A Scrum Implementation Plan by Phases and Oriented by Team Members: A Case Study

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Abstract
Globalization has caused a series of transformations at the social, economic, cultural, technological, and political levels, generating constant changes that force companies to reinvent, transform or improve their processes so that they are sustainable, competitive, and remain in the world market. Companies that offer products or services to people must implement methodologies that facilitate and speed up the development of projects to satisfy the customer. That is, being able to develop their technology products to improve and promote the customer experience. Now, several companies (not software industry exclusive) use agile methodologies since they facilitate their development since it allows them to act quickly in the face of changes in customer requirements. This does not affect the planning and budget. In this project, we proposed a plan to implement the Scrum methodology in the CIB Engineering Area in BBVA Colombia by phases and focus on people's adaptation rather than the process. During this implementation, we observed some factors that caused dissatisfaction in the team, but which were overcome as people understood the purpose and benefits from their own experience. In addition to getting team members to play a role and follow the framework's rules, our highest satisfaction is that most of the team, after two iterations, is willing to transform the way they have been doing their job.

Keywords
Digital transformation, Scrum, Agile, Good Practices.

1. Introduction

The digital transformation is a paradigm shift that brings with it a positive impact on the financial sector, as it ensures sustainability in terms of growth, transactionality, productivity, and efficiency since there are huge mass economies to be exploited. New technologies offer the possibility of turning financial entities into knowledge-based organizations, translating into new and better products and services based on their clients' information [1, 2].

In recent years, BBVA Colombia has started the digital transformation, in which clients want solutions in real-time, personalized and offered simply; they are "mobile" and expect to live a true omnichannel experience; they look for innovative content that is delivered more entertainingly, and they demand much more convenience or value [3]. Therefore, since 2014 Scrum has been adapted as the agile methodology that satisfies clients' needs quickly, effectively, and

CEUR Workshop Proceedings (CEUR-WS.org)

with the best quality to achieve their loyalty. Therefore, a digital transformation is required, which has begun with the implementation of this methodology [4].

An implementation plan of the agile Scrum methodology is proposed, by phases, iterative, and oriented to the needs of the software development teams' needs. A pilot test of the proposed plan is applied with the SD COMEX work team of the CIB Engineering area of BBVA Colombia, through the execution of the four phases contemplated in the plan's design. Finally, the results of the process, conclusions, and recommendations are shown.

2. Background

The digital transformation began with the first Scrum teams in Spain, Mexico, and South America, combining product and engineering profiles in multidisciplinary teams, in the same location, with total dedication to projects [2, 4]. In less than a year, the impact of 'agile' on improving its quality, tighter delivery times, improved productivity, and employee engagement became clear. In South America, scrum teams developed up to three times more functionalities in the same period. At the end of 2016, it already had more than 3,600 people working in Scrum; however, the organization was not really 'agile' because approximately 132,000 people were still working with the traditional model and limited by organizational silos [5, 3].

The change from the traditional methodology to the Scrum methodology for the first teams was not easy [1]. At present, it is not easy since there is a natural resistance to change, and conventional training is not enough. Therefore, it is necessary to design and implement a plan for methodological change, oriented to the needs of the development team that allows establishing specific individual and collective conditions [5]. By providing direct coaching, a gradual adaptation could take place so that teams accept and configure their own Scrum framework much faster.

Currently, at BBVA Colombia, change management for methodological transformation and adaptation, from traditional to Scrum, is carried out in an accelerated manner, and the training contracted by the bank is not enough and generates high costs [4]. These training offer standard material, do not actively involve the participants, are carried out with a meager hourly intensity, and do not contemplate the work teams; so learning slows down and creates frustration in the early stages of the adaptation process.

The proposed project arises from the need for the SD COMEX team to change how it has been working in software development projects, that is, the change from traditional methodology to agile Scrum methodology. A change that is specifically tailored to the team, with the direct accompaniment of a coach, from the beginning, to guide the adaptation process, to help them empower themselves and manage their mistakes, in order to achieve the configuration of the Scrum framework that more effective.

It is worth mentioning that for the implementation of the methodology works, it requires: first, a change in organizational thinking to found a culture which is related to leadership styles, new rules, new roles, etc.; and second, to create agile habits related with attitudes and behavior of people [5, 6]. In this way, this mindset will allow the teams to comply with the values established in the manifesto [7]. Carrying out this methodological change is a complex process because the phases for software development in the traditional methodology are carried out in

sequential order, and people have become accustomed to working in this way. Consequently, a gradual implementation is required, focused from the beginning, on the people who will make up the work team, and accompanied by a coach who knows agility [8, 9].

2.1. Differentiating Features Traditional Methodology and Agile Methodology

Agile methodologies are oriented to the development of complex projects where not all the necessary information is fully available from the beginning; therefore, it is not feasible to plan them in detail [10, 11, 12, 13]. These methodologies depend on the collaboration and active participation of all team members, to foster learning, creativity, and the ability to carry out complex tasks [14]. They also require the active participation of the end customer during the development of the project; and in this way, greatly reduce uncertainty about customer expectations and reduce high failure rates during the creation of business models [15, 16, 17]. For this reason, they are widely used for the creation of new ventures.

Most companies today focus on develop software with quality and gaining customer satisfaction, and to accomplish this, companies should choose between two main approaches: The traditional waterfall method, and the agile software development method. Both Waterfall and Agile project management methodologies guide the project team through a successful project, but there are differences between them [18, 8]. A summary of the two methodological approaches is presented in Table 1.

According to the authors [19, 15, 20], resistance to change occurs both in the organizational and personal spheres and may be linked to personality, the social system and the mode of implementation of change; taking various forms. [19] points out that it can be open (manifests itself in strikes, lower productivity, defective work or even sabotage), or covert (delays, significant absenteeism, transfer requests, resignations, loss of motivation, lower morale, and fees more serious accidents or errors). In this sense, it is expressed that one of the most damaging forms of resistance is the lack of participation and commitment of employees with the proposed changes, even when they have the opportunity to participate. Additionally, changing minds is not easy and not all people are willing to make efforts in this regard, and even if they are willing it is very easy to return to the old patterns of operation [15, 21].

3. The Implementation Plan of Scrum

The proposed plan comprises four phases that seek to generate an incremental adaptation of the team members concerning the framework. Each stage is made up of strategic activities in which are defined: times, managers, templates, and formats that support development. Here is a brief explanation of each phase:

- Phase 1 consists of conducting awareness and feedback from the work team, knowing what their quality of life is like through a data collection instrument such as the survey. Finally, for this phase, carrying out training Scrum to the people who are part of the work team.

Table 1
Differentiating approaches between methodologies

Conventional Methodology vs. Agile Methodology	
It is required to prepare the entire business plan from the beginning, establishing customer assumptions, market demands and cost strategies to capture such demand.	Planning is done in batches. Development is prioritized according to what benefits the most client.
Its focus is top-down, so the initial idea must be clear to continue the process.	Its focus is bottom-up, the initial idea may vary according to the needs of the client.
They mainly aim to get large sums of money to invest in developing the idea and gain market, being financially dependent on investors.	They aim to create a network of contacts, through relationship management, in this way the product is developed, channeled and penetrates the market without great costs.
Much of the budget is used in advertising campaigns in order to penetrate the market.	It is aimed at a viral market through a high quality product, which truly satisfies the client so that he can refer to it.
It establishes that to start a business, market data must be gathered to: identify profitable spaces, collect information from competitors and, as a result, design the product, its launch strategy, and prices.	It establishes that, if the market variables change, the business must accompany this change and pivot towards another approach, being agile in responding to the market.
It aims at a linear and cascading development, in which each of the stages will be executed and executed based on the previously established plan.	It aims at organic growth that adapts to the market as it changes, and adapts the business model as it discovers the true need of the customer.

- Phase 2 consists of identifying the main difficulties or pain points that the work team has, based on the result of the survey applied in the previous phase. Subsequently, we proceed to define the priority of the difficulties that the team has using a study, and a plan of action is established as a team to attack the prioritized problem.

- Phase 3 consists of starting with the Scrum cycle's execution, with the first sprint for a project chosen by the work team, small in size, and without a greater degree of dependence on other areas or suppliers.

- Phase 4 consists of the consolidation of the results obtained in the Scrum cycle's execution, the analysis and documentation of the achievements and non-achievements, and recommendations to take into account when carrying out the following Scrum projects.

3.1. Phase 1: Analysis, Preparation, and Training

Phase 1 is called Scrum Analysis, Preparation, and Training (see Figure 1). Its objective is to predispose the work team to change the methodology from traditional to Scrum and attack
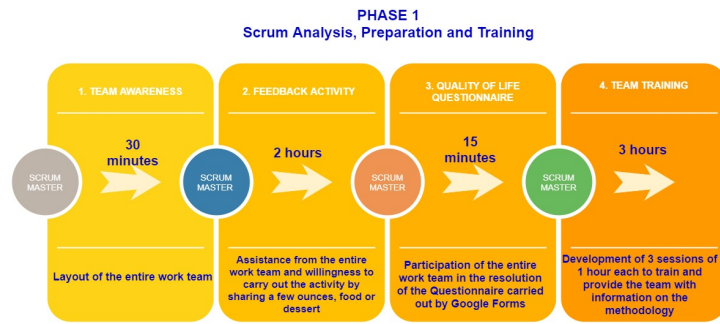
Figure 1: First phase to be applied to the Organization

the problems found in the early phases. It comprises the activities: team awareness, feedback activity, quality of life survey, and team training.

The implementation plan of the Scrum methodology proposed in this project is people-oriented, that is, their well-being is put before tasks: situations are generated in which there is time to analyze alternatives, listen to ideas, propose approaches to the problem, generate ideas, etc. Therefore, it is suggested to promote spaces outside the work environment to predispose individuals' favorable attitudes. The activities especially recommended are awareness-raising, feedback to the work team, and the retrospectives carried out at the end of each sprint.

3.2. Phase 2: Difficulties Prioritization and Action Plan

Phase 2, as can be seen in the Figure 2, is called the Prioritization of difficulties and action plan. And its objective is to solve the problems identified in the work team gradually. It is made up of the activities: pose the most significant difficulties, determine priority difficulty, define an action plan, and follow up on an action plan.

The first activity allows the work team to choose the difficulties with the most significant impact to identify the situations that are causing things not to go well. The second activity allows defining the level of prioritization of the chosen difficulties, to establish a team the order in which they will be solved. The third activity will enable us to propose a plan to attack the problem with a higher prioritization level to propose concrete actions for the solution. The fourth and last activity allows monitoring the action plan to make adjustments and validate compliance with the established objectives. By the above, the team is expected to be trained to resolve difficulties and acquire the ability to face them.

3.3. Phase 3: First Implementation

Phase 3, as can be seen in Figure 3, is called the first implementation of Scrum, and its objective is to apply the knowledge acquired and obtain the maximum benefit from Scrum. It comprises the activities: choose the pilot test project, carry out the product backlog, develop the sprint planning, execute the sprint, present the product increment, review the sprint and carry out a retrospective.
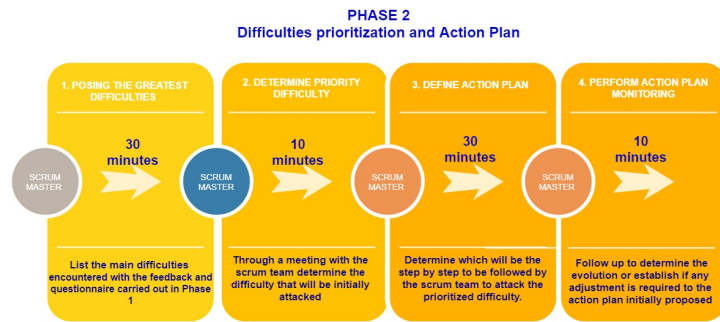
PHASE 2
Difficulties prioritization and Action Plan

Figure 2: Second phase to be applied to the Organization

PHASE 3
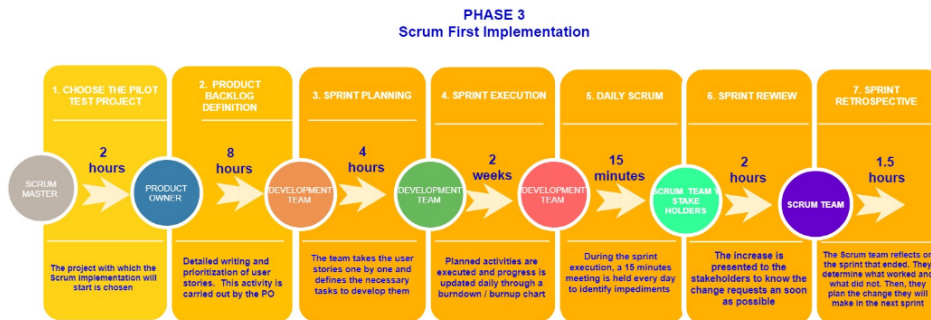**Scrum First Implementation**

Figure 3: Third phase to be applied to the Organization

The first activity allows us to choose the project with which the pilot test will be carried out to start with Scrum's implementation. The second activity allows you to identify the priority user stories and ensure that they are clear to select the user stories for the first sprint and generate the initial product backlog. The third activity allows generating the list of tasks with times and those responsible for the product backlog to meet the first sprint's objectives. The fourth activity allows the execution of the first sprint to generate the first deliverable to the client. The fifth activity shows the product generated in the first sprint execution to generate a first productive deliverable to the client. The sixth activity allows you to communicate and demonstrate what was completed and not completed in the product stack for the first sprint to generate feedback from the next sprint's product stack. The seventh activity allows us to identify the failures and successes generated during the sprint execution, to establish continuous improvement to be applied in the next sprint. In accordance with the above, it is expected that the team is prepared to carry out the next sprint applying the knowledge acquired in the previous one.

3.4. Phase 4: Scrum consolidation

Phase 4 is called Scrum conclusions and consolidation, and its objective is to provide feedback to the work team based on the results obtained in the execution of the sprints (see Figure 4). It
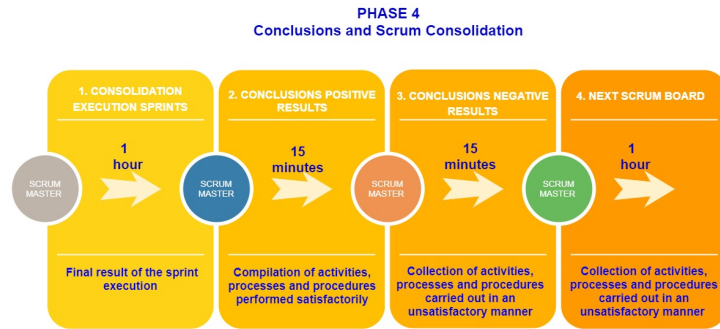
Figure 4: Fourth phase to be applied to the Organization

comprises the activities: consolidation, sprint execution, positive results conclusions, negative results conclusions, and next Scrum advice.

The first activity allows showing the result of the sprints executed by the work team to know the evolution obtained from the first sprint. The second activity makes visible the positive results obtained during the execution of each sprint, in order to continue executing the actions that generated these results. The third activity makes visible the negative results obtained during each sprint's execution to make changes in the actions that generated these results. The fourth activity allows us to analyze and establish the activities that should be part of the framework for the following Scrum projects, to carry out the continuous improvement, adjust and strengthening Scrum for the implementation of the software projects. In accordance with the above, it is expected that the team will have a more defined framework to apply in the following software projects in order to guarantee early deliveries in time, with the expected quality and productivity.

4. Implementation Plan in Action

This section details the execution of each of the phases proposed in the Scrum implementation plan. The activities that make up each phase are described, maintaining the proposed format: name of the activity, the purpose, estimated time, recommendations and other details, and evidence of the activity.

The Scrum master is the role that leads the process of methodological transformation, so it is expressly recommended to prepare in advance all the defined activities and execute them in the established times. In addition to this, configure the scenarios that you consider necessary, use the recommended formats, tools, and materials, and in general, pay attention to all the details to achieve the success of the implementation plan.

4.1. Phase 1

started with the sensitization activity, It was developed with the work team in a restaurant on the city's outskirts (see Table 2). The scrum master directed the activity and clarified the need

Table 2
Phase 1: Activity 1

Phase 1: Sensitization	
Activity: Team awareness. **Objective:** To discuss the importance of implementing a new way of doing things, the benefits of Scrum, and the presentation of Scrum Master. **Place:** A different space outside the office. **Time:** 20 minutes. **Details:** Only members of the Scrum team should be in this activity.	

Table 3
Phase 1: Activity 1

Phase 1: Sensitization	
Activity: Team feedback. **Objective:** Enable each team member to know how the rest of the team sees it. "Understand what attitudes mine bother others, and which others like." **Responsible:** Scrum Master. **Place:** A different place inside the office. **Time:** 150 minutes **Details:** It is recommended to share a dessert so that the work team is in the best disposition to make it [22].	

to make important changes in how the daily activities were carried out. In the end, there was a space for some people to express how they felt

The second activity was on team feedback: "How do my teammates perceive me?". Table 3 shows activity details and the evidence of that meeting. The reflection about this type of session is the importance of spending time preparing for the activity because it is a way to show that they are important and that the process is serious. Second, the cards' writing process must be done individually and secretly to avoid biases and discomfort during the activity's development. Third, it is essential to include some food to share with the team members: this achieves that people adopt a positive attitude before starting [22].

In the third activity, the survey questions should be formulated in such a way that it allows obtaining sufficient information to meet the objective of identifying the difficulties and needs of the work team. Add to this activity, the socialization of the survey results to the manager of the work team and engineering director, to obtain attention to the difficulties and needs that owns the equipment. After applying the survey, a relevant finding was finding that more than 75% of the team was not satisfied with their salary; as it is shown in Table 4.
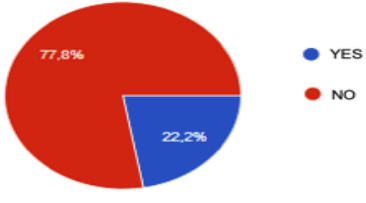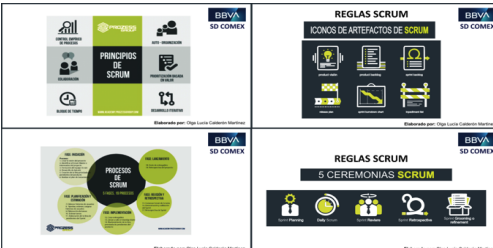
Table 4
Phase 1: Activity 1

Phase 1: Sensitization

Activity: Team Questionnaire.
Objective: It allows to identify the difficulties that cause disagreement in the team work.
Responsible: Scrum Master.
Place: A different place inside the office.
Time: 15 minutes
Details: It is not an anonymous survey. It is a questionnaire to investigate personal or work problems of the respondent.

Table 5
Phase 1: Activity 1

Phase 1: Sensitization

Activity: Team Training.
Objective: The team must know the fundamentals of the Scrum methodology.
Responsible: Scrum Master or some external coach.
Place: A different place inside the office.
Time: 3 Sessions, each 45 minutes
Details: The scrum master must prepare the agenda, training material, examples, activities, and other necessary resources.

The last activity of the phase was training. The topics and the hours of all sessions were presented to the team. They received materials and resources that supported the training, such as notes, presentations, videos, and documents. Additionally, as a souvenir, personalized flashcards with the company logo, and they were delivered to each member of the team(see Table 5). It is also necessary to take special care in choosing the videos to be projected. These must be short, forceful, and closely related to the exposed project. Finally, it is recommended that the trainers recap and give real examples to reinforce concepts at the end of each session.

4.2. Phase 2.

The Scrum master took the phase 1 survey results to come up with a preliminary list of the team's difficulties. Subsequently, the Scrum master socialized them with the work team and sent a new survey to establish the most relevant in the team (see Table 6). The reflection of this activity is taking into account, before and during the session, all the comments of the work team, since it allows obtaining valuable information about the team's state of mind. This little

Table 6
Phase 2: Activities

Phase 2: Activity 1	Phase 2: Activity 2
Activity: Identify and categorize aspects to improve within team **Purpose:**The team must learn to recognize their difficulties **Description:**The information from the survey in phase 1 is taken as a basis. **Estimated time:**30 minutes **Suggested materials:**The use of formats or materials is not required.	**Activity:**Determine the greatest difficulty. **Purpose:**A new questionnaire is prepared and sent to each member of the team to establish the group perception of the most significant problem **Estimated time:** 10 minutes **Suggested materials:** A survey of difficulties rating.
Phase 2: Activity 3	**Phase 2: Activity 4**
Activity: Definition of the action plan **Purpose:** Generate an action plan of the difficulty in the work team **Description:** An action plan is established with the work team with the concrete actions, the people in charge and the times that allow to attack this difficulty. **Estimated time:**30 minutes **Suggested materials:** Action plan format or template.	**Activity:**Validation of the action plan **Purpose:**Validate the action plan of the difficulty of the work team. **Description:** It is evaluated if the plan established in the previous activity is being effective and if, on the contrary, any adjustment is required, it should be carried out. **Estimated time:** 10 minutes **Suggested materials:** The use of formats or materials is not required.

detail makes team members feel heard and valued.

In the second activity, to determine the priority of the difficulties identified, the Scrum master conducted a Google form survey. In this way, the team voted for the difficulties on a scale of 1 to 5. Finally, the most voted difficulty was "Improve communication in the team."

The action plan's definition to solve the difficulty "Improving communication in the team" was carried out by the Scrum master through an initial proposal presented and socialized with the work team. In this session, the actions, the times, and the responsible people where established by all team. For this activity to be effective, the action plan must be easily accessible to the team. Another critical feature is that the action plan must be executable, that is, that the actions established are SMART: specific, measurable, achievable, relevant, and timeable.

The last activity of the phase refers to the follow-up of the action plan. The Scrum master visualized daily progress to evaluate whether it was performing or not during the sprint. In this follow-up, the Scrum team showed improved communication, since two virtual sessions are held daily, one in the morning and one in the afternoon, something that had not been done before.

Table 7
Phase 3: Activities

Phase 3: Activity 1	Phase 3: Activity 2	Phase 3: Activity 3
Activity: Choose the pilot test project. **Description:** the project with which the Scrum implementation will start is chosen. **Estimated time:** 2 hours	**Activity:** Product backlog definition. **Description:** Detailed writing and prioritization of user stories. This activity is carried out by the PO. **Estimated time:** 8 horas	**Activity:** Sprint planning. **Description:** The team takes the user stories one by one and defines the necessary tasks to develop them. **Estimated time:** 4 hours
Phase 3: Activity 4	**Phase 3: Activity 5**	**Phase 3: Activity 6**
Activity: Sprint Execution. **Description:** Planned activities are executed and progress is updated daily through a burndown/burnup chart. **Estimated time:** 2 weeks	**Activity:** Daily Scrum. **Description:** During the sprint execution, a 15-min meeting is held every day to identify impediments. **Estimated time:** 15 min.	**Activity:** Sprint review **Description:**The increase is presented to the stakeholders to know the change requests as soon as possible. **Estimated time:** 2 hours
Phase 3: Activity 7	**Activity:** Sprint retrospective. **Description:** The Scrum team reflects on the sprint that ended. They determine what worked and what did not. Then, they plan the change they will make in the next sprint. **Estimated time:** 1.5 hours	

4.3. Phase 3

was carried out with a pilot test composed of two 2-week sprints (see Table 7). The choice of the project for the pilot was made between the Scrum master and the project manager. The banking project "Banktrade LDAP Integration" was established for testing.

The product backlog was adjusted in a virtual session between the scrum master and the product owner. The product owner wrote the user stories and then shared them with the Scrum master. The PO read each story aloud, and in some, the wording was adjusted. As a result, 8 prioritized user stories were generated.

The first activity shows the result of the sprints executed by the work team to know the evolution obtained from the first sprint. The second activity makes visible the positive results obtained during each sprint's execution to continue executing the actions that generated these results. The third activity makes visible the negative results obtained during each sprint's execution to make changes in the actions that generated these results. The fourth activity allows us to analyze and establish the activities that should be part of the framework for the following Scrum projects, carry out the continuous improvement, adjust and strengthen Scrum for the implementation of the software projects. Following the foregoing, it is expected that the team will have a more defined framework to apply in the following software projects to guarantee early deliveries, with the expected quality and productivity.

Table 8
Phase 4: Activities

Phase 2: Activity 1	Phase 2: Activity 2
Activity: Consolidation execution sprints **Purpose:** Measure and show the process. **Description:** At the end of the project, the results obtained in the execution of each sprint are analyzed, so that in this way the evolution obtained is established. **Estimated time:** 1 hour **Suggested materials:** A team video or a shared presentation file.	**Activity:** Recognize positive aspects **Purpose:** Visualize and acknowledge team victories. **Description:** List the positive results of the sprints. **Estimated time:** 15 minutes. **Suggested materials:** A survey of difficulties rating.
Phase 2: Activity 3	**Phase 2: Activity 4**
Activity: Recognize negative results **Purpose:** Generate the Decalogue of the most common errors of the teams. **Description:** To socialize in a visible place the most common mistakes that should be avoided. **Estimated time:** 15 minutes. **Suggested materials:** Printed poster.	**Activity:** Next scrum tip. **Purpose:** Configure the Scrum framework for the team. **Description:** Write the actions that make them work better as a team. **Estimated time:** 1 hour **Suggested materials:** A shared file.

For the sprint planning, a virtual session was held in which the PO presented the eight user stories generated in the previous activity to the development team. They were read one by one, and some adjustments were made to clarify the development team. Then, a pivot was generated and explained as a reference point to determine the difficulty (in time) of the project's user stories. The valuation obtained is recorded, taking the one with the lowest value and the highest value to ask the team members why their valuation. In this way, the team in a second game evaluates each user story with less uncertainty. Once valued, the highest value is taken. Finally, according to the product owner's priority, 21 tasks are established with times and responsible.

4.4. Phase 4.

The consolidation of the sprints was carried out through a virtual session. The Scrum team records the final results obtained in the execution of each sprint for the banking projects: "Banktrade LDAP Integration" and "Automation of Banktrade Reports to Logical Access." This meeting focused on measuring the team's adaptation to the Scrum framework and fulfilling the acquired commitments.

The implementation of Scrum is an empirical process aimed at recognizing problems, setting priorities, and performing conflict resolution together and synchronously. The team is the one who defines the Scrum framework adapted and configured according to their needs, since it is executed iteratively, allowing them to acquire experience and knowledge in each sprint for the continuous improvement of their process. Table 8 resume the activities of the last phase into

implementation plan.

5. Conclusions

A plan was proposed to implement the agile Scrum methodology oriented to people, designed in phases, to promote an iterative adaptation and detect difficulties in early stages. These characteristics forged an implementation-oriented to the particular needs of each person about their work teams.

Deficiencies were identified in how the work team developed software projects for the internal client. They prioritize the highest to lowest assiduity, additional budget requests, delays in deliveries of the final product, low quality and productivity, and dissatisfaction of internal and external customers.

In the application of phase 1, the mood and work situation of all team members were identified as a starting point to initiate the change in methodology. From this process, the most revealing findings concerning the team members were: more than 50% stated that they knew very little about their weaknesses and strengths at work; almost 80% expressed dissatisfaction with their economic compensation and aspired to an increase between 20 and 50%; More than 60% declared ignorance of the rules regarding the handling of different requests from users and almost 50% did not have fluid and constant communication with their direct boss and team.

From phase 1, phase 2 was applied to build the first action plan: small coordinated team tasks to improve a group difficulty that they identified. From this process, it is worth highlighting the importance of the role of Scrum Master as a facilitator, who motivated the team to accept their difficulties. She guided the primary actions that were adjusted, planned, and carried out to improve communication between the work team members.

After executing the first two phases of the plan, the work team was interested in applying the knowledge acquired in their daily activities. In phase 3, the team chose the most conducive projects to run the pilot, established the precise user stories for the assessment, and formed the overriding task lists with which the first sprints were executed. From this process, it is essential to mention that external factors occurred that prevented the completion of one of the sprints that, together with newsprint execution, allowed the team to apply the knowledge acquired and obtain the maximum benefit from Scrum.

After phase 3, the last phase was applied, in which feedback was given to the team, the positive and negative results obtained during the execution of each sprint were pointed out, the activities for the adaptation of the framework were analyzed and established. With this last phase, a dynamic was generated to continue with Scrum's practice in all its software projects. It is worth mentioning the importance of having a Scrum master who accompanies people to adapt to change and constantly reinforces Scrum's principles, values, and activities.

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