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Factors Limiting the Benefits of the Scrum Framework - What Years of Cumulative Scrum Practice by Professional Scrum Trainers Teaches us About Business Difficulties

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Abstract. Scrum is being used more and more in the software development world and beyond. Alongside this growth, many companies are struggling to exploit its full potential. This research operates on the principle that Scrum, having been utilized for nearly 30 years, should confer certain benefits. Our focus is then to identify the factors that may limit the expected benefits of Scrum. Consequently, we interviewed a dozen Professional Scrum Trainers to draw on their experience. This study give a glimpse into what years of practice shows about the use of Scrum. This research offers valuable insights for companies aiming to begin Scrum implementation or enhance their product development processes using Scrum.

Keywords: Scrum, Agile environment, Limiting factor, Interview, Professional Scrum Trainer.

1 Introduction

The value provided by digital solutions continues to grow and, in this context, agile practices are also flourishing. Among these, the Scrum framework particularly stands out. The Scrum Guide, a concise document of less than 15 pages, outlines the fundamentals of Scrum. Since its publication in 2010 [1], the Scrum Guide has undergone seven revisions as of July 2023. With each version, the guide has experienced changes aimed at reducing its prescriptiveness and enhancing inclusivity. This evolution is especially notable in its efforts to broaden applicability beyond the realm of software development.

According to the 16th State of Agile 2022 study, 87% of respondents say they use the Scrum framework, compared to 58% in the 14th edition, dating from 2020. If the use of Scrum continues to grow, even beyond the sphere of software development, we can also notice the increase in criticism of it through articles or posts on networks like LinkedIn or Medium. This research is based on the principle that if Scrum has been used for almost 30 years, it must be able to provide certain benefits. Therefore, we are interested in understanding what factors can limit the benefits expected from Scrum. We interviewed professional scrum trainers (PST) in order to highlight these factors.

The remainder of this paper proceeds as follows. We present the research method in section 2. We go through the results in sections 3, 4, and 5. We conclude in section 6.

2 Background

First appearance. Scrum takes its name from the eponymous Rugby English term. He was first used by Hirotaka Takeuchi and Ikujiro Nonaka in their 1986 publication “The New New Product Development Game” [2]. In this publication, they share observations made within large companies and describe the following key factors: Built-in instability, Self-organized teams, Overlap of different phases of the development cycle, Global and multiple learning, Subtle control, and Transfer of knowledge in the organization. The work of Takeuchi and Nonaka highlights that different practices have emerged in large organizations. The emergence of these practices has allowed these companies to develop innovative and competitive products, in particular by providing their teams with confidence, which allows them to self-organize and rely on all the necessary skills. Everyone was able to live their experience to achieve their goals. Emerging successes have given rise to new forms of organization characterized by more flexible and more participatory management in which trust thrives both between team members and between the team and its management.

Lean. Lean thinking, which Sutherland and Schwaber summarize as reducing waste and focusing on what matters, is defined by Womack and Jones [3] as how to specify value, align value, create actions with the best sequencing, carry out these activities without interruption every time someone asks for them and carry them out more and more efficiently. Thangarajoo and Smith [4] dissected the existing writings on Lean thinking. They break this thought down into 5 principles: Defining value from the customer's perspective, Identify value streams, Circulating the value stream, Create a pull production, and Continuously seek perfection. According to them, these 5 principles help management move towards the idea of a Lean company, by starting the continuous path to eliminating waste through collective work.

Empiricism. Empiricism is originally a concept from philosophy and brings together different theories. In this case, the term is used to evoke a very simple concept linked to experimentation. It is summarized by Schwaber and Sutherland [5] as a current that affirms that knowledge comes from experience and that decision-making is based on the observation of facts.

Scrum evolutions. The creators of today’s framework claim to have developed it in the early 1990s [5]. They revealed the concept and application methods for software development in 1995 at the Object-Oriented Programming, Systems, Languages & Applications (OOPSLA) conference. Following this presentation, professionals in the software industry started experimenting. Fifteen years later, in 2010, Schwaber and Sutherland released the initial version of the Scrum Guide online [1]. This concise document, spanning less than 15 pages, outlines the fundamentals of Scrum. Since its publication in 2010, the Scrum Guide has undergone seven revisions as of July 2023. With each ver-

sion, the guide has experienced changes aimed at reducing its prescriptiveness and enhancing inclusivity. This evolution is especially notable in its efforts to broaden applicability beyond the realm of software development¹.

Benefits of Scrum. There is a huge amount of existing works on agile methods, particularly Scrum. However, it is crucial to seek practitioners' opinions and understand their perspectives on real-world application. This is why we will examine the existing literature and engage in discussions with professional Scrum trainers.

3 Research method

The objective is to concentrate on the advantages of Scrum and the factors that may undermine them, at several levels (either at the level of the Scrum framework itself, or within it, or at a systemic level). The main research question is *What are the factors limiting the benefits of Scrum?* We conducted a literature review and a qualitative study based on interviews to obtain practitioners' comments. Interviewees with substantial field experience and a deep understanding of Scrum theory, beyond its fundamentals, were crucial. This comprehensive knowledge, including intricacies where most Scrum users may lack expertise, is essential. The study relies on the criterion of the title "Professional Scrum Trainer" from Scrum.org, signifying undeniable expertise in Scrum theory and substantial practical experience. All interviews have been made between March and April 2023. To facilitate the reading of this work, each interviewee is identified by the code found in Table 1, composed of their initials of first and last name.

Table 1 Presentation of interviewees

Code	Name	Company	Region/Continent of expertise
[AB]	Alice Barralon	Orions	Europe
[GV]	Gunther Verheyen	Ullizee-Inc	Europe
[CV]	Christiaan Verwijns	The Liberators	Europe
[FW]	Fredrik Wendt	ProAgile	Europe
[FP]	Fabio Panzavolta	Collective Genius	Europe
[FF]	Francois Fort	Blue Sequoia	Europe & North America
[PM]	Pawel Mysliwicz	Humanize	Europe & North America
[LPC]	Louis-Philippe Carignan	PaceMkr	North America
[NT]	Nigel Thurlow	The Flow Consortium	North America, Europe & Asia
[GF]	Gregory Fontaine	Agorax	Asia
[FN]	Fanny Ndengue	DP World	Africa & Middle East

This research adopts a semi-structured interview approach [6] to enable the discovery of valuable information for participants that may not have been anticipated by the researchers [7]. To ensure effective data collection, an initial interview was conducted as a preliminary test to allow the refinement of the interview structure and enhance the likelihood of acquiring pertinent data [8]. This interview was carried out with Olivier Ledru, another PST. At the end of this interview, the gathered elements appeared pertinent to conduct the research. We followed an interview guide to explore various aspects

¹ Scrum Guide Revisions: <https://scrumguides.org/revisions.html>

related to the benefits, applications, and influences of the Scrum framework (Table 2). The interviews were conducted either in person or via video conference, each lasting approximately one hour. All interviews took place over a period of three months during the first half of 2023.

Table 2 Interview Guide

Sections	Questions
Introduction	What are the benefits of Scrum?
The Scrum framework	How does the "immutable" nature of the framework respond to changes made by a team? What happens when a team applies Scrum mechanically?
Elements added within the frame	Are all complementary practices necessary for teams, do they all contribute positively? Inherent in the definition, Scrum teams are multidisciplinary. What challenges arise if a Scrum Team does not exhibit this characteristic?
Systemic factors affecting the framework	Did you observe the influence of this culture and company rules on Scrum success? Did you observe the influence of national culture on the success of Scrum? Did you notice correlations between behavior, managerial posture, and Scrum success? Did you observe Scrum delivering benefits regardless of the organizational context? Are the reasons for choosing Scrum important to you?
Feedback and conviction	From your perspective, what are the biggest obstacles that limit the benefits of Scrum? What strategies do you believe optimize the chances of success with Scrum and fully realizing its potential?

The presentation of the findings is organized into sections, aligning with the structure of the research questions and hypotheses.

Qualitative studies have to assess several threats to validity [9].

Structural validity: There is a potential for response bias based on how the questions were formulated, influencing participants' responses.

Internal validity: Potential changes in wording throughout the interviews may have guided the interviewees in different directions. Additionally, participants may have been influenced by their previous responses to similar questions.

External validity: The chosen sampling might not fully capture the experiences of all experts, limiting the potential for generalization. This limitation extends to the literature review, which may not be exhaustive.

Validity of conclusion: It is interesting to highlight the confusion of effects, which can confuse the analysis of those interviewed given the multitude of causes, many more than those identified. To nevertheless guarantee a certain reliability, we used the same interview guide for each interview. The sample was composed of diverse profiles and a pre-test of the guide was conducted before launching all the interviews.

4 Limiting factors at the framework level

4.1 A framework to respect

This paragraph highlights the importance of adhering strictly to the Scrum framework and explores the consequences of deviating from its principles.

The Scrum Guide [5] says: “*Try [Scrum] as it is*” and “*The Scrum framework [...] is immutable. Although it is possible to implement only parts of Scrum, the result is not Scrum. Scrum only exists in its entirety and works well as a container for other techniques, methodologies, and practices.*” Another saying is that: “*Changing the design or ideas of Scrum, abandoning elements or not following the rules hides problems and limits the benefits of Scrum, even potentially making it useless*”.

What does it truly entail? Looking into the concept of "ScrumBut" proves interesting. This term emerges from teams asserting, "We use Scrum, but..." followed by a constraint that explains why they deviate. Various studies [10][11][12] have documented recurring examples of ScrumBut. One notable example is the unordered Product Backlog. In this scenario, the Product Backlog, which is intended to be an ordered, evolving list of improvements for the product [5], deviates from its initial goal. The consequence is a potential lack of visibility into risky or high-value elements. The team might unintentionally prioritize tasks based on enjoyment rather than focusing on those of genuine significance for the user. Such a choice in task prioritization could lead the team to neglect more challenging aspects without considering the potential value associated with that work [11]. There are other examples, such as the lack of a Sprint Retrospective. It can have various sources including ineffective practices leading to its removal [11], of external pressures like unfinished work, technical debt, or other factors [12]. Without it, the Scrum Team lacks the ability to inspect individual aspects, interactions, processes, tools, and their Definition of Done. This makes it challenging for the team to strategize and plan improvements in quality and efficiency. These consequences can be extended to all Scrum events [5].

Interviews. Consistent with the observations outlined in the Scrum Guide, [FP] asserts from her experience that she has encountered a limited number of teams getting benefits without the defined framework. However, if teams desire to alter specific elements of the framework, they should do so with a conscious understanding, as each element in Scrum holds significance that must be carefully assessed [GF][OL][CV]. Modifying elements of Scrum without understanding the potential consequences can be dangerous [AL][GF][CV]. [AL] states that the lightweight structure of the framework highlights the importance of each element built upon years of accumulated experience from experts worldwide [PM]. It has only become simpler with each edition.

When removing elements, the resulting impact on benefits varies, underscoring the rationale behind each element of Scrum and supporting an empirical approach [LPC][GV]. For example, the removal of the Definition of Done will impact the quality of Increments while the removal of the Sprint Retrospective will impact the continuous improvement of the team [LPC]. In broad terms, Scrum provides a rhythm of inspection and adaptation [FW] and is primarily the combination of two feedback loops [13]. Altering its elements risks diminishing the effectiveness of these loops [GV].

The Scrum framework, however, is not a miraculous recipe and is not the sole option for creating high-quality products [OL]. The goal is not solely on the framework itself but rather on what takes place within it [OL][NT][GV]. Scrum is essentially a set of game rules. [OL] and [FP] used the metaphor of chess to illustrate this concept. While it's possible to play with different rules and still derive enjoyment (benefit), it would no longer be the game of chess. Scrum is defined by a set of rules aimed at a specific

objective. Scrum is merely a scaffolding that facilitates construction. If a team or organization finds something more suitable than Scrum within its context or decides to change the framework, it should not hesitate to adapt or leave the framework [GF] [LPC][FF]. As practices and tools are inherently contextual, the selection should prioritize those that yield the most benefits, and Scrum adheres to this principle [NT].

On the ground, reaching the level of maturity required to adhere to the rules of Scrum as defined in the Scrum Guide already represents a significant challenge [GF]. Therefore, transcending the rules may not be advisable at this stage unless the context strongly supports such a deviation. The foundations described by Scrum are essential to acquire the Scrum mindset as well as this empirical logic of improvement [FP].

4.2 The vacuity of the mechanical application of Scrum

The mechanical application of Scrum is the superficial application of Scrum. This mode of operation has different names, such as “Zombie Scrum”, “Dark Scrum” or “Mechanical Scrum”. [14] defines *Zombie Scrum* as follows: “*It looks like Scrum but without the beating heart*”. Essentially, it is a use of Scrum that appears normal if we take the Scrum Guide as a check-off list [14]. The literature offers nothing more than definitions on this aspect. The literature review did not uncover any studies concluding that teams practicing *Zombie Scrum* were less efficient. However, even though the scientific literature has not concluded on this point, [15] presents the characteristics of an effective Scrum Team, and many of these are incompatible with *Zombie Scrum*.

Interviews. A mechanical application of Scrum leads to a failure to uphold the spirit of the game and therefore in the loss of something essential [GF][OL]. Mechanical Scrum, in essence, lacks the values of Scrum, and therefore gives inconclusive results as professional Scrum thrives on values, which is what creates the results [FP]. Applying Scrum mechanically lacks what guides the empirical approach [FF]. Mechanical Scrum is convenient as achieving all elements is easily measurable and doesn't require special effort. Difficulty in implementation and measurement often results in a mechanical application of Scrum. Teams applying Scrum mechanically typically do not understand why they use the elements of Scrum [FN][GV][AL][PM] but carry them out robotically [AL].

However, a mechanical application of Scrum is not necessarily devoid of benefits, and it can lead to some improvements. However, these improvements tend to be short-term, and stagnation occurs rapidly [FN][OL]. [CV] tells that understanding the benefits of the elements to move beyond this mechanical application.

On the human aspect, mechanical Scrum tends to create weariness in people who fail to see the meaning of what they are doing, leading them to abandon certain parts [FN][FP]. Teams in this mechanical application are often helpless when confronted with obstacles because their application guide cannot assist them, making them much less competitive [FW]. [FN] illustrates the impact of the mechanical application of a Scrum element by envisioning a Daily Scrum without transparency. This results in inadequate inspection of progress towards the Sprint Objective, leading to insufficient adaptation of the Sprint Backlog and a potential failure to achieve the Sprint Objective by the end of the Sprint. The entire logic of Scrum is therefore compromised.

On a broader scale, as the mechanical application of Scrum becomes more prevalent, the number of failures multiplies, and there is an increase in detractors of Scrum and agility [GF][GV]. [LPC] reframes this by stating that teams generally do what they can with the knowledge they have, and the problem primarily arises from people who impose the use of Scrum. This imposition is one of the main factors contributing to the prevalence of mechanical Scrum [GF][PM][GV][FW].

[FW] draws attention to the fact that Scrum as such is not useful and that it is its underlying principles that are important.

5 Limiting factors within the framework

5.1 Complementary practices to experiment with

Complementary practices are crucial for Scrum team functioning, supplementing the framework. While an exhaustive list is impractical, teams adopt their own sets. While these practices are diverse, varied, and specific to each team, some have gained popularity over time. Additionally, some practices may be inherited from each company that, upon adopting the Scrum framework, chose to retain and integrate them.

Among popular practices, we find the notion of velocity, a measure of speed denoted in 'Story Points' [15][13]. Its high popularity is not without controversy. Some personalities decry this practice, notably Ryan Ripley and Todd Miller, both PST, authors of [12] and hosts of the Agile for Humans YouTube channel. The use of Story Points is facing growing criticism, with a preference for the adoption of flow metrics [6] derived from the Kanban strategy to spend less time discussing planning and more time building valuable outcomes. The No Estimate movement is currently little recognized [17]. Scrum is based on three empirical pillars: transparency, inspection, and adaptation [5]. For improvement to take place, transparency must be maximized to inspect elements that closely reflect reality. However, the use of velocity and Story Points is not very transparent, as it involves estimates on a scale that has no factual unit. Coupled with reliance on estimated size, it tends to bias the empirical approach.

Among the criticized practices, we also find the excessive use of User Stories, additional meetings, or the 3 questions of the Daily Scrum². User Stories, originating from Extreme Programming, describe valuable functionalities for system users. [18] highlights different types of ambiguity related to User Stories. Ambiguity is, as with any type of requirement, a factor in project failure [19]. The use of User Stories as a written means for an exhaustive expression of requirements can be perilous as they are intended to facilitate the transition from a written mode to an oral mode of work [20]. Over-specification of a User Story can then harm the empirical logic of Scrum. Using this format for technical work items can lead to pitfalls since purely technical items do not create a change in product behavior for the user. Additional meetings appear to have potential negative impacts on Developers as they can break the concentration of Developers, reduce their working time, and therefore reduce their productivity and the time

² Let's stop Scrum, it doesn't work! -<https://www.youtube.com/watch?v=4ERtGp-nBAY>

available to complete their work [21]. Another example of complementary practice is the format of the Daily Scrum around 3 questions (What did you do yesterday? What about today? Are you facing impediments?) In this situation, the collaboration is often weak, potentially jeopardizing the Sprint Objective [12]. Team members also tend to diverge [22], which, tends to slow down the achievement of the Sprint Goal.

In short, and after studying a few examples, it seems that the application of complementary practices is not always positive and can even have harmful effects.

Interviews. The question of complementary practices is interesting insofar as the interviewees have very opposite answers a priori but which are completely similar.

Not all complementary practices are beneficial [GF][LPC][FF]. It has also been stated that 99% of practices should be discarded and that very few will be useful [FF]. Others argue that the practices themselves are not harmful but it is their application that matters [AL][FN][NT]. In this context, everything can be either good or bad. This aligns with the concept of limited applicability [NT], meaning that each practice, each tool has a specific use for which it provides value and, therefore, utility. In this context, it is nonsense to insist on using a practice with a poor application [NT]. Complementary practices must target the intended problems, and adaptation should be readily considered [PM]. However, it is the context that must guide the choice of practices [FN][LPC][FF]. In this framework, the effectiveness of practices is context-dependent, and selecting practices suitable for the context at a given time is necessary. This does not necessarily mean that they will always be suitable over time, nor that they will be applicable in other contexts [FF]. Not all complementary practices are at the same level and some work in more cases than others [GF]. It is also interesting to note that the controversial practices mentioned earlier during the literature review also emerged during some exchanges in an equally nuanced manner [GF][CV][OL][PM].

Another proposed perspective is that all complementary practices are beneficial if it is the team that decides to test them, and where failure is seen as a learning opportunity. In this case, regardless of the outcome, each attempt represents a step toward improvement. These experiences must, therefore, contribute to a better way of working [FP]. This notion that practices should be chosen by the teams themselves has appeared several times [PM][FP][FW]. This implies that if practices are imposed on teams, there is little chance of success as it does not consider the context. Understand the reason for the existence of complementary practices used is one of the most challenging aspects for Scrum teams, but it is nevertheless essential [CV]. The literature seems to indicate that most teams do not think about these questions. Additionally, Scrum Masters and Agile Coaches, who strive to guide organizations towards greater agility, bear the responsibility of advising on practices. If they apply the same practices everywhere, then they are accountable for failures [LPC].

5.2 Cross-functionality as a prerequisite

Scrum Teams are defined as multidisciplinary, implying that their members possess all the skills needed to create value [5]. However, a team may possess multidisciplinary members without being independent in terms of skills, lacking the completeness needed to build the product. There is a correlation with performance and customer satisfaction

in cross-functional teams [23][24][25]. However, it also appears that many factors contribute to the real effectiveness of cross-functionality, such as the desire to learn, focus on a sense of responsibility [26]. [27] highlighted that multidisciplinary teams tend to reduce completion time and increase customer satisfaction.

Interviews. The lack of cross-functionality of teams is seen by all interviewees as a significant obstacle. It creates dependencies with external teams which involve waiting time and late deliveries [GF][FN][CV][OL][FF][FP][NT]. When Scrum teams are not multidisciplinary, they may encounter quality problems, as they lack the necessary skills to produce high-quality Increments [LPC][PM]. To adhere to the rules of Scrum, they may adopt an incomplete Definition of Done and therefore consider an Increment as completed, even though it cannot be delivered. Moreover, Scrum teams run the risk of delivering Increments that do not provide the expected value [LPC][FP]. Users do not desire computer code; they seek a solution that addresses their problems [OL]. In this context, having all the necessary skills is vital to be able to address these issues.

Scrum is made to avoid the need for external assistance and to manage unforeseen absences or departures [NT]. However, this cross-functionality is not without cost and involves mutual learning, which requires dedicated time [NT]. Cross-functionality, combined with shared learning, facilitates collaboration, preventing individuals from limiting themselves to their primary field of knowledge [NT]. Cross-functionality is linked to the diversity of individuals, which is a strength for creating high-quality products [FF] [PM]. It is more rewarding to work in multidisciplinary teams [CV].

6 Systemic limiting factors

6.1 The weight of corporate culture

As Scrum teams operate within and serve the larger system that is the company, we can question the mutual influence that these two systems exert. Scrum allows the company to mitigate risk through an iterative and incremental approach, described as empirical [5]. It can also be assumed that the company must provide enough space for Scrum to fully exist and exploit its full potential. To maximize success, Scrum must be understood from a corporate culture point of view and this is a necessary condition for the successful integration of this framework into the ecosystem [28]. If companies do not evolve, it should be noted that the elements that do not change expose themselves to conflicts as well as losses in productivity and employee satisfaction [28]. Even if relatively few texts address this subject of culture linked to Scrum, those are quite clear: the corporate culture must adapt to avoid reducing the benefits.

Interviews. For all interviewees, corporate culture has a major impact. Many companies inherit a Tayloristic and industrial-age culture, emphasizing repeatable and predictable work [GV]. Companies are organized to provide products, but not necessarily to create impact among their users [FP]. The complex problems addressed by Scrum must be seen as creative problems, and work in these contexts should no longer be perceived in an industrial way [GV]. Scrum carries very different ideas from those of

the industrial era. As a result, Scrum often clashes with the historical culture of companies [GF][PM][FP]. If a company is unwilling to change aspects like budgeting, evaluation methods, or organizational structure, the change process may be swiftly halted [GF]. It is also crucial for Scrum Masters and Agile Coaches to consider this historical culture during their interventions [LPC]. If the corporate culture supports formal authority (power granted to specific individuals for high-impact decisions), it tolerates a form of violence, hindering team self-management [FW]. Moreover, if the leadership of companies does not share the elements of the Scrum culture, it can lead to harmful consequences for the teams [AL]. [GV] asserts that culture is one of the biggest challenges to succeeding with Scrum. For the people leading this change, culture is a daily challenge where many obstacles are encountered regularly. Among these challenges are bureaucracy and hierarchical layers, integral aspects of the culture of many companies [FP]. A bureaucratic culture prolongs decision-making processes, impeding the empirical approach of swift iterations advocated by Scrum, which leads to a loss of agility [FW]. Scrum highlights the dysfunctional aspects within the organization, such as dependencies and constraints related to budgeting, decision-making, or approvals [NT]. In a rigid environment, Scrum implementation is ineffective without behavior changes [NT]. Scrum is somewhat constrained when existing in an unsupportive culture. It is not going to help teams succeed if they adhere to implementing preconceived architectures, specifications, and designs in these organizations [GV]. Culture exerts varying influences depending on the circumstances. If there is any form of cultural pressure in the company, psychological safety diminishes, leading to reduced communication and hindering the creation of high-performance and effective teams [PM][CV]. Companies often impose limits that hinder Scrum teams' ability to deliver value [FP]. It is a form of self-sabotage not always apparent. Also, when certain elements are implemented, an inappropriate culture can slow down obtaining the realization of their benefits [GF]. For example, if a team practices Daily Scrum but the culture promotes weak communication, transparency is compromised, and therefore making it impossible to properly inspect progress toward the Sprint goal and adapt the daily plan [GF].

6.2 A secondary national culture has to be taken into account

Just like corporate culture, national culture - meaning the culture of individuals - has effects on many aspects. In the case of Scrum, relatively little research has focused on the subject. However, [29] drew a comparison among different countries by evaluating them on five axes, as presented by [30]. If this system should be taken with caution, it is interesting to note that it underscores the importance of a case-by-case approach. Scrum may not necessarily encounter the same challenges in different cultures.

As a foundation for the cultural lens used for this research, the GLOBE project, which aims to identify cultural specificities influencing leadership practices [31], and the Schwartz framework [32] are considered. Expanding the scope, [33] argues that cultural elements impact the success of agile practices, particularly in terms of communication, dynamism, and shared cultural elements.

Interviews. The culture of individuals varies globally, and without considering cultural particularities, we cannot overcome resistance to change [NT]. Some particularities impact the potential of Scrum teams to a greater or lesser extent, and each culture comes with its advantages and disadvantages [GF] [CV]. These elements necessitate adapting the way Scrum is implemented [GF] since certain framework concepts resonate better in certain cultures. The way people work varies significantly between areas, and this is a parameter that should not be neglected [NT]. [GF] notes that, in his experience, cultural differences, whether North American, Asian, or European, have not posed a problem. He highlights that the distribution of people on communication issues, like open-mindedness and assertiveness, varies significantly based on culture. It is, therefore, important to keep in mind that each company is different [CV]. Sometimes cultures mix in international teams. This can create cultural shocks that make collaboration more difficult [PM]. Indeed, it is easier to derive benefits when all team members share the same communication standards [AL]. However, this diversity is beneficial in that it allows people to strengthen each other. It also contribute to better quality [PM]. In this sense, multidisciplinary and multicultural teams gain stability because there are no imposed standards [FN]. Beyond these elements, there is an influence on the way people were educated academically [AL] [FP], making it primarily a matter of beliefs, which may conflict with those of other people [AL]. [FW] states that it is not relevant to talk about national culture since, even if there are differences in the way people have learned to behave and acquired skills and knowledge, this can be put on the same level as organizational culture since these elements always constitute the sum of people's behaviors. Given that there is no absolute rule per country, it should not be generalized. For [GV], national culture is not as important as organizational culture.

6.3 A management to embark

Middle management, including non-executive managers, plays a crucial role in Scrum adoption and effective implementation. Originating from Taylorism, where control over activities is emphasized, middle managers play a significant role. However, the paradigm shift introduced by Scrum doesn't mean a dead end for them but rather opens up new possibilities. Their role should evolve from being obstacles to facilitators, promoting the smooth flow of work instead of blocking it, actively participating in problem resolution³. For managers, it requires adopting a new mindset or psychology. While the process is vital for ensuring high-quality software that meets customer needs, it's equally important to emphasize that this paradigm shift increases the significance of adaptability, communication, and openness for both team members and management [34]. The manager's role is to eliminate obstacles, promote openness and communication, and oversee the change-oriented environment to ensure the overall product aligns with goals and requirements without excessively dictating the team's operations [34]. Therefore, managers have to adopt an open management method that leaves room for the emergence of ideas and challenges the status quo [35]. Managers should adopt a more delegative and empowering approach by entrusting decision-making to those

³ <https://www.reworked.co/leadership/dont-let-middle-managers-block-agile-transformation/>

most affected. In this transition, they should actively support the Scrum approach and facilitate its growth. Without change, it can harm the success of Scrum [26].

Interviews. How the company exercises its management has a strong impact on the ability to overcome obstacles [CV] [FP]. On a practical level, a Scrum team requires a sense of support and individuals who contribute to its development [GF]. Clear rules, transparency, and trust are essential but many managers are not adequately prepared for them [GF]. Traditionally, management is often associated with resource exploitation and behavior control. The “Command and control” approach is ill-suited for solving complex problems and, in general, for enhancing group performance [AL][PM]. Self-management proves beneficial in many contexts, and we need managers who enable it by being leaders in the service of their team if they want to gain agility [FF][PM]. To act appropriately and avoid limiting profits, managers need to understand this way of working [AL][GV]. As holders of authority, they have to embody leadership characteristics to derive benefits [NT][NT]. Managers struggle to identify the maturity level of teams and adapt their posture accordingly. They lack the knowledge on how to provide adequate support [FF]. Some individuals are naturally inclined to reason, think, act, and make decisions in line with the spirit of Scrum, while others may find it less intuitive [FP]. The influence of managers is twofold, either as genuine supporters contributing to maximum benefits or as significant obstacles hindering the success of Scrum for those who resist or feel uneasy [LPC]. Remote management initially allows teams to have freedom, but over time, individuals may feel neglected and lose their motivation [OL]. Leaders must sustain enthusiasm by offering inspiring visions in business, technology, or organizational strategy. Competent managers should nurture team growth, respecting procedures yet recognizing when deviation is appropriate. Companies require a certain structure, but managers must navigate unforeseeable events and uncertainty [OL]. Managers who establish genuine connections with team members and customers allow teams to lead by example and foster engagement. On the contrary, a manager who fails to build connections, resorts to blaming, and exerts excessive control can hinder the success of teams [CV]. It's vital not to single out individuals, as the entire system must be questioned as a whole [FP].

6.4 More or less suitable contexts

As Scrum is used to generate value through the creation of adaptive solutions to complex problems [5], it makes sense to explore the boundaries of its applicability. Complexity, as defined by [36], is a way of thinking about the world. Complexity highlights the concepts of emergence and unpredictability. If Scrum aims to be used in this emerging context, we can raise questions about its suitability in a project context, where traditionally accepted criteria involve respect for the three parameters: scope, cost, and deadline [37]. However, according to the popular CHAOS Report, “agile” projects have a significantly higher success rate (42% compared to 13% in the waterfall model in 2020) [38]. If Scrum was not designed to enhance the success of projects, but to create products with high added value, it appears that it also allows to improved success in a project context. Other frameworks, like the waterfall (V-cycle), are more appropriate for addressing simple and complicated challenges where there's minimal uncertainty.

Scrum's true value emerges when tackling complex problems, while sequential approaches are more fitting for less uncertain situations [39].

Interviews. Scrum is transposable in numerous contexts [OL]. Indeed, it has demonstrated its effectiveness in many fields, such as IT, robotics, marketing, communication, and even at the government level [PM][GV]. Scrum fits perfectly with the development of new products, especially in contexts presenting a high level of uncertainty [GF][OL]. When experimentation is not applicable, the empirical approach of Scrum is not suitable. Indeed, it is not relevant to perform surgical procedures with Scrum [OL] or for projects with low uncertainty, like building bridges [FF]. As with the complementary practices, the context is crucial and plays a significant role in determining whether Scrum can be effective [CV]. The limited applicability also applies to Scrum, as it does to any other tool [NT]. While Scrum is highly effective for solving complex problems, some of its elements can prove useful in other situations, depending on the problem to be solved [LPC]. Indeed, Scrum can provide value even in less complex contexts, through the transparency, empowerment, visualization, and continuous improvement it provides [GF]. An interviewee also states that he has always seen benefits, even minimal, in using Scrum, such as increased pleasure for individuals in their work [FP].

6.5 Need of compelling reasons for adoption

The reasons and vision for change are crucial aspects of the change process. According to [40], it is essential to initially identify the reason for change, create urgency based on it, and avoid falling into the trap of complacency. This reason for change contributes to a vision should be communicated regularly [40]. Moreover, the quality of the reason for change also seems to be a crucial factor. The phenomenon of the cargo cult, initiated by [41] illustrates extreme irrational mimicry. In the context of Scrum, many texts address the issue of cargo cult [42][43][44][45], highlighting that adopting Scrum for the main reason that this framework works for other companies is the misguided rationale.

Interviews. Originally, Scrum was used in urgency, and it proved highly effective because such situations leave no room for the status quo. Moreover, in urgency, the majority of people are open to trying new things [OL]. Without issues, there is no reason to change. The issues can arise from either aspiration for gain or the avoidance of losses [OL]. If people lack motivation, the results are likely to be inconclusive, especially since Scrum encourages a shift in habits, necessitating motivation [OL].

The reasons why teams adopt Scrum are crucial in determining how effective these teams can be [CV]. The ideal is then to have an initial reason that is aligned with what Scrum can deliver, and to regularly inspect the results to visualize progress [PM]. In this context, using Scrum to reduce risk and foster autonomy is a sound rationale [CV]. Caring for people and, more broadly, human-centric reasons are also compelling motivations to use the framework [AL]. Additionally, if Scrum is integrated into the pursuit of the company's objectives, then the initiative becomes relevant. In such cases, the benefits may be more pronounced [LPC]. Not all reasons are equally good. Having only a monetary objective in mind when adopting Scrum, without an intention to change the company culture, will limit the benefits [FN]. Also, companies that choose Scrum

merely because other companies use it often lack a clear understanding of their own motivations, leading to suboptimal results [GF] [CV]. Wanting to gain speed while maintaining the same practices as before is another reason that will tamper the results [FP].

However, it is entirely possible to uncover the benefits of Scrum through practice and eventually achieve success [GF]. To clarify whether the identified reasons are valid, it is essential to ask the right questions, specifically to find out whether the problem you want to solve can be effectively addressed [NT]. [AL] notes that starting with good reasons makes the choice of framework secondary, as any can fulfil the task. For [FW], the concepts behind Scrum are good, but how the framework prescribes them is not always adapted to the context. We must therefore make these choices consciously.

7 Conclusion and Perspectives

We identified the factors that can limit the benefits of Scrum based on semi-structured interviews conducted with a panel of Professional Scrum Trainers. Through this research, it became apparent that succeeding with the Scrum framework requires consideration that various factors can limit its benefits. Among these factors, various hypotheses are considered, such as non-compliance with the framework, mechanical application of Scrum, use of unsuitable complementary practices, or lack of cross-functionality. Beyond the Scrum team, there are issues like unsuitable corporate rules or culture, the regional culture of individuals, inadequate management, a non-complex implementation context, and absent or inadequate implementation reasons. It appears that considering Scrum as a simple project management method to be applied by teams ensures that its full potential is not fully realized. The paradigm shift by the framework is, therefore, a critical element necessary to obtain the benefits of Scrum. Considering this, companies should rely on Scrum Masters and Agile Coaches, not just to assist their teams in practicing Scrum more effectively, but to adapt collaboration, management, and everything influencing value creation. This research provides insights for companies looking to embark on Scrum implementation or seeking to improve their product development using Scrum.

As perspectives, it could be interesting to question a broader expert audience beyond Professional Scrum Trainers to obtain a more nuanced perspective.

Scrum Seen by Dave West. Dave West, Product Owner and CEO of Scrum.org, was also interviewed in this study. *"It all starts with the goal. Break it down, define it, and figure out how to achieve it. If you do this, it almost doesn't matter whether you're doing Scrum. Scrum is simply a great way to work. If everyone is aligned on purpose, then good happens, and autonomy, mastery, and purpose flow because you have that purpose. Everything else falls into place."*

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