

Learning from the Current Status of Agile Adoption

Georgia M. Kapitsaki^(✉) and Marios Christou

University of Cyprus, University Avenue 1, 2109 Aglantzia, Cyprus
gkapi@cs.ucy.ac.cy, marios_2c@hotmail.com

Abstract. Software processes have evolved significantly since the first formal appearance of software engineering. The academia and the industry have introduced, embraced or rejected various methodologies that are more or less efficient in theory and in practice. A current popular trend can be found in Agile methodologies widely adopted in the last decade. Since software processes are constantly evolving, it is vital to see how they evolve over time. This work presents the current state of the adoption of Agile methodologies with an emphasis on Scrum development method. Study results from 44 different countries were collected during the months of March and April 2012. The results are enlightening in order to understand how Agile development and Scrum are viewed today, to see where their success factors lie, discover if they offer benefits in comparison to heavyweight approaches and discuss their future evolution.

Keywords: Agile · Software process · Adaptive development · Scrum

1 Introduction

As organizations become global and modular new software paradigms derive with some being embraced from the software community and others still lacking wider acceptance. The most widely adopted processes that have gained a strong momentum in the last years can be found in Agile development. Agile methodologies have been adopted by many industry leaders worldwide including Yahoo, Microsoft, Oracle, HP, IBM, Motorola, Xerox, Federal Reserve Bank and Capital One [6]. Adaptive methodologies are generally considered to perform better in terms of increase in productivity, quality improvement, cost reduce, maintainable and extensible code, collaboration and customer satisfaction. Nevertheless, since nothing comes without drawbacks, in Agile methodologies these are usually found in the need for constant customer participation, the difficulty to scale in large projects and the need for training on the use of Agile methodologies [15].

This paper presents a field study conducted on the current adoption of Agile methodologies in the software industry with a specific focus on Scrum [18]. Motivated by this global spread of adaptive software development and our personal experience in a Scrum industrial environment it is interesting to see where Agile

and more specifically Scrum stand in the software engineering world today. The main objectives of the survey we conducted were to:

- Demonstrate where Agile adoption lies today globally in terms of quantities.
- Discover the success or failure rate of and Agile- and Scrum-driven projects.
- Perform a comparison among the results of using Scrum- or Agile-based techniques and of following traditional development approaches (i.e., heavyweight, such as the waterfall model).
- Study development aspects relevant today (e.g., team geographical distribution).

The third point indicated was the most important, since many software engineering books and research works [13] enumerate the differences between Agile and traditional ways of development, in terms of advantages and disadvantages. Since theory may not reflect the real situation, a view in the state of our days is necessary and useful. Although many Agile-related surveys have been conducted, since the introduction of Agile in the industry (the first one dates back in 2003), the reality in the software industry is constantly evolving. Moreover, to the best of our knowledge this is the first survey with an emphasis on Scrum. The initial goal was to concentrate solely on Scrum with its backlog, the burndown chart, the retrospective, the customer review process and the Scrum Master. However, in order to keep contact with the big picture viewing Scrum in the framework of Agile, we decided to study both perspectives: (1) Agile in general and (2) Scrum more specifically. Participants were informed that some questions would concern only Scrum. Those with experience with more than one Agile methodologies were asked to base their answers on Scrum. The majority of participants (76.9%) indicated Scrum as the employed Agile methodology, which makes the results obtained more applicable on this specific case of Scrum.

The rest of the paper is structured as follows. Section 2 analyzes the motivation and execution of the survey, whereas Sect. 3 presents the survey results in detail: the participants views concerning Agile and its comparison with traditional heavyweight methodologies are demonstrated and discussed. In Sect. 4 information specific to Scrum is given, whereas Sect. 5 presents an overview of previous Agile studies Sect. 6 indicates limitations of the study, and, finally, Sect. 7 concludes the paper discussing briefly the future trends observed through the survey.

2 Research Methodology

For the survey management and execution a procedure typical followed for conducting surveys was used [9] with decisions taken at each step:

1. *Formulation of the Statement of Objectives*: The survey motivation was determined, the objectives were set and the following research questions were identified: *R1*. Does Agile or Scrum adoption provide better results in software development? *R2*. Do people follow strictly the guidelines? *R3*. Have companies tried to think out-of-the-box by experimenting with Agile and Scrum variants? *R4*. Do engineers like Scrum?

2. *Selection of a Survey Frame and Determination of the Determination of Sample Design:* A request for participation was distributed to employees of various organizations and individual Agile practitioners. The potential sample members were selected among Agile practitioners instead of targeting software engineering companies in general. We searched for companies of various sizes with an active role in the software industry, sent email requests to over 200 companies with an Agile profile including personal emails to specific employees and requests for distribution within the organization through Human Resources departments. We also sent notifications to members of Agile-related groups (e.g., Scrum Alliance) exploiting relevant mailing lists and exploited Online Social Networks (OSNs) with announcements on the Facebook group of Scrum alliance and LinkedIn contacts.
3. *Questionnaire Design:* In order to keep the time necessary for the completion of the questionnaire to a minimum, the majority of questions were of closed type. However, there were some open questions and the possibility of general comments, in order to allow the participants to express their opinion more freely. Indeed this proved useful as we gained useful insights from these comments. The length of the questionnaire was restricted to 35 questions. In order to increase the validity of our results attention was paid on the survey design making sure that we are asking questions that measure what we want to measure referring here mainly to the research questions posed. In particular, these were divided into the following groups with group (a) covering questions R2 and R3 and group (b) reflecting questions R1 and R4.
 - (a) Agile questions including a set of Scrum-specific questions
 - (b) Comparison of Agile and traditional development approaches
 - (c) Organization profile (e.g., organization type, location, size) and demographics
4. *Data Collection:* The web-based survey was open for a period of two months (March-April 2012). All potential participants were informed that approximately 10 min would be required to complete the survey.
5. *Data Capturing and Coding, Editing and Imputation:* The survey management was done through SurveyMonkey¹.

The preliminary version of the study analysis with an emphasis on Scrum can be found in a previous publication [11]. This paper focuses on the presentation of the results for drawing useful conclusions on Agile adoption in general. Detailed results of the study along with the complete set of questions are also available online (website of first author).

3 Results

We gathered a total of 335 responses during the months of March and April 2012. The initial questions on demographics were completed by all participants, but from the point on where the questions concerned development methodologies

¹ <http://www.surveymonkey.com>.

many participants skipped the remaining questions. As a result not all participants completed all survey steps, which resulted to a total number of 233 complete questionnaires.

3.1 Organization Profile

We obtained answers from more than 126 companies distributed geographically in 44 different countries: North and South America (40 %), Europe (35 %), companies with a global presence, i.e., presence in more than one continent (4 %), Africa, Asia and Australia (total of 13 %), while in 8 % of the cases no country was specified. The participants are working in enterprises of different sizes: one third is coming from enterprises with over 1000 employees (30.6 %), one quarter with 101 to 1000 employees (25.5 %), whereas the rest is employed in smaller companies.

When it comes to new technologies and methods most of the participating organizations do not hesitate to adopt new technologies (62.4 %), some are more conservative (30.3 %), since they follow the approach only when the technology is proven, and a smaller percentage prefers more traditional approaches (7.3 %). We calculated that the ones open to new technologies follow in most cases Agile techniques (62.4 %), whereas the adopters of traditional approaches follow in most cases the waterfall model (91.7 %). This observation supports the fact that Agile development is usually embraced by innovative people [14].

3.2 Demographics

Most of our participants were between the age of 30 and 40 (41.1 %), 28.1 % between 40 and 50, 14.3 % between 50 and 60, 12.1 % between 18 and 30 and 4.5 % above 60. Men mostly responded to the survey (90.5 %) opposed to women (9.5 %). The education level of the participants was high with the majority possessing masters degree (42.5 %), bachelor or diploma (38.9 %) and others in possession of technical degree (8.0 %), PhD (4.4 %) or college degrees (2.2 %).

The results cover a wide range of practitioners. 27 % indicated themselves as software engineers, 25.2 % as IT managers, 23.0 % as project managers, while the remaining 23.8 % of the participants are active in other roles, such as quality assurance engineers (or testers), business stakeholders, data professionals and analysts. The fact that the majority of participants have a direct involvement in the development process is an advantage for the accuracy of the results. Concerning the participants specific experience in teams working with Agile techniques most are quite experienced with their involvement ranging from 3 to over 10 years.

3.3 Popularity Among Agile

Participants were asked about their choice on both heavyweight and lightweight approaches. Our survey showed that the most popular among heavyweight alternatives is, as expected, the waterfall model (36.5 %), whereas enterprises tend

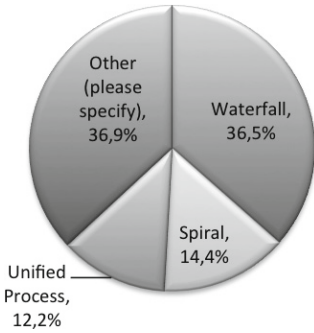


Fig. 1. Traditional methodology mostly used.

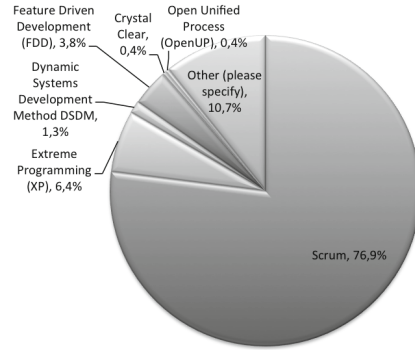


Fig. 2. Agile methodology mostly used.

to adopt also hybrid approaches or reject traditional methodologies completely heading directly for adaptive techniques (36.9 %) (Fig. 1). Among Agile methodologies the big winner is Scrum (76.9 %), whereas Agile combinations are also to be found (Fig. 2). In these combinations increasing importance is given to Kanban, which is based on building the production of software on customer demand. Scrum was the most popular Agile methodology also in a Forrester Research survey of 2010. Earlier back in 2003 XP had the dominant role (the majority of the 131 survey participants in the survey of the Australian Shine Technologies [19] were referring to adoption of XP and around 8 % to the adoption of Scrum).

These results constitute an indication of a tendency moving from XP to Scrum. Scrum is also the preferred way of the participants for constructing software systems: 64.9 % indicated Scrum, 14.9 % chose XP, 4.4 % FDD, 1.8 % DSDM, 0.9 % Open Unified Process, 0.4 %, Crystal Clear and the remaining 12.7 % hybrid approaches.

3.4 How Big Is the Team, How Long Is the Iteration

According to Agile practices the team size should be relatively small (less than 10 members). For Scrum it is often indicated that teams larger than 7 members should be split into more Scrum teams resulting to Scrums of Scrums, for XP ideal teams range between 3 and 20 members, whereas for Crystal Clear even smaller teams comprising of up to 6 developers are suggested [1]. The most famous answer we received from participants is 6–10 team members (45.4 %), whereas some have successfully used larger teams of 11–20 members (22.7 %) (Fig. 3). Dr. Dobbs Journal survey conducted with 168 participants in 2011 also indicated small teams: 63.1 % of successful teams had less than 11 members [3].

Iteration duration is also an important issue. Many factors affect the ideal duration including team experience and time devoted to reviews and planning. Iterations are also relevant to the time the customer has defined in order to assess the progress of the development of the system. Agile iterations usually have a duration of 2–3 weeks. Scrum iterations range from 2 to 4 weeks, while

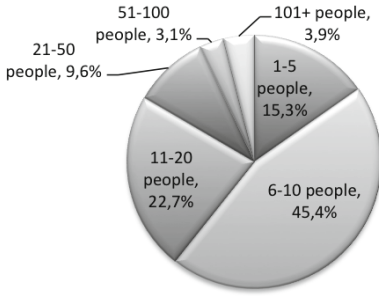


Fig. 3. Largest team size used with success.

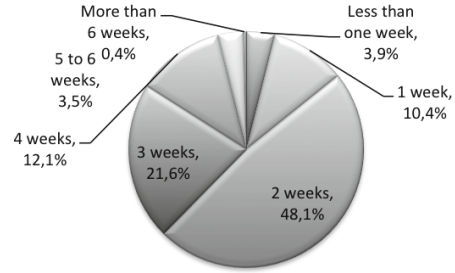


Fig. 4. Length of most recent project iteration.

XP iterations are 1 or 2 weeks long [7]. Having iterations that are longer than one month is generally very random. This was also verified in our case: for most Agile adopters iterations are restricted to 2 weeks (48.1 %), whereas it is usual to have longer ones of 3 (21.6 %) or 4 weeks (12.1 %) (Fig. 4).

3.5 Where Do Teams Work

Team collocation is very important in Agile development. One of the twelve principles of the Agile manifesto states that: “*The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.*” As organizations become global, it is usual for distant teams to collaborate despite being placed in different cities, countries or even continents; this is applied even on Agile projects [16]. Offshore development with engineers operating from different countries, is gaining on importance lately mainly due to the significant cost reduce. At a previous survey on the geographical distribution of Agile teams with 642 participants it was observed that teams are generally collocated [2]. In our survey success rates are very high for collocated teams, while the possibility for a successful project reduces significantly for offshore development (Fig. 5).

3.6 Agile and Tradition

Agile focuses on four main principles found in the Agile manifesto published 11 years ago:

1. Individuals and interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan

The principle that is valued most by practitioners is 4, while many are intrigued by 1 and 2 (Fig. 6). Indeed adaptation to change is one of the main

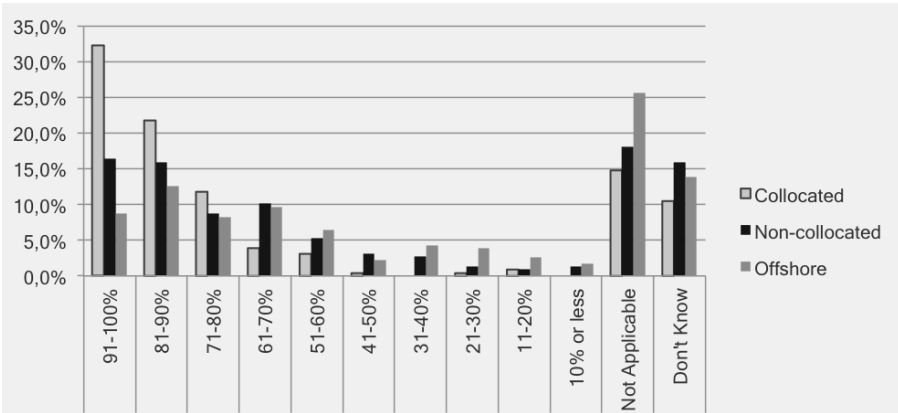


Fig. 5. Overall success rate for different types of distributed Agile teams.

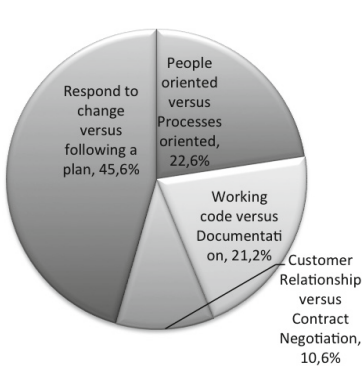


Fig. 6. Appealing Agile aspects compared to heavyweight methodologies.

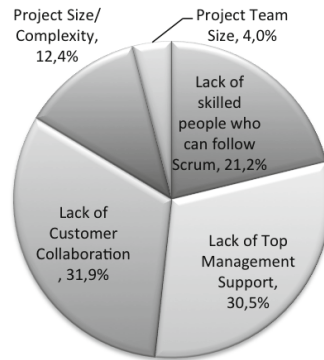


Fig. 7. Most common problem experienced while practicing Agile methodologies.

characteristics of Agile [13]. However, there are also elements that people dislike in Agile as the lack of project structure given as the most typical answer (38.2 %), the low documentation (35.2 %), although some see it as an advantage, the low planning (16.6 %) and the less management control (10.1 %).

Agile adoption is not always easy and seamless within an organization. Agile drawbacks are usually found in the need for constant customer participation, the difficulty to scale in large projects and the need for training on the Agile use [15]. This lack of experience with Agile methods and the company culture are indicated as project failure reasons in previous surveys [20]. The lack of skilled people who can follow Scrum is one important reason for failure according to our survey answers (Fig. 7). Indeed motivated people are needed, since Agile in general requires discipline in order to be successful. In order to motivate their employees organizations undertake educational activities; for instance IBM has introduced an Agile night school program in order to educate staff members on

the use of Agile [22]. Project size/complexity is also a problem. It is true that as project size grows, so does the need for people participation, which introduces more complexity in communication among team members. Other participants see the lack of customer collaboration as a major problem. Customers may find it hard to comply with Agile principles that state the importance of the active participation of the customer throughout the development process. Customer involvement is, however, vital in order to have guarantees that the correct product will be delivered. Other problems noted are the lack of top management support and the project team size. Team size is also linked with project complexity, although in many cases Agile teams are structured hierarchically when large projects are considered. With large team sizes used to cover the needs of large projects non-neglecting communication overhead is added to the software process.

In comparison to traditional approaches adaptive methodologies are considered to perform better in terms of increase in productivity, quality improvement, cost reduce, maintainable and extensible code, collaboration and customer satisfaction. Companies have seen positive results of Agile over Heavyweight, such as in the adoption of XP by Motorola that led to a significant increase in engineer productivity [8]. We also wanted to see whether there was an improvement in the four elements of: productivity, quality, cost of development and stakeholder satisfaction. The majority of participants indicated a more or less significant increase in productivity, much higher or somewhat higher quality of the product, much lower or somewhat lower development cost and much higher or somewhat higher stakeholder satisfaction (Table 1). The percentages of users that found Agile techniques less effective than heavyweight methodologies were significantly low. The rest of the participants did not provide any answer, which may indicate that they did not have access to this kind of information (e.g., software engineers may not have a view of the overall development cost). The only point, where Agile methodologies may be problematic was from the perspective of cost, which appeared slightly increased in many cases (22.4%). This is justifiable for organizations that adopted Agile for the first time, since any changes come with time needed for the transition, training activities and the general learning curve. All these aspects increase the costs and may also affect the development procedure.

Table 1. Outcome of Agile techniques in comparison with traditional approaches.

Project measure	Higher	No change	Lower	No answer
Productivity	89.6 %	6.12 %	4.1 %	0.18 %
Quality	84.8 %	11.7 %	3.2 %	0.3 %
Development cost	22.4 %	23.3 %	54.2 %	0.1 %
Stakeholder satisfaction	86.5 %	9.2 %	4.3 %	0 %

The earlier survey of Shine Technologies [19] shares more or less the same views (49 % of the participants stated that costs were reduced, 93 % that

productivity was better, 83 % that business satisfaction was better and 88 % that the quality of the software was better). Also in a 2008 survey [21] the increased productivity, job satisfaction, improved predictability of costs and quality and the knowledge transfer were the main benefits observed, whereas the lack of Agile knowledge and the individual resistance were seen as the main challenges.

4 Scrum-Specifics

As aforementioned the Agile practitioners of the survey employ mostly Scrum. More specifically, most of them were quite experienced with its use: Scrum is either the normal way the organization uses to build software (32.5 %), one of the standard ways (27.3 %) indicating that it is usually employed in combination with other techniques, the method that has just been adopted for development across the organization (14.7 %) or a method that has been piloted without taking any adoption decision yet (10.8 %). Some are currently piloting Scrum (9.5 %), whereas only 5.2 % have not used Scrum. This last result provides a rough estimation on the non-Agile practitioners contacted during the distribution of the questionnaire. Regarding the specific use of Scrum in the organization development projects, Scrum is generally used a lot (61.1 % answered that Scrum is used for a percentage around 50 % and higher) (Fig. 8) showing a tendency of applying Scrum organization wide.

As aforementioned the Scrum Master is one of the main players in Scrum. Many participants indicated themselves as Scrum Masters. The Scrum Master does not have a pure technical role but provides rather guidance assisting in problem solving in the Scrum team. We wanted to see how people see the Scrum Master: most find the role useful (73.7 %) or useful to some extend (19.2 %),

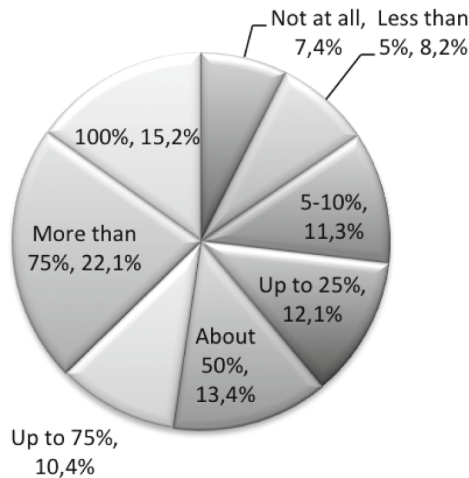


Fig. 8. Development work performed by Scrum.

Table 2. Overall satisfaction with Scrum.

Answer options	Response percentage (%)
Very pleased with Scrum	38.0
Scrum exceeds my expectations	10.9
Scrum is adequate for my needs	38.0
Disappointing outcome	3.1
Not at all pleased with Scrum	3.9
I don't know yet	2.6
Not applicable	3.5

Table 3. Outcome of Scrum in comparison with traditional approaches.

Project measure	Higher	No change	Lower	No answer
Productivity	87.5 %	6,8 %	5.5 %	0.18 %
Quality	84,3 %	13,1 %	2.5 %	0.3 %
Development cost	26 %	25.4 %	48.5 %	0.1 %
Stakeholder satisfaction	85.4 %	9,5 %	5.15 %	0 %

whereas some find it redundant (4.2 %) or not useful (2.8 %). It might be that the role cannot be fully perceived by players involved in the Scrum development process that are not, however, part of the development team that is in constant contact with the Scrum Master.

Investigating how practitioners see Scrum in general most appear satisfied, whereas a small percentage is not sure or does not find Scrum suitable for their needs (Table 2). Roughly 1 out of 10 is either not satisfied or has not made up his/her mind yet Regarding the comparison of the Scrum development success in comparison with traditional approaches, Table 3 presents the results on productivity, quality, cost of development and stakeholder satisfaction as exported for the case of Scrum adopters from the general results (i.e., Agile vs. traditional). The results are very close to the general observations on Agile versus heavy-weight processes. The increase in quality and productivity was also observed in the adoption of Scrum in Primavera [17]: it resulted in an increase of 30 % in quality in terms of number of customer defects compared to the traditional software process and an improvement in time to market with the product delivered in 10 months instead of the original plan of 14 months. Similar improvements were indicated by Yahoo [5], Amazon [4] and Microsoft [23], where the impressive productivity increase of 250 % was observed (measured by the number of lines produced in each Scrum Sprint). Many of the above experience reports indicated the importance of the organization culture for the successful adoption of Scrum. The adoption constitutes a big challenge for companies that are rather traditional than Agile-oriented. Unsuccessful Scrum adoption cases are also to be found proving that Scrum is not a priori successful in any environment [10].

In summary, the main Scrum characteristics in comparison to traditional techniques as collected can be found in the following points:

- *Respond to Change Rather than Following a Plan:* 47.1 % of the Scrum practitioners believe that this is the main asset of Scrum. Scrum can assist in rapid reorganization, allowing sudden project changes without introducing significant losses in time and cost management.
- *People-Centric and Not Process-Centric:* The most significant advantage of Scrum for 22.4 % of the participants.
- *Emphasis on Code Writing Instead of Documentation:* The most important aspect for 21.3 % of the participants.
- *Increase in Team Productivity* was observed for 87.5 % of the participants.
- *Product Quality:* The quality has been increased for 84.3 % of the cases.
- *Decrease in Project Cost:* This is considered true for 48.5 % of the participants, although cost increase was also observed in many cases.
- *Stakeholder Satisfaction:* An increased customer satisfaction is considered true for 85.4 % of the participants. Another positive aspect of Scrum that was not verified directly through the survey concerns the personal relation with the customer. Despite the above, Scrum comes with flaws sharing the ones indicated for Agile in general (Fig. 7).

5 Related Surveys

Apart from the ones aforementioned in the analysis of the previous section (e.g., [2,3,19,21]), various other surveys have been conducted on Agile development processes or software processes in general after the formal appearance of adaptive processes in 2001 expressed through the Agile manifesto. We are interested in global surveys and not cases applicable in specific countries, which can also be found in the literature. One of the earliest surveys on Agile, already mentioned, was conducted by the Australian Shine Technologies in 2003 [19]. Although a rather early survey, when Agile experience had not been not gained yet, the results from the Agile use are in accordance with the outcome of the survey presented in this work. However, as aforementioned XP was much more popular than Scrum. The survey of Digital Focus of 2006 was based on responses from 136 executives across 128 organizations and showcased the main advantages and disadvantages of adaptive software processes.

A survey of 2008 focusing again on Agile adoption indicated among others the benefits and problems of adopting Agile techniques [21]. However, this survey approaches Agile from the perspective of individuals view within the team focusing on knowledge and data exchange opposed to the survey presented in this work. The adoption of Agile methods and on the applicability degree of the Agile principles is also discussed in [12]. From this survey it is interesting to see that the majority of employees and customers are satisfied with the adoption of Agile practices. The most recent survey on Agile adoption and success or failure project results was published by Version One in 2013 [20]. Among the

main failure reasons the lack of experience with Agile methods and the company philosophy or culture were indicated by the participants with higher percentage.

A more specialized survey on the degree of adoption of Scrum was announced to be performed in Carnegie Mellon University in 2011, but its results or whether it was conducted were never reported. The questions used in the questionnaire concerned only the adoption of Scrum and were not referring to any comparisons to other approaches.

In summary, many Agile studies have been conducted in the last decade. In contrast to those, the focus of our work is to give an emphasis on Scrum, present the view of technical users and view whether improvements in comparison to heavyweight processes were observed.

6 Threats to Validity

In terms of threats to validity encountered in case study research [24] the main issues of our study were detected in relation to external validity; related specifically to what extent we can generalize our findings. The communication on the emphasis on Scrum to the participants may have affected the outcome giving less accuracy to the obtained results for general Agile: participants may have responded based only on Scrum even if they also adopted other Agile techniques (e.g., XP, Dynamic Systems Development Method/DSDM, FDD). The number of incomplete questionnaires poses an additional threat (233 questionnaires were complete out of the 335 that were partially answered). This was an observed disadvantage of the procedure selected for the collection, since the survey would allow participants to skip some questions. The high number of incomplete questionnaires is attributed to either the lack of adoption of Agile methodologies from the specific participant or the inadequacy of the participants organization as a representative case for the survey goals. This lack of adoption of Agile techniques was an undesirable characteristic of the potential participants that we tried to avoid from the beginning through the selected dissemination to practitioners with wide or limited Agile expertise. Judging from the survey results the questionnaire apparently reached also non-agile practitioners; it is unfortunate that it was impossible to determine their exact number. Lastly, we did not perform any analysis on the participants distribution among the companies, i.e., if there was a higher participation rate of employees inside specific companies.

Despite these remarks, the conclusions validity is not largely affected. The number of responses and comments we gathered can be considered representative of the current state on the use of Agile methodologies. Regarding reliability validity related with whether the study can be replicated we have made the study results available online (website of first author).

Construct validity refers to whether the explanation provided for the results is indeed the correct one. In our study one threat is linked with whether we are asking the correct questions (in terms of Research Questions). In order to increase the validity attention was paid on the survey design making sure that we are asking questions that measure what we want to measure.

7 Where We Are and Conclusions

In this paper a field study on the effectiveness Agile methodologies in the industry with an emphasis on Scrum was presented. The study was conducted through an online questionnaire and gathered 233 participants from organizations spread in different countries around the globe. The survey indicated a significant increase in the adoption of Scrum with many successful project executions in small-sized teams. Agile projects in general are used in teams of 6–10 people with iterations of 2 weeks for most cases, whereas highest project success rates appear with collocated teams. The participants valued the main characteristics of Agile processes that generally assist in achieving increased productivity and products of higher quality.

The participants answers in the survey were indicative of the current state of Agile compared to traditional approaches, whereas the opinions or experience on Agile development expressed by many participants through dedicated comments were useful for drawing further conclusions on software engineering practice. The most useful outcome was the wide adoption of Kanban or the combination of Kanban with Scrum, namely Scrumban. This hybrid method is indicative of the future trends in software process evolution, whereas the combination of Scrum with other Agile practices, such as XP, is also usual [20]. A general observation is that the efficiency from the adoption of Agile and Scrum depends heavily on the nature of the software product and the organization culture that can assist in the transition from waterfall to Agile. When it comes to specific techniques the adherence degree to the defined principles comes also to play.

In terms of initial research questions introduced the field study assists in expressing the following remarks:

R1. Does Agile or Scrum Adoption provide better Results in Software Development?

The general answer is yes. In addition to our results it has been observed in specific case studies that Agile assists in the quality and productivity increase, but this cannot be identified in the short term, i.e. in a pilot Agile adoption. The problematic part is this initial cost required for investing time on learning Scrum and getting used to Agile processes in general integrating them in coding activities.

R2. Do People follow Strictly the Guidelines?

Although not a direct result of the survey, many companies adopt Agile in a wider sense: they follow its principles (i.e., Agile manifesto) without adhering to a specific Agile methodology. Many Agile processes leave some degrees of freedom and may not be adopted strictly but rather in a more flexible way, however, it is important to adhere to the principal rules.

R3. Have Companies tried to think out-of-the-box by experimenting with Scrum and Agile Variants?

Companies do experiment (the survey showed that 62.4% do not hesitate to adopt new technologies). When it comes to Agile they mainly experiment with

large engineering teams, distributed environments, different sprint durations. All these are vital in order to understand which is the most ideal choice for each environment supported by the fact that the software process lifecycle is closely related to the organizational culture, the management structure and the adopted business processes.

R4. Do Engineers like Scrum?

In principle they do. Of course the answer depends also on the personality, the organization and its effect on the execution of the daily activities of the engineer. Another issue is specific roles as the Scrum Master introduced in Scrum that is not present in other lifecycle models. Is the Scrum master a manager or can a manager become a Scrum master? The answer is no. Indeed one of the participants indicated for Scrum that “*You need a team that is open minded with a strong scrum master who does not over-manage.*” The way roles are viewed depends again on the daily interaction of the engineer; interpersonal relationships are also relevant here.

References

1. Abrahamsson, P., Salo, O., Ronkainen, J., Warsta, J.: Agile Software Development Methods: Review and Analysis. VTT Publications, Espoo (2002)
2. Ambler, S.W.: The distributed agile team (2008). <http://www.drdoobs.com/architecture-and-design/the-distributed-agile-team/212201434>. Accessed 18 January 2015
3. Ambler, S.W.: Agile Adoption Strategies: Survey Results (2011). <http://www.ambyssoft.com/surveys/agileStateOfArt201111.html>. Accessed 18 January 2015
4. Atlas, A.: Accidental adoption: the story of scrum at amazon.com. In: Agile Conference, AGILE 2009, pp. 135–140. IEEE (2009)
5. Benefield, G.: Rolling out agile in a large enterprise. In: Proceedings of the 41st Annual Hawaii International Conference on System Sciences, pp. 461–461. IEEE (2008)
6. Bhardwaj, D.: Scrumming it up, A Survey on current software industry practices (2010)
7. Biju, S.M.: Agile software development methods and its advantages. In: Elleithy, K., Sobh, T., Iskander, M., Kapila, V., Karim, M.A., Mahmood, A. (eds.) Education and Automation Technological Developments in Networking, pp. 603–607. Springer, Heidelberg (2010)
8. Drobka, J., Noftz, D., Raghu, R.: Piloting XP on four mission-critical projects. IEEE Softw. **21**(6), 70–75 (2004)
9. Franklin, S., Walker, C.: Survey Methodology. Statistics Canada, Ottawa (2003)
10. Hajjdiab, H., Taleb, A.S., Ali, J.: An industrial case study for scrum adoption. J. Softw. **7**(1), 237–242 (2012)
11. Kapitsaki, G.M., Christou, M.: Where is scrum in the current agile world? In: Proceedings of the 9th International Conference on Evaluation of Novel Approaches to Software Engineering, ENASE 2014, Lisbon, Portugal, 28–30 April 2014, pp. 101–108 (2014). <http://dx.doi.org/10.5220/0004867701010108>
12. Kurapati, N., Manyam, V.S.C., Petersen, K.: Agile software development practice adoption survey. In: Wohlin, C. (ed.) XP 2012. LNBIP, vol. 111, pp. 16–30. Springer, Heidelberg (2012)

13. Leau, Y.B., Loo, W.K., Tham, W.Y., Tan, S.F.: Software development life cycle agile vs traditional approaches. In: International Conference on Information and Network Technology, vol. 37, pp. 162–167 (2012)
14. Moore, G.: *Crossing the Chasm: Marketing and Selling Disruptive Products to Mainstream Customers* (rev. edn.). HarperBusiness Essentials, New York (2002)
15. Petersen, K., Wohlin, C.: A comparison of issues and advantages in agile and incremental development between state of the art and an industrial case. *J. Syst. Softw.* **82**(9), 1479–1490 (2009)
16. Phalnikar, R., Deshpande, V., Joshi, S.: Applying agile principles for distributed software development. In: International Conference on Advanced Computer Control, ICACC 2009, pp. 535–539. IEEE (2009)
17. Schatz, B., Abdelshafi, I.: Primavera gets agile. *IEEE Softw.* **3**, 7 (2005)
18. Schwaber, K.: *Agile Project Management with Scrum*, vol. 7. Microsoft Press, Redmond (2004)
19. Technologies, S.: Agile methodologies survey results (2003). http://www.shinetech.com/attachments/104_ShineTechagileSurvey2003-01-17.pdf. Accessed 18 January 2015
20. VersionOne: 8th annual state of Agile survey (2013). <http://www.versionone.com/pdf/2013-state-of-agile-survey.pdf>. Accessed 18 January 2015
21. Vijayasathy, L., Turk, D.: Agile software development: a survey of early adopters. *J. Inf. Technol. Manage.* **19**(2), 1–8 (2008)
22. West, D.: *Agile Systems Integrators: Plausible or Paradoxical?* (2010). Accessed 18 January 2015
23. Williams, L., Brown, G., Meltzer, A., Nagappan, N.: Scrum+ engineering practices: experiences of three microsoft teams. In: 2011 International Symposium on Empirical Software Engineering and Measurement (ESEM), pp. 463–471. IEEE (2011)
24. Yin, R.K.: *Case Study Research: Design and Methods* (Applied Social Research Methods). Sage Publication, California (1989)

Evaluation of Novel Approaches to Software
Engineering

9th International Conference, ENASE 2014, Lisbon,
Portugal, April 28-30, 2014. Revised Selected Papers

Maciaszek, L.A.; Filipe, J. (Eds.)

2015, XI, 169 p. 44 illus. in color., Softcover

ISBN: 978-3-319-27217-7