"Use of The Scrum ban Methodology to Improve the Efficiency of Financial Planning in Business Management: Bibliometric Analysis (2015-2021)"

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Abstract

Through this research, the objective is to analyze the main problems presented in the area of financial planning of a company in the food industry, among which can be found the excessive wear of certain collaborators, the non-compliance with the delivery deadlines of files and financial reports and lack of communication between team members; in order to improve the workflow of the financial planning area through the application of agile methodologies such as Scrumban, which flexibly combines the characteristics of Kanban and Scrum. The methodology used in this project has 3 steps, in which surveys, fault records and the Trello application will be used to collect a series of data that will allow us to evaluate the current situation of the work method used. By implementing this methodology, improvements can be found that were measured in qualitative and quantitative indicators that allowed increasing the degree of satisfaction of the collaborators and the functional area, saving time and achieving better efficiency in the work of the financial planning area. After performing the analysis and identifying the respective improvements in the area, this research may serve as a basis to optimize other similar processes in other companies and in large areas such as strategic planning, demand planning, financial planning, etc. They have mechanical components, but they also have projections taking into account internal and external factors of the company, such as the situation of a country at a given time.

Keywords
Scrumban, agile methodologies, financial planning, Scrum and Kanban, Trello.

1. Introduction

Currently, it is very important that organizations or companies have their areas and processes well defined, whether in small or large companies, since there is aggressive competition in most industries, especially in the food industry, which at Being a high-demand sector, it requires a well-developed supply chain, sales area, and well-developed purchases. However, even with all these areas working effectively, a business or company will not progress if it does not have a finance area capable of controlling financial management, managing the company's debts, and managing an adequate investment business.

In this sense, financial planning is currently a powerful management tool in the process of making a business plan for efficient decision-making. According to Reisdorfer, Koschewska and Neusa (2005) "Financial planning offers numerous advantages, such as advance knowledge of the entire consumption budget and investments for the following period, allowing to establish, in advance, the necessary recipe to obtain the intended objective in the planning period, which helps to set more specific goals. In addition, his practice allows the identification by the company of needs such as the possibility of expansion, the feasibility of its budget for the current and versatile market, the evaluation of the possibility of implementing new projects including their costs, and the planning of future investments"

For this reason, our research work will focus on optimizing the financial planning area of a company in the additional sector based in Lima (Peru), since in recent years this area has presented a low level of efficiency in some activities. of the planning process, due to certain inconveniences such as unequal distribution of tasks among the collaborators; which generates excessive wear in some sub-areas, non-compliance with the reporting and financial reporting deadlines, lack of control and monitoring when performing tasks and lack of communication when uploading information to the system; due to a lack of knowledge of the state of the current workflow. To improve the working method of this area and increase the efficiency of the financial planning team, the "Scrumban" model will be used. This is a hybrid methodology that gives teams the flexibility to adapt according to the needs of the project without the obligation to apply strict rules that overload and negatively affect the work team; in which the structure of Scrum is provided by applying the flexibility of Kanban; thus, obtaining a trend of easy adaptation that allows analyzing the tasks carried out and implementing opportune short-term solutions for possible inconveniences.

This research uses agile methodologies, which allow improving the way of working in companies, through its principles of flexibility and ability to implement changes immediately without the need to implement rigorous rules or restrictions. Developing a more agile, communicative, and dynamic team; through parallel and organized group work. According to Aurish, Ahmed and Barkat (2021), agile methodologies are gradually being implemented more and more in large companies, which focus on working based on flexibility and the ability to work in an iterative system. (p. 2).

The application of this methodology will be developed on the free Trello platform, which shows a dynamic online board, were, through virtual cards, the flow of activities in the planning process could be simulated, achieving a greater visualization of the current state of the workflow. Which provides the basis to be able to measure and identify different indicators correlated to team performance, number of tasks, waiting times and bottlenecks. In which the results will be measured through surveys carried out on all members of the financial planning team. In addition, one of the easy advantages of Trello is its management and adaptability, it offers the option to share files, designate managers, add comments, add lists, tasks and descriptions; thus, having a constant collaboration between team members.

This research is based on different premises taken from different scientific articles through an extensive review of the literature, where multiple positive results are evidenced when implementing Scrumban or the union of Kanban with Scrum, using surveys as a method of evaluation and collection of indicators. Therefore, the hypothesis is determined that the application of the Scrumban methodology will achieve a series of improvements in the flow of activities in the financial planning area and they will have total visibility of their flow of activities, being able to detect possible risks and delays that influence the planning process; to implement the appropriate solutions and corrections in the development of their tasks in the shortest possible time.

1.1 Objetives

Develop a work model, which improves the efficiency of the area and eliminates more than 50% of bottlenecks, through a systematic review of the literature and the use of the DIGITAL Trello tool, applying the Scrumban methodology

2. Literature Review

Within the analysis of the main papers used at the beginning of the investigation we have:
Gaete, J., Villarroel, R., Figueroa, I., Cornide-Reyes, H., & Muñoz, R. (2021). In the research named "Agile application approach with Scrum, Lean and Kanban" they focus on the impact of the elaboration of a new agile approach for the development of a Software where 42 students of the Engineering career are taken as a study sample. Civil Informática, who were taking the Web Engineering course at the Catholic University of Valparaíso. The purpose of this article is to seek a new agile approach through the adoption of different methodologies such as Scrum, Lean and Kanban in the development of new software. In this literature, it was shown that good results were obtained by certain indicators such as team satisfaction index, stabilization speed, and number of completed and uncompleted requirements, based on internal surveys.

Abdullah Albarq, A., & Qureshi, R. (2018). In the article entitled "The Proposed L-Scrumban Methodology to Improve the Efficiency of Agile Software Development" focuses on developing the Scrumban methodology together with Lean techniques, such as the 5S method, applying it as a management tool to improve efficiency. in the development of a software, where, through surveys, eight large companies in the field of software creation were evaluated; in which positive results of approximately 93% were evidenced with respect to user satisfaction and the impact on delivery times in tasks.

Albrecht, A., & Albrecht, E. (2021). In the paper entitled "Hybrid project management" it shows that the Scrumban methodology can be very helpful in the current health situation after the impact of Covid 19 and its effect on a virtual world, where processes are more rigorous as well as expectations. of customers. Positive results were collected through the application of this hybrid, focusing on process automation, achieving better management and control in day-to-day activities, leaving aside process delays.

Bhavsar, K., Shah, V., & Gopalan, S. (2020). In the study "An agile integration of Scrum and Kanban in Software Engineering", it is shown that the Scrumbanfall model (Combination of Scrum, Kanban and the waterfall method) provides detailed documentation that positively influences planning, risk estimation and monitoring. of the software development project. This positive analysis is measured by indicators such as delivery times, number of unfulfilled requirements, resource availability, number of defective products and variables such as risk analysis, defect predictability analysis, cost estimation, quality level.

Alqudah, M., & Razali, R. (2018). In the paper entitled "Study of Scrumban formation based on the selection of Scrum and Kanban practices", through a series of interviews with 7 experts in agile methodologies, it was justified that the Scrumban methodology is more appropriate than Scrum or Kanban individually, since that the combination of these two methodologies effectively optimizes time, improves the quality level of products or services, minimizes a greater amount of waste compared to Kanban and requires less adaptation time; as well as fewer restrictions compared to Scrum.

3. Methods

The present investigation is of the type of process improvement with a positivist paradigm, since it seeks to improve the procedures of the activities of the planning area, in which, through measurable and observable phenomena, it is determined that the causes of the problem, in addition, the Scrumban methodology will be experimented with to test the proposed hypothesis. This study has a mixed approach, because both concrete and subjective data will be analyzed and worked on. The scope of the proposed topic will be descriptive, since an initial diagnosis of the area will be carried out, in which data will be collected and variables will be measured based on the current work methodology of the financial planning team; to later compare and evaluate them after implementing the Scrumban methodology with the help of the Trello tool. Regarding the methodological scope, a quasi-experimental design is developed, because the agile Scrumban methodology will be implemented using the Trello tool, applied to the four members of the financial planning team of a company in the food industry, which allows optimal traceability and distribution of tasks.

Regarding the applied methodology, among the techniques chosen to develop this project, a bibliometric review will be used; through Scopus and Vos Viewer, in order to analyze and collect information from scientific articles related to our research topic. In addition, a systematized observation will be applied in which we as researchers will be active participants in the project; supporting us with surveys, registries and pilot tests of Trello; in order to obtain an initial diagnosis of the study area; in order to identify the points to improve and implement the Scrumban rules, such as daily

meetings, correct distribution of tasks, retrospection meetings and the correct use of the Trello platform, in order to obtain the expected results and improve the efficiency in the activities of the team. financial planning area.

As a first step, the search was performed in the Scopus database. A total of 226 results were found and the search was filtered in the period between 2015 and 2021, which are in English, and which belong to articles or conferences. After performing these filters, the next criteria were the Scrumban search in the planning area and the last criteria was to filter by titles. This sweep allowed us to eliminate almost 81% of titles that did not significantly contribute to our research. Ultimately, we were left with 43 investigations.

In Table 1; the criteria used to filter these 43 investigations are shown.

Table 1 Keywords Search

Nº	Words
1	("Scrum" AND "Kanban") OR ("Agile" AND "Scrumban")
2	("Agile methods" AND "Agile Development") OR ("Agile Kanban")
3	("Financial Institution" AND "Financial Institutions")

As a second step, surveys will be used that include different subjective questions on a Likert scale with a rating from 1 to 5, where the qualitative variable of the degree of satisfaction of the workers will be collected through a weighting of the responses issued; with the purpose of knowing the position of the collaborators with respect to the current work methodology used in financial planning of the company in the food sector. (Figure 1)

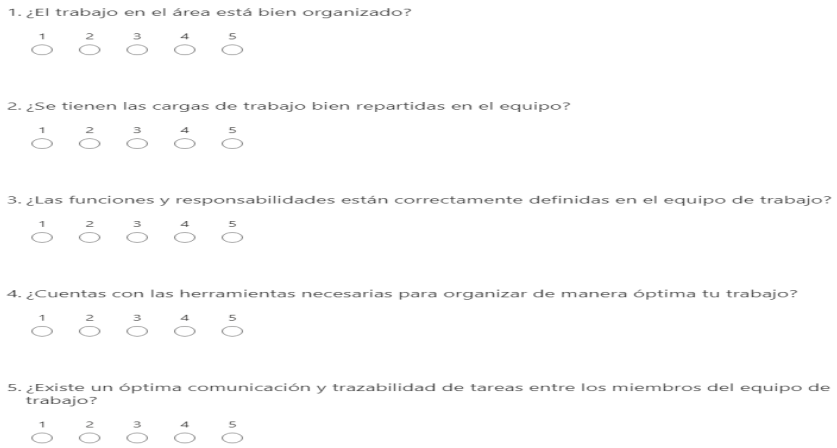


Figure 1. *Survey model to be implemented in the study area*

Figure 1 and Table 2 present the list of questions needed to obtain the expected data and the details of the rating.

Table 2. Definition of the score on the Likert scale

Score	Definition
1	Strongly disagree
2	In disagreement
3	Neutral
4	In agreement
5	Totally agree

As a next step, the failure registration instrument will be used, in which it will be possible to obtain a history of the number of failures of each monthly project since 2019 and the time it took to solve each incident; in order to be able

to establish an average of defects per year, to track the evolution of project failures over time and thus be able to measure how well the project is going when implementing the new work methodology.

Figure 2 shows a sample of the register filled out by the operators of the area in question.

Mes	Característi	Detalle	Horas
Enero	Incidente	Inconveniente con el traslado al módulo EERR	24
Enero	Incidente	Problemas conexión Hyperion	2.5
Enero	Incidente	1) Distribución de Gastos 21 - Hyperion: Análisis de CECOS que no se distribuían en 2021	9

Figure 2. Example of the failure log used at the end of each project

Finally, a pilot test will be applied with the Trello tool to be able to determine multiple quantitative variables such as the number of tasks assigned per worker, time spent on each task and the number of activities per project or sprint; where from these variables it will be possible to evaluate indicators such as team performance, percentage of compliance with financial reports and files on the established date, number of pending tasks to be done, number of hours of delay and number of bottlenecks identified in the project. Finally, within the Scrumban methodology, variables such as the time spent on each task and the number of workers required for each project activity will also be used; this with the purpose of being able to trace the evolution of the work methodology in the area of financial planning, identify the points of improvement and thus evaluate the before and after once the agile Scrumban approach has been applied.

Once the initial diagnosis of the area is made, we proceed with the definition and implementation of the rules of the methodology.

Table 3 details the guide with the different standards of the scrumban model.

Table 3. Scrumban Rules

Rule	Purpose	Comments
Team roles	For the implementation of this methodology, the head of the area is defined as Scrum Master; who is responsible for the management and coordination of the financial planning project with the other areas; as well as mitigate any impediment or bottleneck presented in the project.While the three analysts will have the role of developing the activities for the correct closure of the project.	The team is made up of 1 boss and 3 analysts.
Daily meetings	Know the progress of the activities by answering 3 questions: What I did yesterday? What will I do today? Do I present obstacles to carry out the activity?	These meetings will be directed by the Scrum Master and will be held from Tuesday to Friday with a duration of 30 minutes at the beginning of the working day.
Retrospective Meeting	Reflect on the activities of the week, raise improvements and review the pending of the week	This meeting will be led by the Scrum Master and will be held every Monday of the week with a duration of 1 hour.
Trello app	The Trello tool will be used as a pull system, where there will be a board with activities (represented with cards) that will move from left to right through 4 columns, which are: To do, In progress, To check, Finished	The use of this tool will be carried out throughout each monthly project, in which there will be visibility of the workflow of the area and with the help of daily meetings, each analyst will have a few tasks correctly distributed. Activity cards will be assigned to analysts. Once the card is in the "To be reviewed" column, the "Scrum Master" is in charge of placing it in "Finished" if it is correctly finished or otherwise it is placed back to "In progress" in case it presents any mistake.
Task format	Each card or activity will be assigned a person in charge, description, expiration date and will be classified in colors according to the order of priority.	The degree of priority of the card is defined by the Scrum Master as follows:Red = High ; Yellow = Medium ; Green = Low

4. Results

4.1 Results of The Initial Diagnosis of The Area

In table 4, the 10 journals that have the greatest impact on our research will be presented, these are in descending order, the first being the most important, according to the SCImago Journal Rank (SJR) as of 2021. In addition, the quartile will also be shown maximum reached by said journal with its own Hirsch index and the average number of citations reached in 2020 for the article that was published between 2017 and 2020. This last indicator is the one that has the impact factor of a journal.

Table 4. *Journals with the greatest impact included in the research*

Journal	SJR	Best Quartile	CitesScore
Academy of Management	18.318	Q1	24.7
Journal of finance	18.151	Q1	11.2
American Economic Journal : Applied Economics	12.996	Q1	11.6
Review of Financial Studies	12.8	Q1	9.2
Journal of Financial Economics	11.673	Q1	9.6
Academy of Management Journal	11.193	Q1	14.2
Strategic Management Journal	11.035	Q1	12.5
Brookings Papers on Economic Activity	7.134	Q1	15.6
Journal of Financial and Quantitative Analysis	4.657	Q1	5.3
Long Range Planning	3.852	Q1	11.5

The following graphs show into which areas the 43 investigations found for the study are divided and the number of citations of the authors with the highest appearance in the sample, respectively:

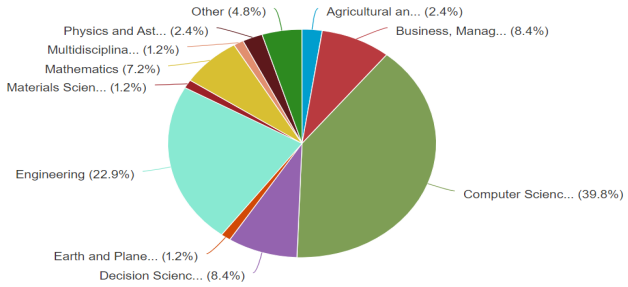


Figure 3. *Percentages of the application areas of the study*

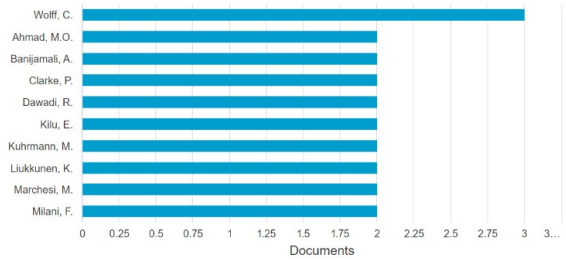


Figure 4. *Number of citations of the authors with the most appearances in the search*

On the other hand, the main thematic axes found in the 43 investigations were captured. In order to analyze this information, the VosViewer software was used, whose tool allows a pertinent quantitative analysis of the authors or keywords of each investigation and to represent this analysis through iterative graphs.

From the sample of 43 investigations, 59 results were found with 2 or more keywords.
Analyzing the image we have 7 clusters, with colors red, green, blue, etc and with their respective items

As we can see, the main words found that had the greatest relationship were “software design”, “Kanban”, “Scrum”, “Scrumban”, “agile manufacturing systems” and “agile software development”. In addition, we can see that "software design" is related to "agile manufacturing systems", "Kanban" and "Scrum", which shows us that these tools are used as agile methodologies in manufacturing systems.

In Figure 5, the results of the keywords obtained from Vosviewer are presented

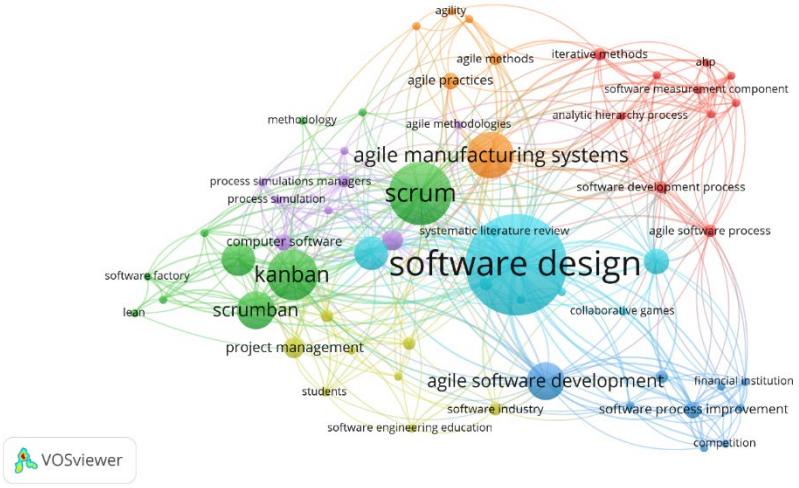
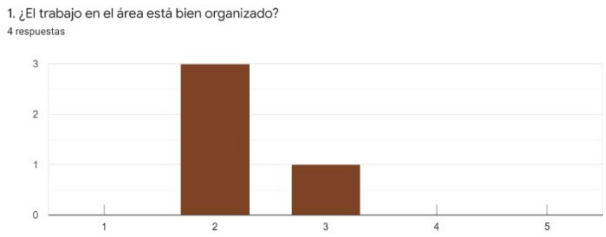


Figure 5. *Keywords VosViewer*

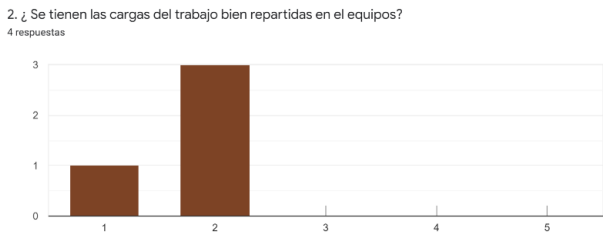
On the other hand, regarding the methodology used; We began by conducting a survey of the 4 people who work in the financial planning area with the aim of being able to measure their satisfaction in the area and the results were as follows, being 1 (totally disagree) and 5 (totally agree) :

Question 1.



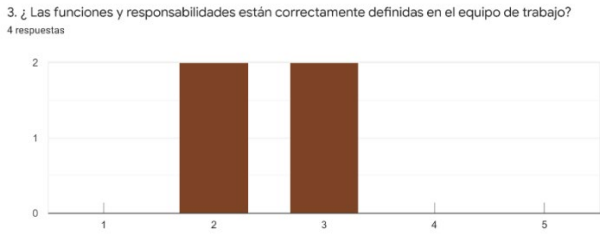
As can be seen in question 1, the work in the area is not very organized, because a "2" was obtained as a score.

Question 2.



In question 2, it is also observed that the respondents conclude that the workloads are not distributed correctly among the collaborators.

Question 3.



In question 3, 50% of the collaborators think that the functions and responsibilities are defined incorrectly and the other 50% think neutrally.

Question 4.

In question 4, we can see that there are no tools to optimally organize work in this área.
In summary, it has been concluded that the financial planning area of this food industry company has difficulties in different tasks that can be optimized with the help of agile methodologies in order to raise the respective indicators in this area.

Figure 6 and 7 show the fault log information collected

	2021													
	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Septiembre	Octubre	Noviembre	Diciembre	Total Horas	Nro incidentes
Incidente	87	18	118	82	86	45	47	63	40	24	58	22	687	128

Figure 6. *Crash Log 2021*

A total of 687 hours consumed in correcting defects were recorded throughout 2021; with a total of 128 incidents in the year.

	2022				
	Enero	Febrero	Marzo	Total horas	Nro Incidentes
Incidente	13	23	64	100	33

Figure 7. *Crash Log 2022*

With respect to this year, up to the month of March a total of 100 hours consumed was recorded; with a total of 33 failures in that period.

Figure 8 shows a graph with the number of failures obtained monthly

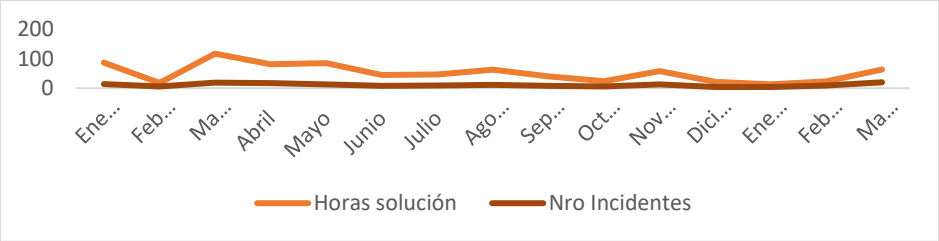


Figure 8. *Incident trend*

It was obtained that the monthly average of incidents is 11 failures in each month and an average of 52 hours per month is invested in the solution of these defects. These results show that, in the area of financial planning, a considerable amount of reprocessing is contemplated that affects the fulfillment of monthly projections; in addition to a large number of hours required to solve the failures; generating fatigue in the workers and delays in the activities of the planning process.
Regarding the Trello pilot test, the activities of the team members in the last two weeks of the project in April were taken as a reference; supervised by the head of the area with the role of Scrummaster.

Figure 9 shows a model of the pilot test implemented in Trello.

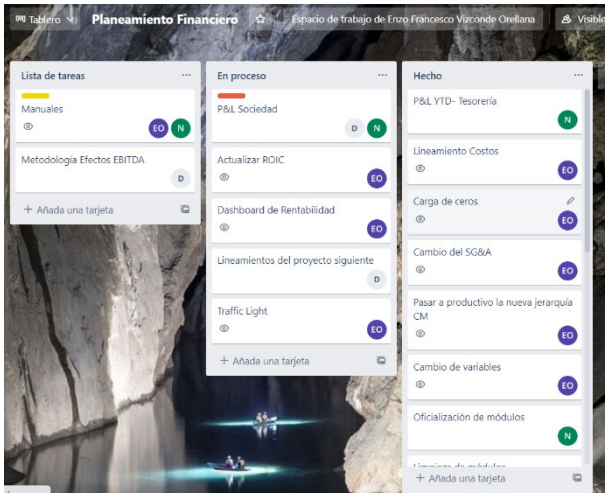


Figure 9. *Trello pilot board*

In Table 5 and 6, the results obtained through this pilot test are presented.

Table 5. *Number of tasks assigned per worker:*

Employee	Number of tasks
Analyst 1 (D)	6
Analyst 2 (N)	8
Analyst 3 (EO)	14

Table 6. *Other results*

Variable	Result
Number of tasks not completed	7
Number of bottlenecks	2

These results show that there is a disparity in the number of tasks assigned to each worker; in addition to a considerable number of incomplete tasks that represent a quarter of the total number of tasks. Finally, two bottlenecks were identified (which are shown with labels in Figure 9) in the process that caused one activity to be stagnant in the two weeks of testing, affecting the times of other areas and another not having could start; due to the large number of pending tasks. Based on what was obtained; It is shown that the current methodology used in the financial planning area is not optimal and generates low efficiency in its activities, generating delays and repercussions in other areas.

4.2 Results of the implementation of Scrumban

Once the pilot test, which lasted 2 weeks, was completed, as well as the training on the correct use of Trello and the presentation of the Scrumban rules; The methodology for the financial project for the month of May was implemented. Figure 10 shows the board used with the scrumban methodology for the activities corresponding to the financial projection for May.

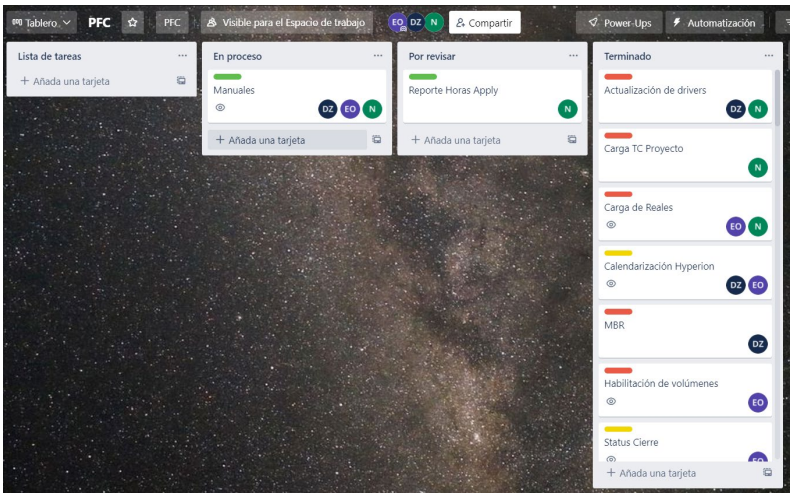


Figure 10. Official Mayo Project Trello Board

Table 7 and 8 show the results obtained from Trello at the end of the projection.

Table 7. Number of tasks assigned per worker

Employee	Number of tasks
Analyst 1 (D)	20
Analyst 2 (N)	21
Analyst 3	20

Table 8. Other results

Variable	Result
Number of tasks not completed	1
Number of bottlenecks	0

There were considerable changes compared to the results with the previous work methodology; such as the fact of having mitigated 100% of the bottlenecks; In addition, there was only one uncompleted task, representing a reduction of 86% with respect to what was presented in the pilot test, this task also had low priority, which indicates that it did not affect the activities of other areas and therefore it was not stopped the flow of projection. Finally, there was greater organization and communication among the team, represented by the homogeneity of the number of tasks assigned to each worker (on average 20 per analyst), which positively affects the performance of the area; since there is better visibility of the status of the activities of the planning process and excessive work is eliminated; as well as delays in carrying out activities.

In Figure 11 and 12, the results of the record of incidents presented throughout the May project are presented.

	2022					
	Enero	Febrero	Marzo	Abril (piloto 2 semanas)	Mayo (Scrumban)	Total
Horas consumidas	13	23	64	35	11	100
Cantidad de fallas	4	9	20	9	5	33

Figure 11. Crash Log 2022 (January to May)

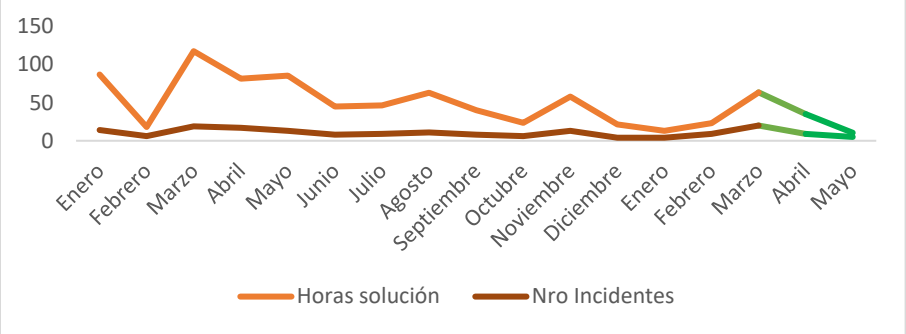


Figure 12. Failure trend (2021 a 2022)

Positive results were evidenced as a result of the pilot test carried out in the last 2 weeks of April and the implementation of Scrumban in the month of May, presenting a reduction in the number of failures presented and in the number of hours used to correct them, to comparison of the average of incidents presented in the projects with the previous methodology (11 failures per month) there was a reduction of 18% for April and 55% in May; Regarding the hours consumed in solving the failures (52 hours on average with the previous methodology), it was reduced by 33% and 79% for the months of April and May, respectively.

On the other hand, these indicators because of the implementation of the Scrumban methodology, can be evidenced in the second survey that we carried out to the collaborators of the area, the results are between 4 and 5 according to the last survey which shows a clear improvement in the results of the process.

After having applied the agile Scrumban methodology, because of the second survey, in all the questions a score between 4 and 5 is obtained, which means that the work in the area is well organized, functions are well defined; the loads, well distributed; there are adequate tools to perform the work optimally and there is good communication and traceability.

5. Discussion

From the results, it is evident that the period in which there was a greater number of publications of agile methodologies magazines, specifically Scrum and Kanban, was between 2020 and 2021 with respect to a total analysis of the years 2015 and 2021; This may be due to the implementation of agile methodologies during the pandemic and which, precisely, coincides with the period in which there is a tendency to increase these methodologies using computer tools to have better visibility of the processes and also on issues such as speed and efficiency that the programs provide. From the results obtained, it was also possible to analyze that the institutions with the highest number of publications on agile methodologies are in the United States and Germany; however, according to the annual study by the Project Management Institute (PMI), 71% of organizations worldwide already use agile methodologies. In addition, this study extracts what could be the main reason for the use of these methodologies, which is that the application of these methodologies has a direct impact on the return on investment (ROI). According to the report, companies grew revenue 37% faster and made 30% more profit than companies that have not yet implemented these methodologies. (CIO, 2017). Examples of successful companies that used agile methodologies are Amazon, Apple, Spotify and Google AdWords.

On the other hand, with respect to the keywords included in the publications, words such as "software design", "scrum", "scrumban", "Kanban" and "agile software development" had a higher rate of matches in journals published in recent years. These keywords are grouped into clusters and in turn serve as a model for other magazines, as they link with branches that include words like software industry, agility, lean, etc.

Likewise, after implementing the Scrumban method, a significant improvement was evidenced in the performance indicators of the financial planning area. In that sense, although an improvement was expected, it was not expected to reduce the bottlenecks by 100%; In addition, there was only one task not completed, representing a reduction of 86% with respect to what was presented in the pilot test. Additionally, there was a 55% reduction in the number of failures per month and a 79% reduction in hours spent troubleshooting. These changes demonstrate the direct relationship that exists between using agile methodologies such as Scrumban and the development of areas such as financial planning where there is a mechanical and an experimental part.

Finally, possible limitations were found when applying these methodologies and it is when the collaborative spaces are very small, basically between 2 people; in this case, it would be better to use simpler tools to better optimize the processes. For the rest, the implementation of this agile methodology in financial planning can serve to help integrate complex teams with a large number of people and in areas where not everything is mechanical, but rather it is necessary to rely on the situation of the country. and even predict certain situations to be effective when planning.

6. Conclusions

The present study demonstrated the advantages of using agile methodologies in combination with the purpose of achieving an improvement in a company's planning area, an area that, in general, is difficult to predict and organize, due to the fact that it is composed of on the one hand analytical and the other experimental, since planning depends, to a large extent, on the current situation that the country is going through already in a social, economic or health context such as the pandemic; According to this, we were also able to identify that to improve the indicators in a work area and be more efficient during the pandemic, it required a greater organization even than in the period before the pandemic, so implementing agile methodology tools during this stage of a health crisis where most people worked virtually and there was no pre-established order regarding schedules, tasks, work divisions, etc. it was a challenge.
However, with the help of tools such as surveys and in combination with agile methodologies such as Scrum, Kanban and Trello, we were able to improve the indicators in this area by reducing bottlenecks by 100% and uncompleted tasks by 86%. For these reasons, it is recommended to continue using this mix of agile methodologies and tools in future research with the purpose of optimizing even larger areas of a company to save efforts and obtain better labor indicators that will translate into higher economic income for the company. and higher percentage of employee satisfaction.

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Acknowledgements

Thanks to the industrial engineering career for all the teachings received during our academic studies and to the professors of the faculty.

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