Adopting Agile With Scrum by Outsourced Project Teams: A Case of Bosnia and Herzegovina

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Abstract **– Attempts to adopt agile practices are challenged by outsourcing and distributed ways of working popularized in the world today. This paper focuses on outsourcing vendors and empirically examines the progress of agile and Scrum adoption in such environments through the case of information technology companies in Bosnia and Herzegovina. Qualitative content analysis was employed to analyze data obtained from 142 professionals from 43 companies, whose clients are located around the globe. The empirical results reveal a fairly good level of agile awareness in the tested community, but also confirm the findings of earlier research that obstacles to implementing Scrum in outsourced projects exist, emphasizing issues originating from distant Product Owners, diminished Scrum Master role, and customer influence. Team self-organization is recognized as the best adopted Scrum practice, while the product backlog definition, Scrum events, and the process managed through excessive meetings are among those that still require significant improvements.**

Keywords **– Agile adoption, Scrum framework, IT projects, outsourced teams, qualitative content analysis.**

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1. Introduction

Agile methodology emerged as a response to the needs of information technology (IT) project-based organizations in the early 2000s to manage the development of their products in changing, complex, and highly competitive environments with reduced time-to-market while minimizing the amount of waste. It relies on the concepts of an adaptive way of work originating even from the 1950s and collects under one umbrella the iterative and incremental development process frameworks that evolved through the 1990s, such as Scrum, Kanban, Extreme Programming, and others [1].

Adoption of agile practices is a journey that is not easy. It requires a change in the mindset that agile is a definition of a culture, that change is the only constant, and that process is not a goal, but a tool to build quality products which are the ultimate goals and the only measure of success. Adoption of agile practices is dictated from the top-down, therefore it requires at least a dose of agile transformation at the organizational level to ensure the top management support for agile project teams. All of this causes high agile adoption failure rates [2], [3]. Consequently, despite being a decades-old methodology, the 15th State of Agile Report finds that 81% of surveyed organizations started their agile transformation only in the past 3 years, where 18% of organizations are completely agile, and in 34% of organizations more than half of the teams adopted agile [4]. A year later, the 16th State of Agile Report brings to the attention that 1 in 3 respondents say they are unsatisfied with the agile practices in their company, half are somewhat satisfied, and 1 in 5 are very satisfied. This indicates that agile adoption and transformation initiatives are still in high demand.

While agile is suitable for project management in all kinds of industries, from its inception as a methodology in 2001 to this day, its application in IT and software industries remains the most common [4].

The Balkans is recognized as a science, technology, engineering, and mathematics-focused education system with high potential and talent in the spectrum of IT knowledge. The IT sector has been expanding in this region over the years, but due to developing economies and small markets in the Balkan countries, it significantly relies on the concept of offshore outsourcing [5].

While agile adoptions have been discussed in many studies in the past, there has been very little attempt to empirically explore the progress of agile adoption in smaller developing countries whose companies face challenges of multiplied management layers that come with the outsourcing setups.

The goal of this study is to fill in this gap with the case of Bosnia and Herzegovina, which demonstrates high outsourcing competence in the IT industry [5]. The study qualitatively explores the application of the Scrum framework in Bosnian-Herzegovinian IT environments, and its objective is to analyze which Scrum knowledge and practices have been successfully adopted in the Bosnian-Herzegovinian IT environments, and which ones still require improvements.

The paper is structured as follows: The next section briefly introduces agile and Scrum theories and leads to the definition of the research question. Then, the research methodology with data analysis steps is explained in detail. An extensive discussion, followed by the conclusions, limitations, and implications of the study are presented in the final sections of the paper.

2. Research Background and Research Question

Agile is a project management methodology best suitable for projects with unclear requirements and short time schedules [6], [7], [8]. To ensure accurate and fast decision-making, agile aligns business and technology by bringing together business representatives and technical staff into one project team whose interactions become a core agile value. The agile project team closely collaborates with customers who remain actively involved in the project until its last day. The most promoted agile value in agile literature is the team's openness to change in all project management aspects. This does not mean that making and following a plan is no longer needed at all. It simply means that agile practitioners accept that not everything can be known upfront, and instead of making bigger plans to commit to, they repetitively perform the activity of short-term planning [9], [10], [11], [12]. They write the minimum amount of documentation in advance, but following the rule: "Just enough, just in time" [13].

Agile promotes incremental and sustainable delivery of business value, and frequent feedback provision [14].

The State of Agile survey is the longest continuous large-scale annual survey of agile practices and techniques, with its 17th and the latest iteration made in 2023, involving respondents mostly based in North America and Europe (up to 80%). It reports that organizations prefer using agile to accelerate product delivery, enhance the ability to manage changing priorities, and increase productivity. However, due to failures to adopt the change at the organizational level in at least 50% of surveyed organizations, the accomplishment of agile adoption goals is not always easy. Challenges with organizational culture, resistance to change, and lack of support and skills tend to be problems for agile adoption over the years [4], [15].

Nevertheless, regardless of the challenges, 48% of surveyed organizations that practice agile report that most of their projects were successful, and at least some projects were successful in 95% of surveyed organizations. The project success was measured by customer and end-user satisfaction, business value, on-time delivery, and quality [4]. This is a huge accomplishment compared to very high project failure rates being reported throughout the history of project management, as discussed in [16].

These numbers also imply that agile success stories are multiplying and that utilizing agile practices and techniques produces many advantages, which undoubtedly makes agile project management methodology a choice number one in various organizations [18], [17].

The term "agile adoption" refers to the adoption of agile practices on a project level defined through one of the agile methods, or agile frameworks, as they are mostly called in the literature [19], [17]. Although Kanban is slowly becoming a favorite framework among developers in the IT industry, Scrum with its hybrids has been the most popular agile framework by far [20], [21], [4].

As the official Scrum Guide explains, Scrum as a framework suggests a set of practices that implement agile values, which teams and organizations can use to define the agile process that works best for them. The fundamental unit of Scrum is a Scrum team, composed of: (1) one Scrum Master, who implements Scrum and helps the team resolve impediments; (2) one Product Owner, who makes product-related decisions, and (3) Developers, people with T-shaped knowledge who create the product [22]. The Scrum Guide insists on a relatively small Scrum team size and a flat hierarchy among Scrum team members.

Mundra *et al.* [23] report that the IT industry consensus is that Scrum Teams should not be bigger than nine people. Zia *et al.* [24] conducted a study to test the application of Scrum in bigger teams. They concluded that a team with more than 10 members experiences issues with communication and endless meetings, and the participation of all team members in the process drops with the increase in team size. More complex teams and organizations can be handled using scaling agile frameworks [25], [26].

Scrum splits product development into maximum month-long sequential iterations called sprints. During one sprint Scrum team creates one product increment. Every sprint starts with the Sprint planning event that defines the work for developers for a given sprint. During the sprint execution, developers meet daily at the Daily Scrum event to inspect the sprint progress, identify problems, and self-organize. Sprint ends with two "inspect and adapt" events: (1) Sprint Review, for the team and stakeholders to inspect the produced outcomes, and (2) Sprint Retrospective, for the team to inspect their teamwork and project development process in order to suggest improvements [22].

The State of Agile Reports show that Daily Scrum and Sprint planning have been the two most practiced and valued Scrum events since 2007, closely followed by Sprint Retrospectives. In the past two years, Sprint retrospectives climbed the scale even higher to become the second most important event after the Daily Scrum. Sprint reviews started gaining their value only in the past 5 years [4].

According to the agile adoption and improvement model in Qumer *et al.* [27], project teams go through six levels to fully adopt agility, regardless of which agile framework they use. Those are: (1) Agile infancy – adopting basic agile properties (speed, flexibility, and responsiveness); (2) Agile initial – enabling communication and collaboration; (3) Agile realization – development of artifacts and reducing documentation; (4) Agile value – establishing practices to value people (internal and external); (5) Agile smart – establishment of a learning environment; (6) Agile progress – minimizing the resources necessary for production. Packlick [28] reduces the number of agile maturity levels to five: (1) Awareness – there is knowledge of agile principles; (2) Transformation – agile practices are being implemented; (3) Breakthrough – the constant use of agile approach despite the barriers; (4) Optimizing – the focus is on improvements of practicing agile; (5) Mentoring – agile teams are high performing and mentoring other teams in an organization. In recent years, Scrum practitioners named these five phases as follows: (1) Ad Hoc agile; (2) Doing agile; (3) Being agile; (4) Thinking agile; (5) Culturally agile.

However, they also claim that no agile adoption model reflects the real agile journey, as the growth of agile teams is not linear and does not happen in discrete phases [29].

With the great help of digital enablers, many organizations today have teams distributed around the globe, and many work with outsourced teams to reduce costs and find the talent and expertise that could not be found locally. With the global pandemic that started in 2020, the number of distributed and outsourced teams grew exponentially, which could be the reason why inconsistency in processes and practices across teams became a highly significant challenge for agile adoptions post 2021 [4]. Agile methodology was not designed with outsourcing in mind, and many authors conducted studies about the impacts of outsourcing on the process of adopting agile practices, but mostly from the perspective of organizations receiving outsourcing services – the "clients". Sarfraz *et al.* [30] and Stokman [31] conclude that the most common challenges that come with outsourcing are also challenges that slow down agile adoptions, but they do not make them impossible. Those are: more difficult team communication and collaboration, the absence of team cohesion, conflicts, and lack of trust. In addition, Warnakulasooriya [32] finds that physical distance and cultural differences make significant impacts on the success of agile methodology in outsourced projects, while time zone difference is not a significant issue.

Bosnia and Herzegovina is a clear example of a country with a developing economy that has become a refreshing outsourcing destination in the IT industry for North America and Western Europe, together with other Balkan countries [5]. The first evidence of agile promotion in the Bosnian IT community appeared in 2014, with the establishment of an agile association that promotes agile and lean project management in the Bosnian IT sector [33].

To achieve the main objective of this study and examine the experience of agile adoption in outsourced project teams, the IT sector in Bosnia and Herzegovina was recognized as a suitable case. The focus was on the Scrum framework, as a widely implemented agile framework. Accordingly, one research question (RQ) was raised:

> *RQ: Which agile & Scrum practices have been successfully implemented and accepted in the outsourced Bosnian-Herzegovinian Scrum teams, and which ones still require improvement?*

3. Materials and Methods

This section explains in detail the chosen research methodology, outlining the data collection and analysis steps carried out to produce research findings and answer the research question posed.

3.1. Research Design

With the aim of collecting a larger sample of data for qualitative analysis, a survey with a questionnaire as an instrument was recognized as the most suitable data collection method, with open-ended questions, giving freedom to research participants to express their honest opinions about the explored topics [34]. The questionnaire was composed of two sections: (1) A section that captures data about Scrum team composition and the high-level project organization, composed of 8 questions; (2) A section that captures data about good and bad practices in the analyzed Scrum-based project development process, composed of 5 questions. The Google Forms tool was used for the survey creation and data collection.

3.2. Subjects and Procedure

The target group of study participants were developers in Scrum teams, as developers are the ones who are most affected by the challenges of project development processes. Data was collected from 43 Scrum teams in Bosnian-Herzegovinian IT project environments, reached through direct contact with the top-level managers in IT companies. Data collection took place in the third quarter of 2023. Every contacted company made one Scrum team available to participate in the research. The selected 43 Scrum teams had 322 team members in total with mixed roles. Of these, 251 were developers, being the target role, out of which 144 developers accepted to participate in the research (responses were received from 1 to 9 developers per team). To ensure trustworthiness, following the team selection, the managers themselves did not collaborate further, and the questionnaire was communicated and sent directly to the developers of selected teams, independently.

After the data review and cleaning process, the responses of 2 study participants were discarded due to the low-quality responses. The final dataset had 142 survey responses, which is characterized as a very good sample size in qualitative studies [35], [36].

3.3. Data Analysis Method

Content analysis, as a qualitative research method that enables the objective interpretation of the content of text data through the systematic classification process of coding, categorization, and identifying patterns, is the primary data analysis method used in this research. It is suggested to be the most suitable method when the main source of data is written text, which rules out the unwanted interactions between participants and researchers [37], [38], [39]. The analysis was performed through four major repetitive steps, as suggested by the relevant literature review in Bengtsson [40]:

(1) The collected data were initially stored in Google Sheets. Both the survey and the collected data were in English, therefore the translation efforts were not needed. The data that corresponded to the first part of the survey were suitable for analysis directly in Google Sheets, while data collected via the second part of the survey were transformed from Google Sheets into NVivo software for qualitative analysis. The author first got familiar with the textual content, detected the analysis units, and developed the coding list inductively during the analysis process. The inductive list of codes was developed capturing the project management aspects, activities, and practices the study participants were pointing out in their responses to the survey questions. This step was performed in 5 iterations to ensure reliability and stability. Codes were continually changing – the highly complex codes were refined and simplified, identical codes were merged, and duplicates were removed. The initial list of 165 analysis units was converted into the final list of 55 codes.

(2) The textual content was reviewed again, alongside the developed code list, to detect and discard the text which was not relevant to the research.

(3) Codes with similar indications were grouped into categories and themes following the mixed inductive and deductive approach, relying on: (a) Scrum terminology from the latest Scrum Guide, focusing on higher-level Scrum units; (b) Components of the Project performance model in Durmic [41] that tackles the project people and project process aspects of project management.

(4) To deepen the content analysis results and clarify their magnitude, the quantification was added to the qualitative analysis through the rank order comparison method which involves “counting” [42], [43]. While counting is not a fundamental part of qualitative analysis, many researchers consider the enumeration to be an “intrinsic” part of it [44], [45].

The results were discussed and transformed into conclusions, at both manifest and latent analysis levels, relying on Scrum theories and related past research.

4. Results

The results obtained by selected research methods are presented in this section in two parts. The first part details the size and structure of the analyzed Scrum teams, while the second part provides the results of the content analysis performed on the qualitative dataset.

4.1. Scrum Roles and Events

The size of analyzed Scrum teams ranges from 2 to 13 members (Table 1), where 67% of analyzed Scrum teams have 4 to 8 members.

Table 1. Size of analyzed Scrum teams

Scrum team size	Number of teams
2	2
3	3
4	4
5	9
6	4
7	6
8	6
9	1
10	3
11	2
12	1
13	2

27 (63%) teams have 1-50% of members distributed across the globe, and the remaining 16 (37%) teams are based in Bosnia and Herzegovina in their full capacity. All teams are outsourced. The clients of all teams are located in foreign countries, and no team is building a product for the local or regional market.

Developers in all teams reported that there is a role of a Product Owner in their project organization. In 30 (70%) cases, the Product Owner is located at the client end and the other 13 (30%) Product Owners are the local ones who work for the same company as the rest of the team. Next, the results reveal that only 16 (37%) teams see their Product Owner as a member of their Scrum team, out of which 9 are local Product Owners and 7 are client-end Product Owners. Developers in another 27 (63%) teams consider their Product Owners an external role to their team, where 23 were client-end Product Owners, and 4 were local ones.

Furthermore, the study results report that not all teams have the Scrum Master role or any form of a dedicated team/process facilitator, more specifically 13 (30%) of them.

Teams that do have a Scrum Master see this role in their team lead, project manager, or mostly in the actual Scrum Master role defined by Scrum theory.

One team reported that they even have two Scrum Masters to support two parts of the team: the outsourced part of the team in Bosnia and Herzegovina, and part of the team at the client end. In all cases, data shows that developers consider their Scrum Masters as team members. Four teams reported that Scrum Master and Product Owner roles were executed by the same person in their teams.

When it comes to Scrum events, 34 of the analyzed 43 teams practice Daily Scrum. Nine of these teams do not practice any other recurring event. Eight of the remaining 10 teams replaced Daily Scrum with the unofficial ‘Weekly Scrum’ event, and 2 teams do not have any form of a Daily Scrum. Other Scrum events and team-specific meetings that Scrum teams in this study practice regularly are presented in Table 2. The knowledge that ‘Sprint’ is also a Scrum event by Scrum theory was not demonstrated among study participants.

Table 2. Scrum events and other meetings the analyzed teams practice

Scrum events	No. of teams practicing them
Daily Scrum	34
Unofficial Weekly Scrum	8
Sprint Planning	25
Sprint Review	20
Sprint Retrospective	13
Other meetings	**No. of teams practicing them**
Backlog refinement	8
Customer engagement	6
Technical organization meeting	5
High level planning	4

4.2. Content Analysis Results

Results of the coding process were split into two groups, presented in Tables 3-4. Table 3 contains 29 codes that represent valuable and well-implemented aspects in the Scrum-based process, and Table 4 contains 26 codes representing aspects that still require improvements. Codes in both lists are organized into 8 categories and 3 themes.

Table 3. Well-implemented Scrum practices in the analyzed Scrum teams

Theme	Category	Code	Code Count	Category Count	Theme Count
Project people	Scrum team	Team competence	7	61	69
		Teamwork and organization	20		
		Team communication	15		
		Personal skill development	10		
		Freedom at different levels	4		
		Having a Product Owner	5		
	Customer	Direct communication with customers	5	8	
		Understanding customer needs	3		
Project process	Backlog refinement	Prioritization of work	8	14	109
		Requirements ready on time	4		
		Refinement sessions	2		
	Scrum events	Sprint planning sessions	4	28	
		Daily Scrum	12		
		Sprint review	1		
		Sprint retrospective	2		
		Having sprints	9		
	Process definition	Fast and flexible process	20	31	
		High-level process organization	9		
		Transparency	2		
	Process management	Problem solving	7	32	
		Adaptation and agility	3		
		Time management	3		
		Programming practices	2		
		Testing keeping the project stable	1		
		Well organized sprints	9		
		Regular meetings with everybody involved	2		
		No unnecessary meetings	5		
	Equipment and technology	Equipment and technology	4	4	
Nothing	Nothing	Nothing was implemented well	2	2	2

Table 4. Scrum practices in the analyzed Scrum teams that require improvement

Theme	Category	Code	Code Count	Category Count	Theme Count
Nothing	Nothing	All good, nothing to improve	30	30	30
Project people	Scrum Team	Teamwork and organization	7	9	18
		No education of team members	1		
		Involvement in multiple projects	1		
	Customer	Vague request and feedback from customers	5	9	
		Customer bureaucracy and insufficient involvement	4		
Project process	Backlog Refinement	Poor requirements and design specification	7	13	88
		No priorities	1		
		Sizing of user stories	1		
		Complex and time-consuming requirement specification process	4		
	Scrum events	Scrum ceremonies overall	3	19	
		Daily Scrum	6		
		Long and tiring sprint planning	4		
		Too frequent Sprint retrospectives	3		
		Sprint retrospectives	3		
	Process definition	Lack of high-level planning	1	5	
		No process	4		
	Process management	Difficult to follow the process	2	48	
		Poor time management	1		
		Frequent changes in the market	6		
		Slow decision making	2		
		Excessive meetings	20		
		Writing documentation	4		
		Development practices	4		
		Testing organization	9		
	Equipment and technology	Outdated tools and technology	3	3	

5. Discussion

An extensive qualitative content analysis, with the addition of quantification of qualitative data, was performed to analyze the level of agile and Scrum adoption and understanding of agile and Scrum principles and concepts in the Bosnian-Herzegovinian agile community, in the context of IT projects.

The results reveal a satisfactory level of agile awareness in the community, but there is still a need for significant improvement of certain Scrum practices.

The majority of analyzed teams have members distributed across the globe, but with manageable team sizes according to best Scrum practices [26].

However, the results raise a concern regarding the engagement and positioning of the Product Owner role in Scrum teams. A large number of developers (60%) report that Product Owners are superior to their team and they do not position themselves as members of Scrum teams, which is not in line with the Scrum theory which promotes the horizontal organizational structure of a project team. This confirms the earlier research findings of Paasivaara *et al.* [46] and Bass and Haxby [47] who discuss the gaps that exist between the Product Owner and team members who are not co-located. In addition, the results reveal a small number of teams who face collaboration and approachability issues even with the co-located Product Owners. These issues may be a barrier to productive communication among team roles resulting in uninformed decision-making, inefficient process execution, and poor quality of project outcomes. Reported issues in this context may also aggravate the alignment of project business and technical aspects as a major goal of agile methodology.

Furthermore, the results indicate that more recognition should be given to the Scrum Master role and the value it brings to the team. However, doing Scrum with no Scrum Master and failing to understand the purpose of this role is not the case only for the agile environment in Bosnia and Herzegovina. It is a more global issue in the Scrum adoption process discussed by many authors, like Moe and Dingsoyr [48], Ereiz and Music [49], and Spiegler *et al.* [50].

The team composition-related results also confirm the findings of Jilani and Ikram [51] who find that Scrum Master and Product Owner roles in outsourced agile projects are sometimes combined in one person, which is a practice that should be avoided according to the Scrum theory.

A detailed discussion of results that answer the research questions in this study is presented in the next section.

5.1. Discussion of the Research Question

Study results that answer the raised research question are presented in Tables 3-4.

They indicate that agile and Scrum adoption in Bosnian-Herzegovinian IT project teams is beyond the “ad hoc agile”, going back and forth between “doing agile” and “being agile” phases on the Scrum maturity scale.

5.1.1. Project People Dimension

Study participants, as members of Scrum teams, find two very similar groups of factors that make or challenge their Scrum-based process and their satisfaction with it.

Nevertheless, looking at the quantitative results at a higher level, it can be concluded that study participants are more focused on the positive aspects of their project process. The group of factors that makes the positives stand out quantitatively belongs significantly to the Scrum Team category, which corresponds to the agile and Scrum adoption requirements. This also confirms the findings of multiple authors, practitioners, and researchers in past projects and studies, summarized in Handzic *et al.* [52], stating that it is the quality, competence, and involvement of the project team that the project execution and its outcomes depend on the most.

The results indicate that Scrum teams highly appreciate the teamwork and team organization established around Scrum principles in which everyone participates in the process definition, where the customer is part of the process and developers work closely with the available Product Owner to solve customer problems. Study participants value frequent and constant team communication and knowledge sharing within the team which they describe as creative, ambitious, good, responsible, competent, self-contained, that self-organizes and, most importantly, whose members are ready to help each other. Study participant #27 comments: *“Our process allows our team to be in sync with each other and to resolve all potential misunderstandings as soon as possible. Scrum helps us to ‘be on the same page’, and that is the most important thing. Without it, most of the team members would not follow each other.”*

On the other hand, team members who are perfectionists and also ones who complain too much and *“expect their Scrum Master to solve problems instead of being self-organized”*, as study participant #103 explains, is a usual team-related situation that needs improvement. Although not primarily related to Scrum, two study participants also report that not having the office and working remotely full time is a barrier to establishing teamwork and productivity.

Study participants also value that the Scrum-based process gives them enough opportunities to broaden their skills and experience through learning and “freedom” to share opinions and propose changes in the process or the product they are building. Study participant #78 comments: *“Agile development gives me, and my team, a lot of freedom and autonomy in terms of decision-making, which I think is very beneficial and helpful when it comes to problem-solving, especially since most of us are working from home.”*

These results clearly imply that the Bosnian-Herzegovinian agile community knows what the Scrum team should look like, and that companies are investing in their teams to achieve the agile team goals.

On the other hand, collaboration with the customer is not reported to be at the same level. For a smaller number of projects where a good collaboration with customers was established, study participants find the easy communication and understanding customer needs to be the highlight of their well-implemented Scrum-based process, and they find it useful that they have a Product Owner in their team to *"give them guidelines and communicate with the customer, so they do not have to"*. At the same time, customer-related issues are also reported to be those that most significantly slow down the project development process. The study results show that these issues usually result from customers who are not able to specify their requests, who give vague feedback, or who are being "bossy" and distant from the projects, and make teams wait for their decisions for too long. Process issues of this kind are most likely due to the gaps between a distant Product Owner and team members in outsourcing projects that were already discussed. They are another clear indication that Product Owners need to invest more effort in supporting their customers throughout the process to help the team, especially in the outsourcing project organization where cultural differences and physical distances may add to the project management complexity. The support for this conclusion can be also found in [53], [54].

Comments of two study participants who work in different organizations explain also how customers' familiarity with Scrum can make an impact on the process:

Study participant #5: *"Well, some customers do not understand the process of Scrum. That leads to misconceptions and false expectations."*

Study participant #59: *"We are lucky to have a 'super Scrum customer', who knows all the principles and supports us."*

5.1.2. Project Process Dimension

When the aspect of the project process definition itself is considered, the most valuable characteristics, among study participants, are iterative and smooth project processes. It makes their teams compact and flexible. They enjoy a good project atmosphere in which *"everything is done faster"*, and find that the concept of frequent delivery results in an increased quality of product increments. Study participant #35 explains: *"Our current development process is very fast and flexible; this enables us to shift priorities fast and take care of the most important features and stability improvements first."*

Furthermore, study participants state that transparency in the process that relies on set standards contributes to the quality of their work and team commitment.

These conclusions signify the presence of an understanding of the benefits of an iterative and incremental development concept in the community. The positive effects that such kind of product development approach makes not only on the product quality, but also on the project team, can be inferred from a comment of a study participant responsible for the product quality control in their team: *"In an agile environment, we can build features in smaller pieces that can be more easily automated. We can also discuss easily if the flow of the feature is correct in the context of a given environment."*

However, iterative development that lacks high-level planning may also have negative consequences: *"Since the agile process outputs products piece by piece, you do not really know what the final version of the product will or should be."* (Study participant #43).

The refinement of the product backlog, as one of the key artifacts in Scrum, was commented on from both positive and negative aspects almost equally. Study participants find the prioritization of product backlog items, which describe the work that needs to be done, to be the most helpful refinement activity. Priorities help them understand which features and tasks need attention in which order, which consequently helps them make better daily plans. Organizing refinement sessions with the whole team to make the requirements ready on time is recognized by study participants to have a very positive impact on the sprint execution that follows. On the contrary, the results show that dissatisfaction with the product backlog in their projects originates from the poor or non-existent requirement specification and the practice of starting to code before the Product Owner defines the feature, resulting in demotivating multiple revisits of the same code before the feature is finalized.

Study participant #8 says: *"We often need a lot of time for backlog refinements, because we do not know all the requirements."*. These findings complement the observations in van Rooden [55] indicating that product backlog, which is not prepared in accordance with the Scrum rules, triggers a series of problems for the whole Scrum team later in the development process. In other words, good sprint execution is not possible without a well-defined product backlog. To ensure a fluent sprint execution, Scrum invites a collaborative effort of a Product Owner, who makes the top of the product backlog ready for development together with the team, and a Scrum Master who should block the inclusion of unprepared items in the sprint plan.

Several study participants also raised a concern about the complex and time-consuming requirement specification process as a result of the outsourced project organization, where customers are mostly dispersed across different time zones. Study participants who brought up this observation mostly work with clients and customers based in the USA.

This confirms the findings of Omair [56] and Mighetti and Hadad [57] who investigate challenges in requirements engineering in offshore and global agile-based system development.

Scrum literature authors find that together with the definition of the product backlog items and setting their priorities, estimating the backlog effort is considered an elementary product backlog refinement activity in Scrum practice, as discussed by López-Martínez and Juarez-Ramirez [58]. However, only one participant in this study spoke about estimations, in the context of practices to be improved: *"Sizing of user stories can also take a long time as it requires everyone on the same team to agree on each one."*. Other participants did not demonstrate a significant interest in this topic, which may mean that work estimation is not a practice in their projects at all, or they do not find it valuable enough.

When it comes to Scrum events, the results show that 60% of analyzed Scrum teams on average practice them (Table 2). Among all events, the high implementation rates show that study participants appreciate the values of Daily Scrum the most, corresponding to the global trend reported in the annual State of Agile reports. Sprint Planning and sprint review events come next with the application in around 40% of analyzed teams, while the benefits of sprint retrospective events still need to be recognized by the majority of teams. The sprint retrospective, as the least practiced event in Bosnian-Herzegovinian Scrum teams, does not follow the global trend reported in the State of Agile reports since 2006, where retrospectives rank very high on the scale of employed agile techniques [4].

When the quality of implemented Scrum events is considered, the results reveal that even though Daily Scrums could still be improved, study participants are very satisfied with the way they are practiced: *"I think the daily meeting before we start our work every day is great. Because we get to reflect what we did and what is ahead of us and we start the work day with the right mindset."* (Study participant #47). Daily Scrum events also help them identify and then resolve problems. However, other Scrum events are identified more as things to improve, rather than things that contribute to the quality of the project development process. The reason may be twofold: (1) The lack of a dedicated Scrum Master in many teams who would facilitate the events properly; (2) The outsourcing project organization with distributed team members which challenges the implementation of Scrum events as they need to be held by means of online calls.

While some study participants value that Scrum promotes sprint plans as a team decision, a few others describe this event as *"a long and tiring meeting that does not result in a good plan"*.

Furthermore, some think that the Sprint retrospective should not be a separate event and could be a part of Sprint planning to reduce the number of meetings. A similar observation comes from another group of participants, who state that there is no need to have a Sprint review event after every sprint. These results imply that there is room for improvement in the way Scrum events are being organized, so that the team can recognize the value they carry. Their current state of quality leaves an impression that most of the Scrum events are seen as a Scrum obligation to fulfill, rather than ways to achieve transparency, inspect the work, and adapt as needed. The following observations of two study participants complement this conclusion (they use the term "ceremony" as a synonym for "event" in Scrum):

Study participant #137: *"…A lot of ceremonial meetings that just waste time and do not result in anything. Fortunately, there are not many of those lately. I try to avoid them and focus on the important stuff."*

Study participant #62: *"Each of our team members has Scrum in their DNA, so we are forcing and supporting it. We did not realize any negative sides of it, but we had negative experiences because Scrum was not fully implemented but only in parts, and in the end it did not work properly. People always say that Scrum does not work, but in essence, what they do is not Scrum. They only think they do Scrum by introducing some ceremonies, but the essence is missing."*

The next category defined by the content analysis, process management, has been raised as the biggest concern and subject to improvement by the study participants. The highest number of observations in this context relates to the imbalance in "talk vs. work", which very often results in slow decision-making. Participants state that there are too many redundant meetings in the process without a clear purpose, which are not engaging and take too much time, which in turn leaves bad impacts on their motivation. They describe most of these meetings as unplanned meetings with customers and other stakeholders which, by their content, are not relevant for developers. Study participants, who defined positive aspects of the process management on their projects, share the same observation from a different angle: *"I really appreciate not being involved in numerous meetings with clients. Only the most important information is propagated to me which helps using my time more efficiently."* (Study participant #18). They emphasize the lack of unnecessary meetings as good process management. However, study participants do see value in regularly planned/scheduled meetings with customers as they serve as the source of information and necessary feedback from customers.

These observations confirm the findings of Marchenko and Abrahammson [59] and Uludağ *et al.* [60] who discuss the inefficiency of having too many meetings. Furthermore, the results also show that there are teams who managed to achieve and recognize the value in the process agility concept and quick adaptation to change as a pillar of Scrum, but there are still teams that fail to manage changes successfully. Study participants coming from these teams explain that sudden, often, frequent, and constant changes in the market result in failures of delivery and an increase in process unpredictability. Nevertheless, this is in line with expectations as a failure to adopt the change remains one of the top problems in agile adoptions over the years globally [4].

The process management category data also indicates that improvement efforts are needed in the context of managing the process of fixing bugs detected in production environments. Due to the lack of proper process in some cases, many team members often spend their time on "false alarms". In addition, the testing of unstable components is reported as a practice to avoid. Programming practices were not commented on much, although pair programming was mentioned as useful, while code reviews were indicated as a practice to improve.

Lastly, time efficiency and the ability to detect problems on time and fast were reported as very useful aspects of implemented Scrum-based processes, mostly as a result of a well-practiced Daily Scrum event. On the other hand, writing technical and user manual documentation is suggested to be optimized, which is supported by agile principles of project management.

6. Conclusion

The empirical study investigated well-implemented and challenged Scrum practices in Bosnian-Herzegovinian Scrum teams to assess the level of agile adoption in the Bosnian-Herzegovinian IT community, as an example of an outsourcing environment. The results reveal that obstacles to implementing Scrum in such an environment exist, but the general understanding of agile concepts is at a fairly good level. The transition towards the adaptive mindset is still progressing in Bosnia and Herzegovina's agile community.

The study results provide important implications for theory and practice in the field of project management. For theory, the study contributes empirical evidence that challenges originating from outsourcing project organizations may impact the implementation of agile methodology.

It strengthens the earlier research findings that the Scrum-based process is founded on the self-organizing, functional team, and collaboration between its roles, but also recommends that customer impacts should be considered in the agile adoption assessment models. The study also empirically confirms the concerns raised in earlier more global research about the Scrum Master role being diminished in the attempts of project-based organizations to adopt Scrum.

Such findings suggest that organizations need to invest in hiring a Scrum Master in every Scrum team to coach the team and stakeholders and help resolve agile journey barriers. Eventually, Scrum Masters' engagement is expected to also reduce the gaps between distant Product Owners and developers that the study reports. Study results also highly recommend a significant improvement in sprint retrospective implementation rates to speed up the achievement of more significant agile and Scrum benefits.

Naturally, the study results should be interpreted in light of certain limitations: (1) Even though the author invested the effort to manage the possible subjectivity effects in the data collection and analysis process, subjectivity in qualitative research can never be isolated fully. The study participants may have relied on their subjective interpretation of Scrum as a framework and its implementation in their projects when answering the survey questions; (2) The study investigates the perspective of only one Scrum role in Scrum teams – developers.

As a response to these limitations, further research is suggested to explore perceptions of team members holding the other two Scrum roles (Scrum Master and Product Owner). It is expected that the comparison of results in this and the proposed research will also reveal the differences in each Scrum role's expectations when it comes to the agile way of managing projects. As part of future work, there is also an opportunity to extend the results of this study by their statistical confirmation through extensive quantitative research.

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