general concept of agility established especially in business and management disciplines. In general, it refers to the ability of the organization to sense and react appropriately and quickly enough to changes in its environment. Furthermore, there are more focused sub-concepts of agility (e.g., business agility). Overall, there is enterprise agility.

Following the above line of discourse, in this ongoing research work, we scrutinize extant agile software research literature with respect to what key “agile X” terms and concepts have been used and in what ways they have been defined—if at all—in different scientific works. We argue that consistent terminology and rigorous conceptualization are needed to really advance agile software research from what has been done so far during the past two decades to next levels of software agility necessitated by current and future competitive environments.

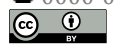
2. Approach

Our research approach is critical literature review (CLR). The purpose of a CLR is to provide critical accounts of prior research by analyzing a broad topic—such as agile software development—to reveal weaknesses and inconsistencies to prompt researchers [1]. Such

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reviews do not necessarily cover all potentially relevant literature, and the selection of the publications may be subjective [2]. The search and analysis methods are not always explicitly documented [3]. However, the “criticality” should be clearly explained and operationalized [4].

In essence, CLRs aim to identify conceptual contributions of the included literature and furthermore bring up possibly competing schools of thoughts for spurring new levels of conceptual developments [3]. Markedly, CLRs can be by nature provocative and even disruptive [4]. They attempt to stimulate further research ideas and directions based on the critique of extant literature of “taken for granted” knowledge and inconsistencies over the years [5].

Our CLR strategy was to examine key texts in the field guided by our individual research knowledge. Highly-cited and well-respected articles were covered (1998–2023). The selected articles were read fully, looking for “agile” definitions, meanings, phrases, and expressions.

3. Findings

In our literature search, we identified a broad set of “agile X” terms and concepts ranging from the very term “agile” (noun) to “agile literature”. Table 1 exhibits exemplars of selected key terms and concepts. Altogether, we recognized more than 30 relevant terms and concepts. Notably there are interrelationships between the items in the different rows.

Remarkably, as exemplified in Table 1, we have discovered that there are substantial variations and vagueness even with the most typical and frequently used terms and concepts. They are used in variable ways—sometimes even in one publication—even inconsistently, often without giving any explicit definitions.

Table 1
Illustrative examples of “agile X” and “X agility” terminology in research literature

Concepts/Terms	Excerpts	Publications	
<i>Agile</i>	“... no agreement on what the concept of "agile" actually refers to exists...”	[6]	2002
	“an umbrella term for a set of management practices—including Scrum, Kanban, and Lean—which enable...”	[7]	2016
	“...we take the position that agile is a mindset,”	[8]	2022
	“Others view ‘agile’ as a capability...”	[9]	2022
<i>Agile software development (ASD)</i>	“approaches such as Extreme Programming, Crystal methods, Lean Development, Scrum”	[10]	2001
	“is a phenomenon”	[11]	2008
<i>Agile project (management)</i>	“A project is agile if it is able to execute its reorienting and action-taking cycle faster than the changes occurring in its environment.”	[12]	2006
	“The Agile project management methodology”; “Agile methods...in agile projects”; “...whether Agile projects truly are more successful”; “non-Agile project”	[13]	2015
<i>Agile transformation</i>	“large-scale agile organizational transformations”	[14]	2016
	“implies that organizations apply agile methods also outside of software development units”	[15]	2020
<i>Agility</i>	“in software development means not only quick delivery of software products but also quick adaptation to changing requirements”	[16]	1998
	“Agility, or the ability to rapidly adapt to volatile requirements, is a cornerstone of ASD”	[17]	2017
	“Agile, the most well-known representative of agility today”	[18]	2021
	“company-wide agility”	[19]	2019

<i>Software agility</i>	“agility, as practiced by information technology (IT) departments”	[19]	2019
<i>IS(D) agility</i>	“no universally accepted definition of an agile method in the field of Information Systems Development (SD)”;	[20]	2004
	“definition of agility...assessment framework of ISD agility”		
	“agility in IS development”; “agility related themes in IS”; “agility concept in IS research”; “IS agility/flexibility studies”	[21]	2015
	“agility concepts related to ISD Agility in software firms”	[22]	2022
<i>Digital agility</i>	“define digital agility as the capability of a unit to capitalize on opportunities/threats induced by generative digital technologies under constrained or unfolding timeframes”	[22]	2022

4. Conclusions

Historically, software engineering and its research have been subject to terminological variability and even inconsistencies [23]. In general, the concept of agility is diverse in different disciplines [24]. In software engineering research, it is not just about the terminology but even the core conceptualization has in many areas been vague and geared towards perceptions and interpretations of different researchers in different research streams [23]. While this may not be critical in individual studies, lack of common precise terminology and moreover conceptual foundations make it difficult to synthesize shared knowledge and compare different research results and their publications (e.g., searches in literature reviews) [25].

Agile software engineering has been researched actively with respect to many “agile” terms and concepts since the publication of the Manifesto. In this critical literature review investigation, we criticize the inconsistent and loosely defined terminology used in extant “agile” research publications. Our main reflection is that this stems from practitioner-based origins lacking sound conceptual foundations. Well-defined terminology and sound conceptualization would help to clarify and unite different perspectives amongst researchers and practitioners [26]. That would position software agility in different contexts and advance fundamental software agility research.

Astute software engineering research should continue to discern and even charter with clearly defined terms and conceptual theory development, what agility is principally and what it could—and perhaps even why it should—be in current and future digital environments. One intriguing future issue is how the current terminological variability in research publications affects outputs from generative AI (e.g., ChatGPT). Especially, do such tools help or exacerbate the problemacy?

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