

# The Effectiveness of the Roles Envisioned by Agile Scrum and XP Methodologies.

Allan Gonçalves Bueno

<sup>a</sup> Postgraduate Program in Applied Computing, Federal Technological University of Paraná, Curitiba, Brazil, allangbueno@gmail.com

**Abstract.** This article presents a brief history of the emergence of agile methodologies showing the importance of the roles of agile methodologies in the development of software using Scrum and XP, to verify that the established roles in agile methodologies Scrum and XP are applied in companies in the same way that they are proposed in academic circles, aiming to verify which main divergences between these two visions and how they can complement each other. He was Bibliographical, descriptive, and field research was carried out with fourteen people who work in the area of information technology in the public service, and who have knowledge or who work with agile development, were used to verify if in practice the roles of the agile methodologies Scrum and XP are applied by the theory. Questionnaires in Google Forms and the Likert scale were used.

**Keywords.** Agile Methodologies, Theory and Practice, XP, Scrum.

## 1. Introduction

Software Engineering has its theories and methods based on the industry of the time, mainly the automobile industry, as presented by [5] For years, Software Engineering was inspired by manufacturing processes to consolidate its working methods. Born in the second half of the 20th century, it sought most of its theories and production methods in emerging sectors of industry at the time. In particular, the automobile field, in a broad industrial rise, played an important role in the formation of the new IT industry.

Already in the nineties, alternative processes for the development of software that were considered lighter than the previous ones began to emerge, as presented by [5] In the mid-1990s, alternative software development processes began to emerge, in response to the traditional ones, which were considered excessively regimented, slow, bureaucratic, and inadequate to the nature of the activity. These new processes were dubbed "lightweight" as opposed to the previous "heavyweight" processes.

These lighter alternative processes were the forerunners of agile methodologies that have as

their landmark the Agile Manifesto that took place in 2001 and is presented by [5] In common, both are based on iterative development, in which requirements and solutions evolve through collaboration between self-organized and cross-functional teams (people with different expertise). They encouraged frequent inspection and adaptation, a philosophy of leadership, alignment between development and company or customer objectives, and a set of good engineering practices that enabled fast high-quality deliveries. These methodologies only started to be called agile after 2001, when a group of 17 specialists met at the Snowbird ski resort, in Utah, in the United States, to discuss ways to develop software in a lighter, faster, and people-centered way. - sounds. They coined the terms "Agile Software Development" and "Agile Methods" and created the Agile Manifesto – widely disseminated as the canonical definition of agile development, composed of the values and principles that we will see below. The Manifesto was published in 2001, and anyone can be a signatory. Later, some of these people formed the Agile Alliance (2014), a non-profit organization that promotes agile development.

There is a great debate in the academy about what it means to be agile, and it is important to

highlight that the most important thing is not obedience to protocols, but the attitudes and behaviors that the team manifests as it presents [5]The Agile Manifesto is composed of the declaration of some values and 12 principles, presented in the next section. There is, in the community, a great debate about what it means to be "agile". Unlike other development cultures, agility is not related to obeying pre-established production protocols, but to new patterns of behavior and attitude. Therefore, a team cannot call itself "agile" if it does not behave like that. Books and articles are great sources of knowledge, but no team becomes agile simply by reading them. After all, agility is not granted but achieved with each small daily transformation of behavior. Each Agile Method defines its practices, but all, at one time or another, share the values and principles postulated by the Agile Manifesto.

In this article, I seek to verify how the roles foreseen in the agile methodologies Scrum and XP behave. It will address the main differences between them in theory and practice, how they are applied in companies, and how they are presented in the academic literature.

## 2. Methodology

I carried out descriptive research this type of research according [2] can be defined as Research of this type has as its primary objective the description of the characteristics of a given population or phenomenon or the establishment of relationships between variables. Numerous studies can be classified under this heading and one of their most significant characteristics is the use of standardized data collection techniques. Some descriptive research goes beyond simply identifying the existence of relationships between variables, seeking to determine the nature of this relationship. In this case, there is descriptive research that approaches the explanatory one. On the other hand, there are studies that, although defined as descriptive based on their objectives, end up serving more to provide a new vision of the problem, which brings them closer to exploratory research. Descriptive research is, along with exploratory research, what social researchers who are concerned with practical action usually carry out.

According [2], I carried out a field survey that is presented as follows: Research of this type is characterized by direct questioning of the people whose behavior you want to know. Information is requested from a significant group of people about the problem being studied so that, through

quantitative analysis, the corresponding conclusions can be obtained from the data collected.

In this field survey, a questionnaire was made available only for professionals who work with Information Technology, more specifically with software development, this questionnaire was about the roles of Scrum and XP methodologies, aiming to obtain the differences between the theory and practice of these roles in companies. The Likert scale was used to obtain a more consistent result. This questionnaire contained the following questions:

1. Full Name:
2. Name of the Company where you work:
3. Is the company you work for public or private sector:
4. In your company, the Scrum Master is part of the team and participates in development tasks (eg coding) like all other team members.
5. In your company, the Product Owner is responsible for ensuring the return on investment in addition to managing the product.
6. In your company, the Development Team is responsible for updating and improving the product with each delivery.
7. In your company, the agile coach acts exclusively by assessing the use of the agile methodology, not participating in the architecture or modeling.
8. In your company, the role of tracker is necessarily played by a developer from the systems team.
9. In your company, the customer (who knows business rules) is necessarily a team member.
10. In your company, the role of agile coach is always assigned to a programmer who necessarily has XP experience.

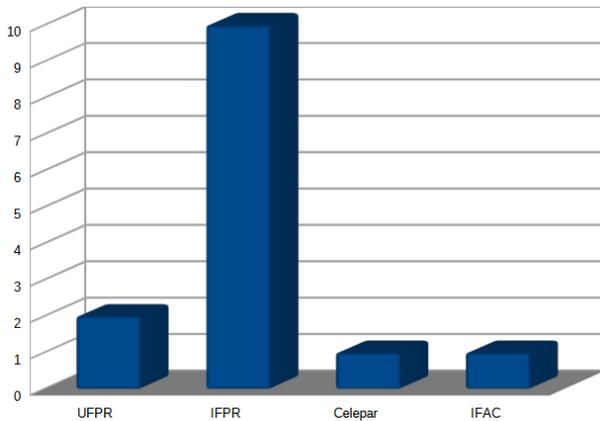
It is worth mentioning that we carried out bibliographical research that is defined for [2] as: The bibliographical research is developed from already elaborated material, consisting mainly of books and scientific articles. Although in almost all studies some type of work of this nature is required, there are researches developed exclusively from bibliographic sources. Part of the exploratory studies can be defined as bibliographical research, as well as amount of research developed from the content analysis technique.

This research focused on the roles of agile methodologies Scrum and XP and sought to find the most diverse definitions for each of the roles of the two methodologies studied in this article. The research question that this article intends to answer is: How is the use of Scrum and XP roles in companies that use these agile methodologies? Do these roles differ much from theory in practice?

## 3. Results

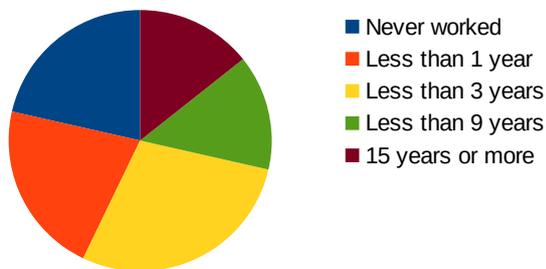
Through my research, it was possible to verify that of the 14 participants, all work with Information

Technology and are public servants, with 71.43% working at the Federal Institute of Paraná, 14.29% working at the Federal University of Paraná, 7.14% at the Federal Institute of Acre, and 7.14% at the Paraná Information and Communication Technology Company. As shown in the **graphic 1** below:

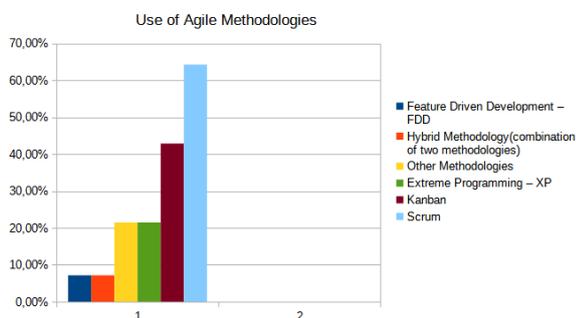


It was possible to verify that 21.4% of the interviewees had never worked with agile development, 21.4% worked less than one year, 28.6% less than three years, 14.3% worked less than nine years, and 14.3% 15 years or more. As you can see in the **graphic 2** below:

Time working with agile methodologies



As for the use of agile methodologies, 7.1% used Feature Driven Development – FDD, 7.1% used a hybrid methodology, that is, a combination of two methodologies, 21.4% other methodologies, Extreme Programming – XP, 21.4% already Kanban 42.9% and 64.3% used Scrum. As shown in the **graphic 3** below:



The Likert Scale was used, which assigns the following weights to the options chosen by respondents: Totally Agree +2, Partially Agree +1, Unsure 0, Partially Disagree – 1, and Totally Disagree -2. The questions used in the questionnaire, using a Likert scale, were: 1. In your company, the Scrum Master is part of the team and participates in development tasks (eg coding) like all other team members. 2. In your company, the Product Owner is responsible for ensuring the return on investment in addition to managing the product. 3. In your company, the Development Team is responsible for updating and improving the product with each delivery. 4. In your company, the agile coach acts exclusively by assessing the use of the agile methodology, not participating in the architecture or modeling. 5. In your company, the tracker's role is necessarily played by a developer from the systems team. 6. In your company, the customer (who knows business rules) is necessarily a team member. 7. In your company, the role of agile coach is always assigned to a programmer who necessarily has XP experience.

Table 1: Likert scale

Question	Totally agree	Partially agree	Unsure	Partially disagree	Totally disagree	Result
1	4	2	4	2	0	8
2	2	4	4	2	0	6
3	4	5	3	0	0	13
4	0	2	8	1	1	-1
5	1	5	6	0	0	7
6	2	3	3	3	1	2
7	0	1	7	3	1	-4

## 4. Discussion

Although the role of the Scrum Master is always presented as a facilitator of Scrum implementation and an essential profile for the use of agile methodologies. For [6] some empirical research on Scrum teams found that the Scrum Master sometimes behaves as a barrier for teams to become agile, that is, he ends up making this process difficult, in the early stages and the main reason this happens is that Scrum Masters tend to behave in a command and control mode. It is important to highlight, however, that in teams that have applied agile methods for three years, on average, they seem to have no problems with the Scrum Master and that in these teams the leadership role is shared. This can be explained by changes in the maturity of agile teams. Teams learn to be agile when they go

through different stages of maturity. Thus, the agility of a team is a process that changes as time goes by. However, there is not, as far as we know, an empirical analysis of the changing leadership role of the Scrum Master during the agile journey.

The agile coach, despite often being considered a role that will drive actions for the development team to become agile and advocate for agile methods, should not assume a role of imposing his decisions on the rest of the team.

For [1] the expected behavior of an Agile Coach should be that of a guide and facilitator, never of directing and imposing their decisions, they should keep everyone focused on providing business value, they should not value deadlines and approaches that no longer work, in addition, he must have a keen interest in the overall performance of the team, he must not expect specific results from the team.

## 5. Conclusion

In this work, a survey was carried out with fourteen information technology professionals, working in the public service, to verify whether in practice the roles of the agile methodologies Scrum and XP are applied by the theory, for which the Likert scale was used.

In this research, the options for using agile methodologies were presented: Extreme Programming (XP), Feature Driven Development (FDD), Hybrid, Kanban, Lean Software Development, Lean Startup, Scrum, Scrumban, and others. Regarding the use of agile methodologies Regarding the use of agile methodologies, 7.1% used Feature Driven Development – FDD, 7.1% used a hybrid methodology, that is, a combination of two methodologies, 21.4% other methodologies, Extreme Programming – XP, 21.4% already Kanban 42.9% and 64.3% used Scrum.

Using the Likert scale, it can be seen that for most of the research participants, it is not true that the agile coach acts exclusively by assessing the use of the agile methodology, not participating in the architecture or modeling. Furthermore, it can be seen that it is not true that the role of agile coach is always assigned to a programmer who necessarily has experience in XP.

However, it can be seen that for the majority of respondents in your company the Scrum Master is part of the team and participates in development tasks (for example, programming) like all other team members. In addition, it was also verified that for the majority the Product Owner is responsible for guaranteeing the return on investment in addition to acting in the management of the

product. For most respondents, the Development Team is responsible for updating and improving the product at each delivery. It was also found that in the company where the interviewees work, the role of the tracker is necessarily performed by a developer from the systems team.

Another finding was that for most of them where they carry out their work activities, the customer (who knows business rules) is necessarily a member of the team.

It can be observed the role of the agile coach according to the result of this research deserves special attention, since both questions that were asked using the Likert scale gave a negative score, that is, it does not correspond to the reality of the professionals who work in the companies surveyed.

It is also interesting to point out that question 3, that is: In your company, the Development Team is responsible for updating in addition to improving the product at each delivery, had a high score on the Likert scale, which means that in most companies and in the sectors where these professionals work, this statement is a reality.

With not-so-expressive results, but with a reasonable score are the following three statements: In your company, the Scrum Master is part of the team and participates in development tasks (for example, programming) like all other team members. In your company, the tracker's role is necessarily played by a developer from the systems team. In your company, the Product Owner is responsible for ensuring the return on investment in addition to acting in product management.

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