Assessing Scrum's Contribution to Speed up Change Delivery: A Literature Review

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Abstract: Scrum is a popular project management method that has received significant academic attention. Nevertheless, there are superficial, ambiguous, or contradictory arguments about the benefits of agile management, of which Scrum is the dominant representative, especially in its contribution to delivering changes faster than traditional project management methods. This paper aims to provide a concentrated knowledge of the contribution of Scrum on the speed of delivered change. It also clarifies the fragmented perception of fast project or initiative delivery and the influence of individual Scrum practices. This is achieved through a narrative review of the existing academic literature. The dominant conclusion of the review is the consensus that Scrum does not typically and definitely accelerate the delivery of a given change. However, it primarily affects other project time criteria that may prove more significant. The findings suggest that enterprises should move towards using Scrum for other reasons because the contribution to delivering the full scope of change in a shorter time is ambiguous.

Keywords: Scrum; time of delivery; change management; agile; project management

JEL Classification: M12; M13; M15

1. Introduction

1.1. Background and Context

Agile management has significantly impacted change delivery methods over time, and to the greatest extent, its most popular representative, Scrum (Anghel et al., 2022; Dingsøyr et al., 2012). This method is often put in opposition to traditional project management, which it usually replaces in enterprises (Reiff & Schlegel, 2022). Traditionally, this change has been associated with expectations of higher customer satisfaction, quality of output, and employee satisfaction, and sometimes reported positive impacts on project velocity (Brito & Vieira, 2017; Piedrahita et al., 2023). Very often, publications state that agile as a whole is a faster approach without justifying the mechanism and, in some cases, without supporting empirics or sources (Galster et al., 2017; Hasibovic & Tanovic, 2019).

At the same time, it is possible that companies are already in the aftermath of a massive boom in the proliferation of agile approaches, and companies are in a phase where they are embracing hybrid change management approaches (Reiff & Schlegel, 2022). With it comes the deconstruction of previous approaches, including Scrum, into individual practices and their assessment to be used as building blocks for emerging hybrid approaches. This puts pressure on a deeper understanding of Scrum, not just to view it as a whole, but to be able to

evaluate its individual practices contributions and, more precariously, to be able to assess for which objectives it is an appropriate method (Krupa et al., 2023; Reiff & Schlegel, 2022).

1.2. Research Gap and Problem Statements

The above leads us to the need to oppose publications that describe entire methodologies in a cursory manner and delve into a deeper analysis of the individuality that is the speed of delivery. Thus, to clarify the situation, whether Scrum is the appropriate method if the priority is to deliver change as quickly as possible. To date, there is no clear direction of publications providing answer and there are also conflicting arguments about the project time contribution (Cardozo et al., 2010; Mkoba & Marnewick, 2020). On the one hand, there are publications talking about the adoption of Scrum because of its speed of delivery compared to traditional management. On the other hand, there is criticism of Scrum directed towards the high level of bureaucracy, frequent lengthy meetings, and the dissatisfaction of roles like developers that they do not have time for productive work within this method (Anghel et al., 2022; Fisher & Bankston, 2009). For these reasons, the paper aims to clarify the "How does Scrum, as an agile methods representative, contribute to the speed of change delivery compared to traditional approaches?"

1.3. Relevance to Industry and Academia

Nowadays, when agile practices are not only applied as a whole but are combined with elements of traditional management or are more adapted to the context of the enterprise, it is all the more important to understand Scrum not only as a whole but also how its parts contribute to the enterprise (Krupa et al., 2023). This includes clarifying whether speed of delivery is an appropriate motivation for applying Scrum. This will enable more explicit decision-making about the proper method for a given project or organization.

At the same time, this focus of the publication benefits academia on multiple levels. Besides answering the research question that raises ambiguity, the paper aims to balance publications that try to go through a cross-sectional analysis of the whole method or several at the same time, which condemns them to superficiality. Further, by clarifying the topic of speed of delivery in the context of agile project management, which, in fact, contains many concepts and indicators of project time quality (Mkoba & Marnewick, 2020).

2. Methodology

The literature review research method was chosen because the area of agile development contains many publications that touch on the speed of delivery, and the problematization under examination is based on their inconsistency and ambiguity (Brito & Vieira, 2017; Gregory et al., 2016; Lundene & Mohagheghi, 2018). At the same time, the dominant trend of agilization is falling away, corrections and a more sober assessment of agile practices are taking place, which is represented, for example, by the subsequent development of hybrid project management (Gregory et al., 2016; Krupa et al., 2023). The literature review also provides us with an opportunity to unpack the reasons for potentially conflicting claims about whether scrum is a preferable approach when trying to deliver change in the shortest time.

Data collection was based on information from the main world research databases Web of Science and Scopus, which are generally accepted and contain a broad base of publications (Martín-Martín et al., 2018). Both of them were searched through the available attributes, including title, abstract and keywords. The search query always required the content of two words expressing Scrum and a synonym for speed of delivery. Specifically, the queries were "Scrum" AND "speed", "Scrum" AND "time", "Scrum" AND "efficiency", "Scrum" AND "slow", "Scrum" AND "fast", "Scrum" AND "duration", "Scrum" AND "velocity" and "Scrum" AND "pace". The retrieved records were exported to Excel and, after removing duplicates, were further analyzed.

The selection criteria were, therefore, the presence in the mentioned databases. Furthermore, mention of the Scrum methodology under study and terms indicating a reflection of the speed of change delivery. Only publications in English were included. The sample was not limited by location or industry. The exclusion criteria were the lack of quality of the publications, which was typically manifested by the lack of details about the empirical phase of the research or if claims about the speed of delivery were not based on academic literature or data.

The literature review followed standard PRISMA guidelines. Eight queries searched in two databases yielded a total of 3,073 records, among which there were 499 duplicates. Further consolidation occurred during the analysis phase.

Next, the screening relied on the use of AS Review, which is a software tool used specifically for literature review (Van De Schoot et al., 2021). With the tool support, the researcher eliminates or keeps articles based on title and abstract according to relevance. The software, using machine learning, then suggests other relevant articles based on the previous decisions of a researcher and manual intervention, which were included in the export from the research databases. This continues until only non-relevant articles remain. This system allows larger samples of articles to be browsed, which was the case for this research with an initial listing of over 3,000 results. After screening with this tool, 98 relevant records remained.

This was followed by a full review of these 98 papers to confirm their relevance and their potential to contribute to this review, which led to a final number of 38 included papers. The content analysis was executed with the support of MAXQDA24, a tool that allows markup and encoding of text. For each record, research parameters such as location, industry, or type of change were tagged for review. Next, statements about Scrum's contribution to delivery speed were coded and then synthesized into the themes discussed in the Results section.

3. Results

3.1. Overview of the Research Papers

The reviewed articles follow a standard where the application of change management frameworks, including agile ones, is mainly used in the IT sector. At the same time, however, the range of industries covered is relatively diverse, containing research from construction, pharmaceuticals, and university settings (Azanha et al., 2017). There is even more diversity within the regional distribution, where although the USA is the top-ranked region, there are

data from South America (Ormeño Zender & García De Soto, 2021), Africa (Mkoba & Marnewick, 2020), Europe (Plateaux et al., 2020), and Asian countries, where India is dominantly represented (Cho et al., 2006). Although no time frame filter has been applied, all articles are found after 2000, and new publications have been added in recent years. The efforts of the researchers should be acknowledged; given the solid empirical database, they repeatedly use mixed methods; otherwise, quantitative and qualitative research methods are relatively evenly represented. Regarding collection methods, case studies are the most typical representative, and second in order are questionnaires, which repeatedly contrast with case studies from a cross-industry perspective.

The unifying element is the optimistic view of Scrum, which is visible, especially in abstracts and introductions of publications, and only after a more profound look is it evident that for many, the optimistic view is only an expectation or based on the reference of earlier studies. At the same time, there is a wide divergence on what project or initiative time criteria Scrum influences, as discussed in the following subsection (Iqbal et al., 2019).

3.2. The Time Aspect of the Project

Outside the scope of this study is the implementation phase of the methodology, and the subject matter is only the delivery of change in an already established framework. Yet, relevant studies are repetitive in recognizing that sufficient time must be left for the introduction of Scrum and agility so a company is fully capable to benefit from them (Anghel et al., 2022; Heimgärtner & Solanki, 2014).

One of the objectives of this paper was to confirm or refute the literature's consensus on whether Scrum contributes to increased speed of change delivery. Although readers may find many publications addressing the time aspect of Scrum and highlighting its benefits, there appears to be a wide variety of perceptions of what time criteria and, therefore, benefits the publications report (Mkoba & Marnewick, 2020; Plateaux et al., 2020). The distribution of these time criteria is quantified in Table 1. The most cited benefit is time-to-market, which expresses the time from the start of a project or initiative to the impact of the initial incremental changes on users or customers (Peixoto & Silva, 2009; Shirokova et al., 2020). While this is undoubtedly an essential aspect of the project, providing, among other things, early feedback and greater customer satisfaction, it does not reduce the project delivery time but only more tactfully phases the delivery of change (Goyal et al., 2023; Mkoba & Marnewick, 2020). This, in turn, can negatively affect the overall length of the project or the change delivery initiative. Although publications refer to fast delivery, this naming can be misleading to the reader as it does not target faster change delivery. In the literature, there is also a lead time, which contains the exact mechanism described in relation to time-to-market; only it starts at the point of the change hypothesis and ends with its partial delivery to the customer. At the same time, there have been publications that describe Scrum as fast delivery, with flexibility behind its description, which is widely agreed upon as a framework that can react quickly to and reflect external changes. (Anghel et al., 2022; Peixoto & Silva, 2009)

A comparable number of publications deal with delivering the scope in the shortest unit of time, trying to meet the planned time without exceeding it, criteria that reflect the desire

to speed up the delivery of the initiative or the project as a whole, and the influences on these variables based on Scrum are discussed below.

Table 1 below indicates the variance of publications in the focus on the contribution of Scrum on the time aspects of change. There are individual cases of specific time criteria where, for example, according to one study, Scrum is the methodology in which employees feel the most time pressure (Hidalgo, 2019). Not only is there a wide variance in the perceived importance of Scrum velocity between publications, but there are visible contradictions and confusion between different time criteria within the same publication, with delivery velocity and time to market being confused (Mkoba & Marnewick, 2020).

Table 1. Focus of reviewed papers on the time perspective contribution of Scrum

Primary time indicator	Number of papers[1]
Time to deliver	11
Time-to-market, lead time	10
Speed of delivering scope	6
Schedule handling	4
Time spent	4
Efficiency	3
Frequency of added value	2
Reaction to changes	2
Effort to deliver task	1
Time pressure	1
Velocity	1

[1]More indicators could be identified within one paper. Therefore, the sum may be higher than the number of included papers.

When analysing the project time and speed aspect of using each framework, it is important to keep in mind the publication-validated mechanism where speed or slowness can translate into other aspects of projects such as scope or quality (Plateaux et al., 2020). Even with Scrum, these manifestations are noted: "Many issues arise during the implementation of interaction detailed design. Developers may not solve these issues in order to save time during development" (Peixoto & Silva, 2009).

3.3. Positive Practices Contributing to the Delivery Time

Intentionally, the wording of improving the time for a project or an initiative is used. Associated with Agile and Scrum is a retreat from the project-based notion of change in favour of building teams and a structure that delivers long-term or multiple changes through the continuous development of multiple initiatives. Therefore, it is not always about projects. This practise is perceived as a positive pattern of Scrum, which brings additional efficiencies from better team interplay and stabilization of the change delivery mechanism, saving time from repeatedly building a temporary organization as in traditional change management (Cho et al. 2006; Fitzgerald & Hartnett, 2005).

According to multiple studies, when defining or assessing speed of project or initiative, there should be consideration reimplementation or rework (Chumpitaz et al., 2020;

Heimgärtner & Solanki, 2014). In another words, assessment of delivering scope over time should involve changes in scope incoming during the project. If this approach is taken, there is a consensus on the benefits of agile methodology in the sense that by continuously collecting feedback from an early stage, Scrum is more effectively directed towards delivering a corrected scope for a project or initiative. In contrast, reflecting the need for scope change occurs more slowly in more traditional approaches. This advantage is reflected in the following conclusions: "The whole development was accelerated through continuous customer involvement and early feedback. This also helped in finalizing the requirements faster and earlier" (Heimgärtner & Solanki, 2014, p. 127).

These given processes that require laborious decision-making by all lead to Scrum being labeled as bureaucratic. However, it is also true that compared to traditional management, significantly less management documentation is produced, which is undoubtedly a saving that has a positive contribution on the speed of delivery (Fisher & Bankston, 2009). Inextricably linked to this is the workload estimation mechanism, whereby it only determines the relative workload to other activities and does not attempt to accurately reflect the money and time that tends to be required by management. This frees up time to actually implement the change (Li et al., 2019).

For a comprehensive analysis, it may be a misleading definition to consider the methodology, in our case, the impacts on speed, through the lens of only one initiative or project. Within the literature reviewed, there is a consensus on the functionality of the concept of continuous improvement, where a series of measures, such as Retrospectives, positively impacts project effectiveness, particularly over longer time horizons beyond a single initiative. This is also true with respect to existing project improvement mechanisms in traditional approaches, but Scrum is superior in this regard (Shirokova et al., 2020).

Scrum has a prevalent positive effect where there are challenging and significant needs for communication, which was confirmed among the environments studied, for example, the construction industry (Streule et al., 2016). Some studies even conclude that the improvements in communication outweigh the adverse time effects of Scrum in terms of high bureaucracy and meeting time (Chumpitaz et al., 2020).

3.4. Negative Practices Contributing to the Delivery Time

One of the negative time contributions of Scrum is its relative unsuitability for changes requiring the coordination of multiple teams with interdependent timing dependencies (Fisher & Bankston, 2009). Scrum has proven itself as a framework for managing individual teams, and therefore, scaled agile frameworks have proven helpful in orchestrating larger units up to organizations (Bass & Salameh, 2020; Cho et al., 2006). Poor coordination of mutual impacts leads to its late identification and planning. A related constraint reported in the literature is prioritization mechanisms (De O. Melo et al., 2013; Uikey & Suman, 2012). When the teams create their independent priority lists for themselves, there is no appropriate mechanism in Team A's work list to reflect that it contains a requirement that Team B is waiting for and stalling.

One of the characteristic elements is the decentralization of management in the sense of shifting it from the manager to the team to be exercised in newly designated meetings where the whole team makes decisions (Piedrahita et al., 2023). In doing so, it is necessary to explain and achieve the understanding of each member of the team and then vote, which is naturally more time-consuming and costly compared to the decision of the manager alone, although following the wisdom of the crowd mechanism leads to better decisions (Cho et al., 2006; Qayyum et al., 2020). As a result of the study, they repeatedly come up with conclusions such as: "The Scrum methodology received mixed reactions, with respondents calling it "timeconsuming""(Anghel et al., 2022, p. 52).

Associated with Scrum is the practice of iterative work in cycles, where, for example, part of the output is delivered every two weeks through production and quality control. This practice has two opposing effects impacting the length of delivery. First, compared to the sequential approach, the iterative approach may have a negative effect on time, and it adds redundant work represented, for example, by testing. A tester in each iteration ideally has to test the entire product to check that new changes have not damaged the previously produced work. This is called regression testing in the context of software development, and if other approaches principally test predominantly once at the end, the time for it is significantly reduced. This negative effect is formulated in one of the studies as follows: "Furthermore, the results suggested that all of the team factors are positively correlated, apart from leader meetings and, unit and regression testing" (Iqbal et al., 2019, p.7). The second contradictory effect is that if testing finds bugs that need to be fixed, in Scrum's iterative approach, they are uncovered sooner, and fixing them is easier because the developer does not have to backtrack as much mentally, and also encounters fewer bugs at one point in time, which are easier to deal with as a rule than if he or she had checked them all in at the end of the change project (Fitzgerald & Hartnett, 2005). Although this example is given for the IT environment, it is a logical mechanism independent of it.
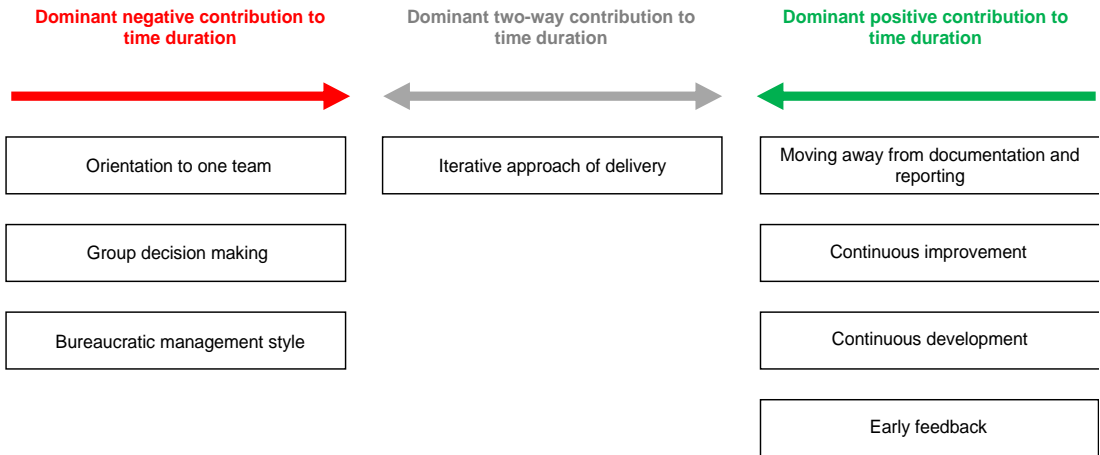

Dominant negative contribution to time duration	Dominant two-way contribution to time duration	Dominant positive contribution to time duration
Orientation to one team	Iterative approach of delivery	Moving away from documentation and reporting
Group decision making		Continuous improvement
Bureaucratic management style		Continuous development
		Early feedback

Figure 1. Time tendencies of Scrum practices

3.5. Assessing the Quality of the Studies

The following conclusions can be drawn by focusing on and assessing the quality of publications in this area. Contrary to the expectation that the topic would be problematic to

quantify, and qualitative research would prevail, in summary the quantitative and mixed empirical research dominates with 53%. Nevertheless, the difficulty of quantitatively assessing the speed or effectiveness of a methodology is demonstrated by the fact that the predominant analytical method of quantitative publications is descriptive statistics only. Authors often delegate the responsibility for assessing effectiveness to respondents and merely describe what respondents think. Only 29% of the quantitative papers use correlation mechanisms to arrive at their own conclusions.

Also unsatisfactory are publications that provide insufficient information about respondents which is repetitive pattern. Not only is there a lack of data on the number of respondents to give us an indication of the validity of the outputs, but also a summary of respondent's roles is repeatedly not apparent (Azanha et al., 2017; Ormeño Zender & García De Soto, 2021). This is particularly significant because the role of the responder can have a major impact on biases; for example, one might expect a more positive assessment of the Scrum Master role as the role disappears with the demise of the Scrum methodology. This is reinforced by the aforementioned fact that evaluations about speed and efficiency are often directly transferred from the respondents due to the use of descriptive statistics only.

At the same time, some articles opting for quantitative methods show an insufficiently small sample of respondents for data collection, which repeatedly occurs only in the order of tens (De O. Melo et al., 2013; Hayat et al., 2019). On the other hand, the qualitative research that falls under review in most cases does not describe the analytical methods, which does not allow the reader to discern the degree of working with biases, the degree of interpretation, and the degree of conscious or unconscious focus on sub-topics (Ormeño Zender & García De Soto, 2021; Peixoto & Silva, 2009).

4. Discussion

4.1. Summary of the Main Findings

The literature focusing on Scrum and its contributions to project or initiative timelines can be misleading because Scrum's widely repeated speed is not always supported by empirical evidence of shortening the project or initiative time but is an expression of the flexibility of the framework, not always the ability to deliver a project or initiative in a shorter time.

As discussed in the Results, some elements of Scrum contribute to higher delivery speeds and some to higher time spent. These findings may lead practitioners to follow the ongoing trend of implementing hybrid methods (Reiff & Schlegel, 2022) and choose only from positively contributing practices. If the goal of the enterprise is to maximize delivery speed, it makes sense to construct a framework that will draw only partially from Scrum and can leverage the above description of specific practices to support this goal.

4.2. Reflecting Contemporary Literature

The fact that Scrum contains practices, some of which have a positive effect on project length and some of which have a negative effect, is supported by contemporary trends to

develop hybrid project approaches and typically to select practices from Scrum that make sense in a given context (Hájek & Krupa, 2024).

In line with the findings of this paper, agility and Scrum are credited with the ability to respond flexibly and quickly to changes in the environment, as exemplified by changes in the market. Such a significant number of benefits are repeatedly associated with this agile approach that it makes little sense to unjustifiably glorify it and describe it as the optimal framework for the fastest delivery of change, which even, in its true nature, according to many publications, is not what it seeks to do. This relatively critical view of Scrum's contribution compared to other publications, however, follows the increasing ability of researchers to view agile approaches more distantly, critically and pragmatically (Gregory et al., 2016; Krupa et al., 2023).

4.3. Practical and Theoretical Implications and Proposal

Based on this work, practitioners can better assess whether Scrum is the right choice to reflect the goals of their project or initiative. By assessing the speed aspect at the level of individual practices as well, the paper can also help companies to compose a suitable hybrid framework.

Through a critical subsection on the quality of the publications reviewed, it also seeks to generate pressure for better adherence to methodological standards, which in most cases have been inadequate. The subsection clarifying the time aspects of the publications should also provoke reflection on the accuracy of statements about the positive effects of some of the methodologies that appear to be misleading.

From a scientific point of view, there is an opportunity to verify the claims made in the literature about the positive or negative speed contributions of individual practices and what contribution prevails in a particular context, for example, industry, through quantitative methods.

4.4. Limitations

The limitations of this publication stem primarily from the boundaries of the scope. The review loses some knowledge by focusing only on English publications and publications that are present in the two main publication databases. This has negative implications for the publication bias. Further, as noted, it is limiting to look at impacts only within the flow of a single project or initiative because positive or negative contributions of Scrum are expected to have long-term or delayed manifestations. (Tennant, 2020)

5. Conclusions

An essential consensus among publications is that Scrum provides practices typically leading to improved quality and increased efficiency of change. This, in turn, is redeemed by the time-consuming nature of these practices, creating in sum conflicting forces. These are reflected positively typically in the time-to-market and other time measures. However, when considering the delivery of the maximum amount of change per unit of time, the results are contradictory at the very least, and the resulting positive or negative effect on time spent depends on factors such as the industry of the company in question (Chumpitaz et al., 2020).

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