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Implementation of Scrum Framework and Trello-Based Visual Management for Production Process Optimization: A Mixed-Methods Case Study in a Sports Apparel Manufacturing Company

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Abstract. This study addresses operational inefficiencies in small-scale manufacturing environments, particularly within sports apparel production, where fragmented workflows and limited coordination hinder productivity. Despite the growing adoption of agile methodologies, their application in traditional manufacturing contexts remains underexplored. This research proposes a Scrum-based framework integrated with Trello as a visual management platform to optimize five critical stages of the production chain: fabric selection, cutting, sewing, ironing, and packaging. A mixed-methods, applied research design was employed, combining diagnostic and descriptive analysis in a cross-sectional, non-experimental field study. Data were collected through a structured instrument consisting of 74 items administered to the entire workforce (n=16), enabling a systematic evaluation of operational bottlenecks. The implementation of this agile framework yielded significant performance improvements. Results show a 43% reduction in downtime, a 62.5% decrease in material waste, and a 150% increase in task management capacity, alongside a 43.7% improvement in internal communication. These findings demonstrate the effectiveness of integrating Scrum principles with digital visual management tools as a scalable approach for enhancing productivity in manufacturing SMEs. This study contributes to the literature by providing a real-world application and comparative analysis of agile methodologies in non-software environments, establishing a replicable benchmark framework for process optimization in industrial contexts. The results highlight the potential of agile systems to foster operational efficiency, team cohesion, and continuous improvement in production settings.
Keywords: Scrum, Trello, Production and Optimization,

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1 Introduction

Today, the textile industry is a strategic sector for employment, the economy and the country's cultural identity. In Mexico, the field of textile manufacturing concentrates a total of 42,067 economic units, according to the records of the Economic Census carried out by INEGI (2020). In the state of Hidalgo, this sector groups 1,930 units, which represents 4.58% of the national total. Among them, 24 micro, small and medium-sized enterprises are identified, equivalent to 1.9%, specifically oriented to the manufacture of sports uniforms. However, 53% of textile companies have deficiencies in their production processes (INEGI,

2020). This problem is mainly attributed to inadequate planning, the persistence of obsolete technologies, poorly structured processes, poor time management and lack of internal communication, factors that limit its competitiveness and capacity for innovation.

Currently, organizations are facing increasing pressure to optimize their production processes, respond more quickly to market demands and adopt management tools that strengthen their competitiveness in an environment characterized by the accelerated dynamics of change and the constant need for innovation. In this scenario, agile methodologies have become especially relevant by providing frameworks that favor collaboration, flexibility, continuous value delivery and progressive improvement.

Among these methodologies, Scrum is positioned as one of the most widely used globally. Although it was originally conceived for software development, its flexibility and iterative approach have proven to be highly effective in other sectors, such as manufacturing and production. Its implementation contributes to the structured organization of tasks, the clear definition of roles and the optimization of time, essential factors for operational efficiency.

In a complementary way, the use of digital visual management platforms such as Trello enhances the advantages of Scrum, by facilitating the assignment of responsibilities, the monitoring of activities and communication in real time. The synergy between Scrum and Trello is therefore a key strategy to boost productivity, innovation and organizational competitiveness in contexts of high demand and constant transformation.

Multideportes Pachuca S.A. de C.V., is a company in the textile sector specialized in the manufacture of personalized sports uniforms. Founded in 2011, the organization has established itself as a relevant supplier in its niche market; however, the sustained growth of its production volume has evidenced various operational inefficiencies in its production chain. The initial diagnostic study identified key problems that limit the efficiency and competitiveness of the company: inadequate planning of tasks, poor internal communication, presence of downtime, significant losses in materials, absence of continuous supervision and inefficient distribution of work. These deficiencies generate negative impacts on both productivity and the quality of the final product, in addition to affecting the coordination and performance of the work team. The implementation of Scrum, accompanied by collaborative management tools such as Trello, is proposed as a viable alternative to structure processes, improve the assignment of responsibilities, optimize times and promote internal communication, thus promoting a comprehensive improvement in the operational efficiency and competitiveness of the organization.

The identified problem gave rise to an applied research project whose main objective was to determine if the implementation of the Scrum framework, complemented with collaborative management tools such as Trello, would improve the efficiency of five key production processes: fabric selection, cutting, sewing, ironing and packaging. In congruence with this purpose, a methodological proposal was designed based on the formal adoption of Scrum, which contemplated the precise definition of strategic roles such as the Scrum Master, Product Owner and Development Team, the use of specific artifacts such as the Product Backlog and the Sprint Backlog, as well as the systematic execution of essential events. including sprint planning, daily stand-ups, reviews, and retrospectives. In this sense, the integration of Scrum and Trello is configured as a strategic alternative to structure organizational processes, optimize the assignment of responsibilities, reduce operational times and strengthen internal communication, contributing significantly to the increase of operational efficiency and the strengthening of the competitiveness of the organization.

The central hypothesis of this research postulates that the systematic implementation of the Scrum framework, complemented by the use of the Trello visual management platform as a technological support tool, has a significant impact on the improvement of the productivity of production processes in a manufacturing company. It is also proposed that the integration of this methodological and technological approach favors the consolidation of an organizational environment characterized by greater interdisciplinary collaboration, more fluid and transparent communication, as well as a clear and structured assignment of roles, responsibilities and activities. In this sense, the use of Trello allows you to visualize the workflow in real time, facilitate the tracking of tasks, prioritize strategic activities and strengthen coordination between team members, which is expected to translate into an increase in the quality of the final product and higher levels of customer satisfaction. as a result of continuous improvement.

The expected results offer a strategic, accessible, and viable alternative for manufacturing organizations looking to optimize their operational performance by adopting more flexible management models and using easy-to-implement technology tools. The Trello platform, by providing a visual and intuitive environment for task management, contributes to improving the planning, control and coordination of activities, reducing operational ambiguity and strengthening decision-making based on up-to-date information. This study not only validates the relevance of integrating agile methodologies with collaborative management

technologies, but also demonstrates its potential as an effective strategy to drive the modernization and competitiveness of manufacturing organizations.

2 State of the art and description of the problem

In this section, the conceptual framework that supports the research is developed, through the analysis of the central categories that structure the study. In particular, the first axis of analysis related to the optimization of production processes is addressed, examining its conceptualization and the main types of production processes in the manufacturing context, in order to identify their characteristics and areas for improvement. As a second axis of analysis, the Scrum methodology is analyzed, considering its foundations, relevance, benefits, and structural components—roles, artifacts, and events—from an organizational perspective. Likewise, the revision of the digital tool Trello as a visual management platform that facilitates planning, monitoring of activities and continuous improvement is incorporated. In this way, the section integrates the theoretical and technological foundations that support the research proposal, providing a framework of reference for the analysis and optimization of production processes.

2.1. Optimization of production processes

The optimization of production processes is a management strategy that seeks to increase efficiency by improving procedures, reducing waste, increasing yield and better use of human and material resources. In the textile industry, where tasks are highly sequential and require precise coordination, the benefits of optimizing these processes are especially relevant.

According to Cuatrecasas, L (2011), optimizing a process involves reducing times, minimizing waste, and increasing the quality of the final product. These actions not only increase the company's profitability, but also improve customer satisfaction and reduce operating costs. In this sense, optimization should be understood as a continuous process and not as a one-off action, since the conditions of the environment are constantly changing.

The optimisation of production processes is one of the fundamental pillars for the profitability of a company. This approach not only promotes efficiency and effectiveness in the production area, but also encourages the commitment of each employee towards the achievement of organizational objectives. In addition, optimization contributes to the reduction of manufacturing costs and times, which in turn increases profits.

Based on the idea generated by Campo, E; Cano, J; et, al. (2020) it can be established that companies constantly face the challenge of developing effective production strategies that allow them to obtain competitive advantages and ensure their long-term sustainability. To achieve this, they must address the challenge of optimizing and adjusting operational capacity based on the demands of their customers. The optimization of production processes is considered a key tool to improve capacity in the medium and long term, as it proposes production strategies aimed at meeting the expected demand, taking into account current capacity constraints. Some strategies that can be used for the optimization of the production area are, inventory control to avoid excess or lack of raw material, train personnel to work more effectively and efficiently and ensure that the machines are always in optimal conditions and thus be able to maintain a constant production rhythm.

Types of production processes

Knowledge of production processes is a fundamental element for any company inserted in the textile sector, since it allows optimizing the use of material resources, human capital and machinery, through the systematic and structured execution of a set of interrelated activities. In this sense, it is essential to identify and understand the different types of production processes, as well as to determine their relevance based on the characteristics, needs and specific conditions faced by the organization, in order to strengthen its operational efficiency and competitive capacity. The production process is the core of any industrial organization, defined as the set of operations that take inputs and transform them into products with a higher value than the original. In Mexico, production management has evolved from artisanal methods to complex systems that seek global efficiency. As Fernández, E. (2003) points out, the product is the starting point, since its nature determines whether the process will be for a tangible good or an intangible service.

According to the authors Andrés, B., & Sempere, M. F. (2022), processes are categorized into three main aspects:

- By projects: Characterised by long manufacturing cycles and a minimum production volume, often aimed at obtaining a single customised unit.
- Batches: In this scheme, diverse products are manufactured in varying quantities using the same facilities intermittently.
- Continuous production: It is defined by the uninterrupted manufacture of a standardized product in specialized facilities, guaranteeing a uniform result.

The authors point out that the project system is executed in successive stages without a linear product flow; batch production is used when demand is insufficient to justify permanent operation; and the continuous flow is organized in such a way that materials transit between operations without interruptions or discrete transitions.

It is evident that Mexican organizations adopt various productive configurations depending on their demand and technological capacity. Specifically in the manufacturing sector, authors such as Fernández, E (2003) and De la Garza Toledo, E (2005) converge on a classification of four essential models, which structure competitiveness and operational efficiency in the manufacturing sector (See Fig. 1):

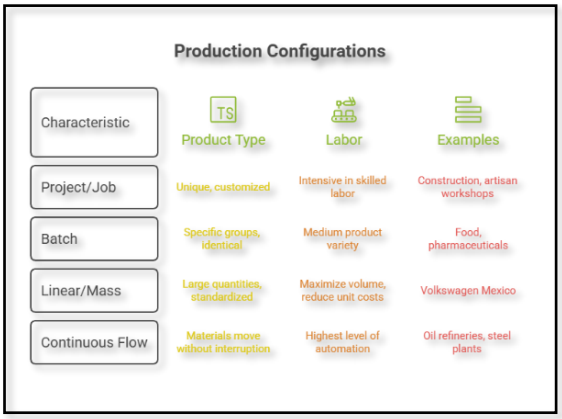

Fig 1. Essential Models. NapkinAI. (2026). [Generative AI Model].

The above can be explained in the following table:

Table 1. Fundamental types of production

Types of production processes			
Mass production	**Batch production**	**Artisanal production**	**Production by project**
This model is based on the search for economies of scale by manufacturing high volumes with minimal variability. Its success lies in the extreme standardization of processes and components, with the automotive sector being the paradigmatic reference of this configuration, where efficiency and repetition are the pillars of the workflow.	It is defined by its ability to manufacture a specific number of products with similar characteristics before transitioning to a different model. It is an intermediate system that allows moderate customization and flexible management of machinery, common in industries such as textiles or chemicals, where it is necessary to alternate between different design lines or formulas.	Unlike high-volume industrial models, the artisanal configuration prioritizes the added value of technical expertise and exclusivity. Here, the volume is small but the degree of customization is maximum, allowing each unit to be unique and respond to specific requirements that cannot be satisfied by automated processes.	This modality is aimed at achieving unique, complex and large-scale products. It is characterized by a management based on milestones and singular activities that do not follow a continuous linear flow, but are coordinated over time to comply with long-term and highly specialized technical specifications.

Authors, with information from Fernández, E (2003) and De la Garza Toledo, E (2005).

State-of-the-art strategies and tools for the optimization of production processes

Among the most widely used tools in process optimization is the Eisenhower matrix (See Fig. 2), which allows prioritizing activities according to their urgency and importance. Gutiérrez Pulido and De la Vara Salazar (2008) explain that its use helps to balance the workload and to allocate resources according to their impact on the objectives; from the authors' perspective, it is important to specify that it is addressed within the context of quality planning and prioritization tools. This matrix is one of the main intervention strategies considered in this project.

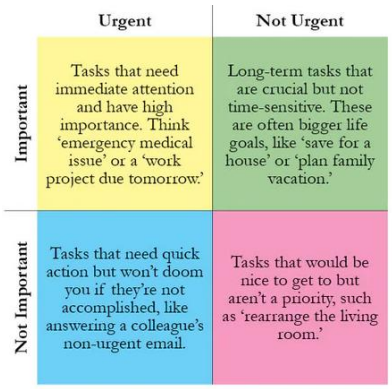

Fig 2. The Eisenhower Matrix

Production indicators are essential quantitative metrics for the evaluation and monitoring of performance in specific processes, projects or activities. In the manufacturing field, these instruments make it possible to quantify critical dimensions such as efficiency, effectiveness and effectiveness, pillars that guarantee operational competitiveness.

According to Pacheco, A., Mogrovejo, D. et.al.(2024), this conceptual triad is imperative for the optimization of production systems. Its implementation ensures a comprehensive use of inputs, from their reception at the plant to the final delivery to the consumer, guaranteeing that orders are fulfilled accurately and on time. Ultimately, the alignment of these indicators not only improves the traceability of the process, but also facilitates the achievement of the goals and strategic objectives that the organization has set for itself. The description of these indicators is presented in (Fig. 3):

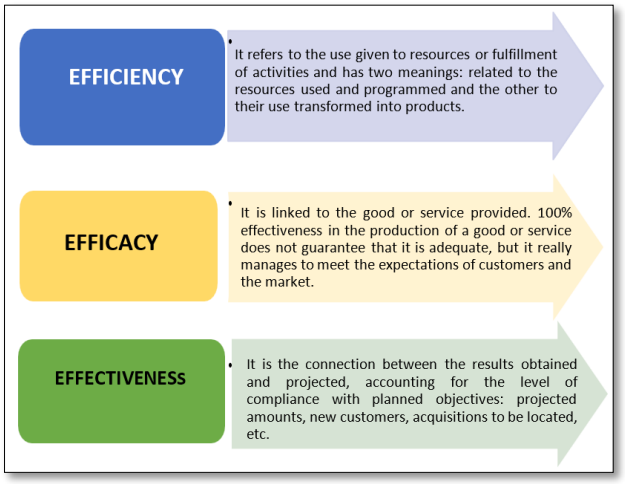

Fig. 3. Production area indicators.
Own elaboration (2026) with information from Criollo, F. (2019).

Continuing with the ideas of Pacheco, A., Mogrovejo, D. et.al. (2024), innovation and quality control are also essential components within process improvement, they must be present at every stage of production, from planning to final delivery for the reduction of costs and times, thus avoiding waste or rework. Lean thinking, on the other hand, offers principles that align with the Scrum philosophy. Womack and Jones (1996) emphasize that all activity must generate value and that those that do not must be systematically eliminated. This logic was applied in the reduction of waste, elimination of downtime and better use of materials. Measurement using quantitative indicators is essential to validate the progress achieved. Hernández Sampieri et al. (2014) indicate that comparative statistical analysis is key to verify the effectiveness of any intervention strategy, especially in organizational settings.

As for the technological synergy between Trello and Scrum methodology, their joint implementation has proven to be one of the most effective strategies. Trello, based on the visual Kanban technique, enables unprecedented visibility into workflow (WIP), making it easier to track tasks and assign responsibilities in real-time. By integrating Trello with Scrum, organizations achieve (See Table 2):

Table 2. Collaborative Work: Scrum Methodology and Trello Digital Tool

Management by Sprints:	Operational Transparency	Synchronous Collaboration
Divide production into iterative cycles that allow quick adjustments to unforeseen events.	Digital dashboards act as a "single source of truth," reducing ambiguity and improving operational continuity.	It facilitates communication between multidisciplinary teams, increasing staff autonomy and reducing interpretation errors.

Own elaboration (2026) with information from Trello (Atlassian) (2022)

Finally, the documentation of processes through job manuals and operational guides, added to the use of internal feedback surveys, closes the cycle of continuous improvement. These tools ensure that strategic planning is realistic, consistent with human capital capabilities, and aligned with senior management objectives.

T

ogether, both the Scrum methodology and process optimization offer complementary frameworks that, when integrated, allow for substantial improvements in production results. The combination of agile planning, constant review, team involvement, and quality control represents an effective solution to meet the challenges of today's manufacturing organizations.

2.1. Scrum Methodology

Scrum is an agile methodology widely adopted in software development, but in recent decades it has transcended to other sectors, including manufacturing and industrial production, due to its iterative approach, adaptability to changing contexts, and ability to improve team efficiency. The term "Scrum" was first introduced by Hirotaka Takeuchi and Ikujiro Nonaka in 1986, but was formalized as a framework in 1995 by Ken Schwaber and Jeff Sutherland. Its essence lies in delivering functional products in short cycles (called "Sprints"), based on continuous collaboration between all team members (Schwaber & Sutherland, 2020). The benefits granted by this methodology are (See Table 3):

Table 3: Benefits of SCRUM

Benefits	Improvement Points
Increased productivity	Quick responses to area changes
Improved communication	Improvement in the viability of the tasks performed
Quality improvement	Technologies deployed in large numbers

Own elaboration (2026) with information from Schwaber & Sutherland (2020)

Today, Scrum has established itself as the go-to framework, the effectiveness of which generates full confidence in the optimization of organizational processes. Through its implementation, companies can foster an engaged and proactive work climate, where each team member has a clear and defined role. Scrum operates through three essential pillars: transparency, inspection, and adaptation. These principles guide all of your activities, from planning to the final review of each Sprint. The framework includes clearly defined roles, periodic events, and essential artifacts to ensure continuous delivery of value. This structure favors an empirical approach to project management, which means that decisions are based on direct experience, observation of results, and real-time data analysis.

In (Fig. 4), the roles, artifacts and main events of the Srcum methodology can be seen in a synthesized way:

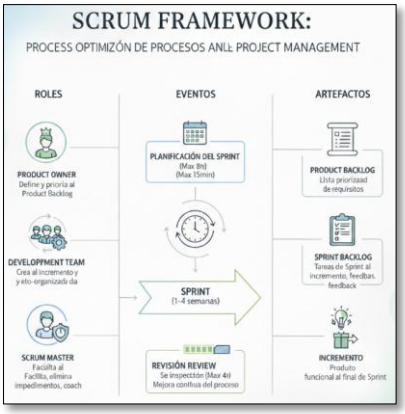

Fig. 4. Transparency, inspection and adaptation: the pillars of Scrum.
Schwaber, K., & Sutherland, J. (2020). NapkinAI. (2026). [Generative AI Model].

Roles of SCRUM

According to the International Software Quality Association (2023), the Scrum framework is articulated through three fundamental roles, whose synergy is decisive for the success of the project. In the first instance, the **Scrum Master** acts as a strategic facilitator and methodological guarantor, ensuring the rigorous adoption of the practices and principles of the model. Their role is to ensure that the team understands and correctly applies the methodology, removing obstacles and fostering a culture of continuous improvement. It is also responsible for promoting internal collaboration and protecting the team from external distractions. For his part, the **Product Owner** assumes responsibility for defining and prioritizing the product requirements, safeguarding the business vision and maximizing the commercial value delivered. It manages the "Product Backlog", prioritizes tasks and acts as a bridge between the client and the development team. It has the global vision of the product and sets the priorities for each iteration. Finally, the **Scrum Team** is constituted as a multidisciplinary and self-organized unit of professionals, empowered to transform requirements into high-quality functional product increments.

In (Fig. 5), you can see in a summarized way, the characteristics that the professionals who support the main roles must possess to carry out the Scrum methodology:

Scrum Roles

Characteristic	Product Owner	Scrum Master	Development Team
Responsibility	Maximize product value	Facilitate Scrum process	Deliver functional increments
Key Actions	Manages Product Backlog	Removes obstacles	Self-organized
Communication	Bridge between client and team	Promotes collaboration	Autonomous
Vision	Global product vision	Fosters continuous improvement	Cohesive

Fig. 5. Characteristics of Scrum professional profiles
International Software Quality Association. (2023). NapkinAI. (2026). [Generative AI Model].

SCRUM Artifacts and Events

Within the Scrum framework, artifacts are not mere control documents, but vehicles designed to maximize transparency and provide opportunities for inspection and adaptation. According to Schwaber and Sutherland (2020), each of these elements

contains a specific commitment that reinforces quality and focus on the end goal. Table 3, shows the three key artifacts of the methodology and their respective descriptions:

Table 3. Scrum Artifacts: Product Backlog, Sprint Blacklog, and Increment

Product Backlog	Sprint Backlog	Increase
It represents the single, orderly source of all the work needed for the product. This device is dynamic and constantly evolving to reflect the needs of the market. Effective Product *Backlog* management requires a continuous refinement technique, where the highest priority elements are detailed more accurately to ensure strategic alignment and technical feasibility.	It is composed of the Sprint Objective, the set of Product Backlog items selected for the current cycle, and an action plan to deliver the Increment. It is a plan created by and for Developers, which encourages self-organization and real-time visibility into progress towards the goal. It allows the team to maintain an absolute focus on delivering value without the distractions of unplanned external requirements.	It constitutes the concrete step towards the Product Objective. For an increment to be considered valid, it must strictly comply with the Definition of Done, ensuring that it is a functional and potentially deliverable piece. The accumulation of these increases reduces the risk of deviation in complex projects and optimizes the return on investment through frequent, high-quality deliveries.

Own elaboration (2026) with information from Schwaber and Sutherland (2020) and Cohn (2010)

On the other hand, events in Scrum are designed as critical checkpoints for inspection and adaptation. As established by Schwaber and Sutherland (2020), these events constitute blocks of time (*time-boxes*) that seek to minimize the need for meetings not defined in the framework, thus optimizing operational efficiency. Each has a defined purpose and limited duration:

- Sprint Planning: Decides which tasks will be addressed in the Sprint. The objective of the Sprint is defined, how the tasks will be performed are discussed and the success criteria are clarified. Effective planning not only clarifies the criteria for success, but acts as a catalyst for motivation by aligning the team towards a shared Sprint Goal.
- Daily Stand-Up: A short meeting (maximum 15 minutes) where each member reports what they have done, what they will do, and the obstacles encountered. This event improves team synchronization and allows for immediate adjustments.
- Sprint Reviews: The results of the sprint are presented to stakeholders for feedback. It is an opportunity to inspect the product and adapt it to new market or customer conditions.
- Sprint Retrospective: An internal team meeting to identify strengths, weaknesses, and improvement actions for the next cycle. It promotes organizational learning and the development of collective competencies.

In short, the Scrum framework transcends conventional management to consolidate itself as an example of efficiency in the optimization of production processes. Its value proposition is differentiated by a rigorous and dynamic operational architecture, articulated through iterative cycles called Sprints, which guarantee a constant delivery cadence. This structure is reinforced by an unambiguous assignment of responsibilities through their fundamental roles and a governance based on harmonious events that allow for technical analysis and critical evaluation of each phase.

Ultimately, Scrum's true competitive advantage lies in its ability to develop a participatory organizational culture. By empowering teams to decide how to carry out their work, a sense of ownership and responsibility over results is generated. This has proven to have a positive effect on team morale and performance.

The synergy between Trello and Scrum

In its initial stages of commercialization and adoption, Trello was used almost exclusively by engineering and software development teams to manage iterative programming cycles using agile methodologies, particularly Scrum. According to the creators of this methodology, Schwaber and Sutherland (2020), the success of a project depends on empirical pillars such as transparency and inspection. Trello provided the ideal platform for these teams to visualize the "Backlog" and "Sprint." However, due to the extreme flexibility of its architecture based on the triad of boards, lists, and cards, its use quickly transcended the programming niche and expanded into general project management in various industries. It has historically been employed as a centralized "information radiator," where all hierarchical levels involved in a project visualize the same progress status in real time, breaking down traditional communication silos and democratizing operational information within companies.

The implementation of technological tools such as Trello in the manufacturing industry in Mexico represents a critical step towards operational digitalization, allowing agile methodologies such as Scrum to be executed with greater precision and transparency, allowing an effective transition towards operational digitalization and the optimization of production processes.
Trello is defined as a collaborative visual management platform based on the paradigm of operational digitalization, being the technological evolution of classic industrial methodologies such as the Kanban system developed by Taiichi Ohno for Toyota.

By integrating Trello with Scrum, manufacturing companies in Mexico can materialize fundamental pillars such as transparency and inspection.

The success of an agile project requires that the artifacts be transparent to those who perform the work and those who inspect it. Trello facilitates this transparency through boards where columns represent the status of the product increment, categorized from Product Backlog to Done. The adoption of this tool in Mexican plants helps to overcome the "sequential relay" approach that, according to Takeuchi and Nonaka (1986), tends to slow down innovation and generate conflicts with speed and flexibility objectives. Instead, using Trello encourages a global approach, where the production team acts as an integrated unit that shares information in real-time, removing departmental barriers.

One of the greatest benefits offered by Trello in the Mexican work context is the reduction of cognitive friction; This means, according to Norman (2013), that the Trello interface possesses "functional attributes," which they clearly and visually suggest how it should be used, which reduces the learning curve, without the need for extensive training that consumes time and resources; it also operates as a Single Page Application (SPA), ensuring that changes are synced in the background without reloading the page (See Fig. 6). This is vital on the shop floor, where the fluidity of information prevents interruptions in communication and saves operational time.

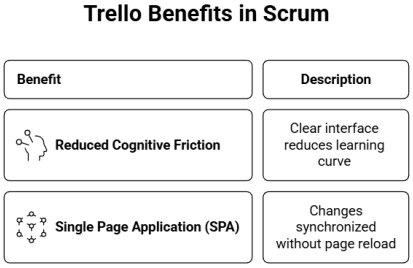

Fig. 6. Benefits of the Trello platform as a Scrum auxiliary technology tool.
NapkinAI. (2026). [Generative AI Model].

In conclusion, the use of Trello as a Scrum support in Mexican manufacturing not only digitizes the workflow, but also democratizes operational information and optimizes the use of the company's assets, ensuring impeccable traceability and continuous improvement in productivity.

3 Methodology and data

This research was carried out in the company **Multideportes Pachuca S.A. de C.V.**, located in the city of Pachuca de Soto, capital of the state of Hidalgo, Mexico (See Fig. 7). This organization is mainly dedicated to the manufacture and marketing of customized sports uniforms for school institutions, sports teams and private companies. Founded in 2011, the company has experienced a constant growth in the demand for its products, which has brought with it a series of operational challenges that directly affect the efficiency and quality of its production processes. The company's structure comprises five key processes: fabric selection, cutting, sewing, ironing and packaging; which were the object of analysis and intervention in this research.

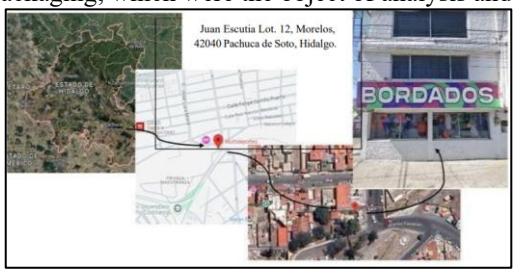

Fig. 7. Location of Multisports, Pachuca de Soto, Hidalgo.

The target population of the study was composed of the 16 workers in the company's production area, who perform direct functions in the five key processes, mentioned above. Given the size of the unit of analysis, it was decided to apply a census-type study, which allowed the participation of all workers in the data collection and in the subsequent implementation of the Scrum methodology. This methodological decision guaranteed complete coverage of the phenomenon under study, avoiding sampling biases and strengthening the validity of the results obtained.

Table 4. *Delimitation of the study population*

Key processes	Employees	Age 21- 35	Age 36 - 51	Female	Male
Fabric selection	2	2	0	2	0
Cutting	3	3	0	2	1
Preparation	5	0	5	3	2
Design	3	0	3	1	2
Ironing & Packaging	3	3	0	2	1
Total	**16**				

Own elaboration (2025)

The research is based on a methodological design of mixed approach, which integrates quantitative and qualitative dimensions to favor a triangulation of data that guarantees a holistic vision of the phenomenon and a rigorous evaluation of the impact of the intervention. By its nature, the study is defined as applied research, aimed at solving a factual problem in an industrial manufacturing environment. Likewise, a non-experimental, cross-sectional design was adopted, oriented to the collection of data at specific moments before and after the implementation of the Scrum framework, without the deliberate manipulation of independent variables. To obtain information, a "questionnaire" type data collection instrument was designed: "Production Area: Your opinion counts", whose structure is made up of 48 items, organized in a thematic section that addressed the different aspects of the production process. Among the dimensions evaluated were: internal communication, task planning, operational efficiency, waste levels, downtime, quality of supervision, use of tools, organization of space, teamwork, staff satisfaction and suggestions for improvement. A two-step procedure was applied for the validation of the data collection instrument. In the first, the Content Validity Ratio (IVC) method was used, where 3 teaching experts in the area of economic-administrative sciences evaluated each of the 48 items in terms of: clarity, coherence and relevance; In the second, a pilot test was carried out, distributing the instrument in a small population of 10 workers who represented the key areas of production and 16 students of the Administration career. As a result of the piloting, drafting errors, redundant response options and terminological barriers were identified and corrected. After making the adjustments derived from the two stages, the final version of the instrument was drafted, which presents a structure adapted to the context of the unit of analysis, thus ensuring its validity and reliability in data collection.

The statistical analysis was carried out using the SPSS (Statistical Package for the Social Sciences) software, which allowed the organization, processing and analysis of the data obtained in a structured way (See Fig. 8). Through this program, frequency tables, comparative graphs, and measures of central tendency were generated, which facilitated the interpretation of the findings. Triangulation of quantitative and qualitative data strengthened the reliability of the results and the validity of the study's conclusions.

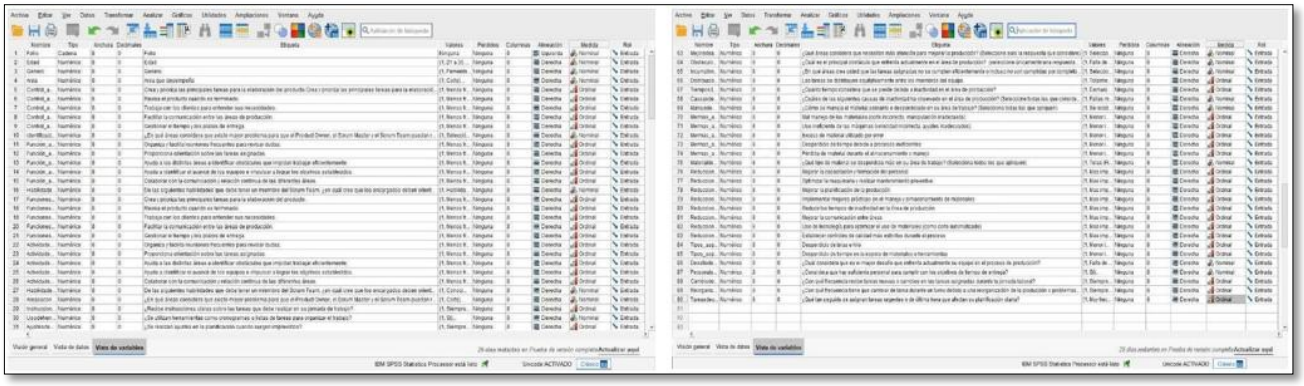

Fig. 8. Data collection and information processing instrument with SPSS (2025)

Below is the matrix that indicates the detection of internal and external problems, derived from the first application of the instrument in its diagnostic phase (See Fig. 9). From this, the design of various strategies aimed at helping in the solution of problems is proposed, which are part of the Trello virtual assistance tool based on the application of the scrum methodology.

Weaknesses	Threats
1. Internal communication. Lack of clarity in the assignment of responsibilities and poor coordination between teams. **2. Job roles** Lack of clarity of job roles Inefficiency of the Scrum Master in problem solving Little leadership from the Scrum Master **3. Downtime** No employee involvement in goal setting **4. Assignment of tasks.** Unequal distribution of work, generating overloads in some areas and downtime in others. Lack of software for task control and production monitoring. Lack of meetings for the assignment of tasks. Little training of employees in terms of defining the work activities they must carry out. Delays in the execution of activities. **5. Losses.** Inefficient use of materials that increases production costs. **6. Distribution of tasks.** There is no follow-up or feedback on the review of work tasks. Inefficient distribution of the workload. **7. Efficiency.** Poor workflow organization, affecting production and customer satisfaction.	Companies in the sector have adopted advanced technologies to improve efficiency and costs. Preference for companies with Flexible production and delivery times fast. Direct impact on the costs of production and profitability of the company. Difficulty in hiring staff trained in Efficient textile processes.
Strategies to implement: Scrum and Trello methodology	
1. Internal Communication Implementation of Daily Stand-ups with a Scrum Master to improve communication. **2. Job roles** Implementation of weekly meetings with the Scrum Master and the Scrum Team to clearly define the roles and responsibilities of each employee and address any problems and complaints that may arise. Use of digital tools such as Trello to track tasks. **3. Downtime** Conduct surveys where employees can express their opinions on the goals that will be set, the challenges they perce the areas where they feel they can contribute the most. **4. Task assignment** Prepare guides with clear descriptions of the functions of each job. Use the Eisenhower matrix technique (Divides tasks into categories such as urgent and important, important, but im but important). not urgent, urgent but not important, and neither urgent nor important). **5. Shrinkage** Weekly meetings to detect waste patterns. Creation of a bank of reusable materials. **6. Distribution of tasks** Use the digital tool Trello for project management and distribute tasks in a balanced way. Implementation of more detailed production schedules. Process evaluation using productivity indicators. Use of the Product Backlog to list and prioritize production tasks. Weekly workload monitoring using Sprint Reviews. **7. Efficiency** Establish a seamless workflow.	Negotiation with multiple suppliers to Diversify sources of supply. Inventory optimization with prediction based on historical data. Use of lower-cost alternative materials, but of equal quality. Expansion into online sales channels for reach more customers.

Fig 9. Results of the diagnostic study: Weaknesses, threats and strategies to be implemented (2025).

Development and Application Phase of Intervention Strategies: Scrum and Trello

The execution of the project was articulated in three fundamental stages: the diagnostic phase, the development and implementation of intervention strategies. During these last two phases, the critical indicators of the process were addressed in a systemic way: internal communication, definition of roles, downtime, assignment of tasks, shrinkage, distribution of activities and operational efficiency. To this end, strategies based on the Scrum framework were designed and implemented, using the **Trello** platform as a technological support for visual management and monitoring of workflows.

The following is the correlation matrix that articulates the problems detected, the intervention strategies implemented and their respective link with the variables and measurement indicators (See Fig. 10):

PHASE: DEVELOPMENT AND IMPLEMENTATION OF INTERVENTION STRATEGIES	PHASE OF DEVELOPMENT AND APPLICATION OF INTERVENTION STRATEGIES VI1-SCRUM VD1-Optimization of production processes			
	No.	**Problem**	**Estrategy**	**Indicator**
	INTERNAL COMMUNICATION			
	1	Lack of clarity in the assignment of responsibilities and poor coordination between teams.	Implementation of Daily Stand-ups with a Scrum Master to improve communication.	Roles Internal Communication
	JOB ROLES			
	2	Lack of clarity of job roles.	> Implementation of weekly meetings with the Scrum Master and the Scrum Team to clearly define the roles and responsibilities of each employee and address any problems and complaints that may arise. > Use of the digital tool Trello for task tracking.	Roles Downtime
	3	Inefficiency of the Scrum Master in solving problems.		
	4	Little leadership from the Scrum Master.		
	TASK ASSIGNMENT			
	5	Lack of clarity of the work roles and activities to be carried out.	Prepare guides with clear descriptions of the functions of each job.	Roles Task assignment Product Backlog
	6	Lack of software for task control and production monitoring.	Use of Trello digital tool for task tracking.	
	7	Lack of meetings for the assignment of tasks.	Implementation of weekly meetings with the Scrum Master and the Scrum Team to clearly define the roles and responsibilities of each employee and address any problems and complaints that may arise.	
	8	Little training of employees in terms of defining the work activities they must carry out.		
	9	Delays in the execution of activities.	Use the Eisenhower matrix technique (Divide tasks into categories such as urgent and important, important but not urgent, urgent but not important, and neither urgent nor important).	
	SHRINKAGE REDUCTION			
	10	Inefficient use of materials that increase production costs.	> Weekly meetings to detect waste patterns. > Creation of a bank of reusable materials.	Product Backlog Sprint Planning Shrinkage
	DISTRIBUTION OF TASKS			
	11	Lack of follow-up and feedback on the review of work tasks.	Process evaluation using productivity indicators.	Roles Product Backlog Revision del Sprint Sprint Planning
	12	Inefficient distribution of the workload.	> Use the digital tool Trello for project management and distribute tasks in a balanced way. > Implementing more detailed production schedules. > Using the Product Backlog to list and prioritize production tasks. > Weekly workload monitoring using Sprint Reviews.	
	DOWNTIME			
	13	No employee involvement in goal setting	Conduct employee satisfaction surveys to gather feedback on sprint goals.	Sprint planning Downtime
	EFFICIENCY			
	14	Poor workflow organization, affecting production and customer satisfaction	Establish a seamless continuous workflow	Sprint planning Efficiency

Fig 10. Correspondence matrix of the Design and Development Phases: Strategies, Variables and Indicators (2025).

Twelve intervention strategies were designed and executed based on the Scrum framework, integrating Trello as a fundamental technological support. In the following section, the articulation of these strategies aimed at solving the problems identified is detailed. They are briefly explained below:

Strategy 1	*Implementation of daily meetings (Daily Stand-Ups) with Scrum Master for the improvement of internal communication.*
Problem:	*Lack of clarity in the assignment of responsibilities and poor coordination between teams.*

The implementation of daily meetings was one of the first strategic actions to improve internal communication within the production team. These brief meetings, held every morning before the start of the activities, brought together all the personnel involved in the different areas of the company: fabric selection, cutting, sewing, ironing and packaging.

During each session, workers shared what they had done the previous day, what they planned to do during the day, and mentioned any obstacles that were preventing them from making progress in their tasks. This simple, yet structured format made operational issues that previously went unnoticed quickly visible.

As a result of this strategy, a 43.7% improvement was achieved in the perception of workers regarding internal communication. Information flows became more efficient, conflicts between areas decreased, and the team developed a greater sense of shared responsibility. The meetings also strengthened the culture of collaboration and helped align staff with the goals of each weekly Sprint.

Strategy 2	*Use of the digital tool Trello for task tracking.*
Problem:	*Lack of technological tools for task control and production monitoring.*

The use of Trello as a digital tool for tracking operational tasks was implemented. Digital boards were set up where the activities of each Sprint were visualized, dividing the columns into pending, in process and completed tasks (See Fig. 11). This platform was chosen for its ease of use, accessibility from mobile devices, and potential to improve traceability.

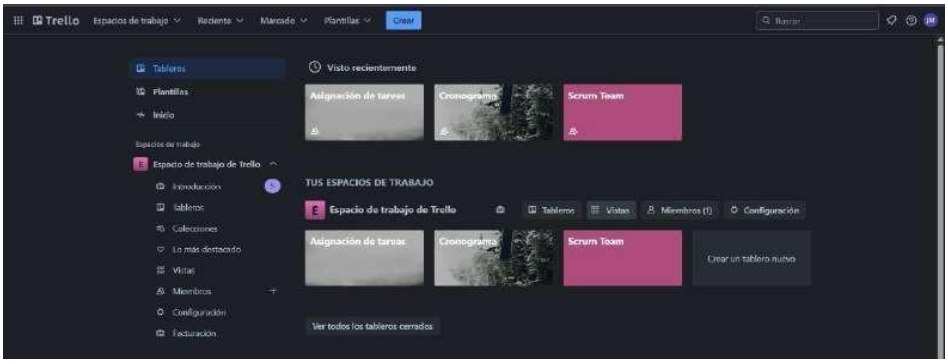

Fig. 11. Task Tracking 82025)

Customized digital dashboards were implemented by functional area, ensuring universal access to the platform for operational personnel (See Fig. 12). This structure allowed each employee to monitor their assignments, identify priority hierarchies, and understand their linkage within the systemic value stream. In addition, the integration of deadlines, categorization tags, and feedback channels facilitated real-time, multi-directional feedback.

Fig. 12. Task Tracking (2025)

With this strategy, a 38% improvement in task control and a 41% improvement in delivery times were achieved. The team increased their productivity by having a clear view of their responsibilities, avoiding confusion, repetition, and incomplete tasks. In addition, the Scrum Master could monitor the team's progress and make corrective decisions based on up-to-date data.

Strategy 3:	*Weekly meetings to detect patterns of waste of materials: shrinkage.*
Problem:	*Inefficient use of materials that increases production costs.*

To reduce material waste, weekly meetings focused exclusively on the identification and analysis of waste were implemented. These sessions reviewed production records, analyzed areas with the highest scrap rate, and discussed errors that contributed most to losses, such as inaccurate cuts, manufacturing defects, and errors in material selection (see Fig. 13).

These meetings involved both operational and administrative staff, fostering interdisciplinary collaboration in the search for solutions. Proposals for improvement were put forward and then tested in the following Sprints.

Fig. 13. Product Backlog: Using Trello (2025)

Similarly, a team responsible for the analysis and monitoring of waste was designated, using the digital notion tool, as can be seen in (Fig. 14).

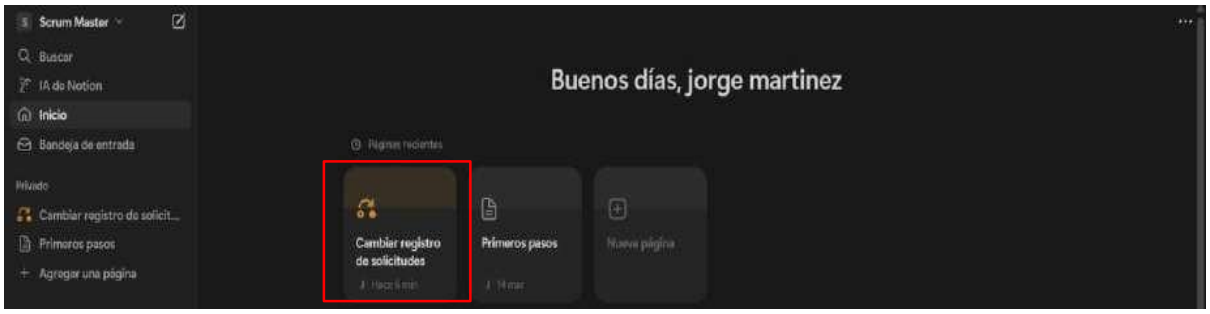

Fig. 14. Product Backlog: Notion (2025)

Thanks to this strategy, a 62.5% reduction in material waste was achieved, cutting practices were standardized, personnel were trained in waste reduction techniques, and awareness was raised about the importance of efficient use of inputs. The information obtained in these meetings also fed the Backlog with specific tasks aimed at reducing losses.

Strategy 4:	*Creation of a bank of reusable materials.*
Problem:	*Inefficient use of materials that increases production costs.*

A physical space within the plant was allocated to collect, classify and store materials that were previously discarded, such as fabric scraps, surplus supplies and components with minor defects (See Fig. 15). This bank of materials was managed by a person in charge who ensured order, labelling and proper disposal for reuse. The bank of reusable materials was managed through the Notion platform, which sought to centralize, catalog and facilitate access to scraps of fabric, leftover threads, unused accessories and other supplies that were previously discarded or stored in a disorganized manner. The personnel of each area were trained in the use of the platform to record the materials that remained as surplus from their production processes.

Fig. 15. Material Bank (2025)

These materials were used in the creation of samples, sewing tests, prototypes of new models or parts of lower commercial value. Procedures were developed to record what type of material entered, its condition and its possible subsequent use. This strategy generated a use of 45% of the reusable resources that were previously considered as a loss. In addition to reducing environmental impact and costs, the initiative promoted a more responsible mindset towards the use of resources and reinforced the team's commitment to more sustainable production.

Strategy 5:	*Use of the Product Backlog to list and prioritize production tasks.*
Problem:	*Inefficient distribution of the workload.*

The Product Backlog was implemented as a visual and physical organization tool within the production area. A board was created where all the tasks needed to meet the weekly goals were listed. These tasks were prioritized according to their importance, urgency and dependence on other activities.

These lists of tasks were managed weekly by the Scrum Master together with the area managers, who reviewed the progress and adjusted the execution sequence according to the operational priorities. Trello was the platform of choice to digitize backlogs, which allowed for a clear and collaborative visualization of assigned tasks (see Fig. 16).

Each card in the Backlog represented a task, including information such as responsible, estimated time, materials required, and acceptance criteria. This visualization allowed the entire team to have clear guidance of what needed to be done, in what order, and with what priority.

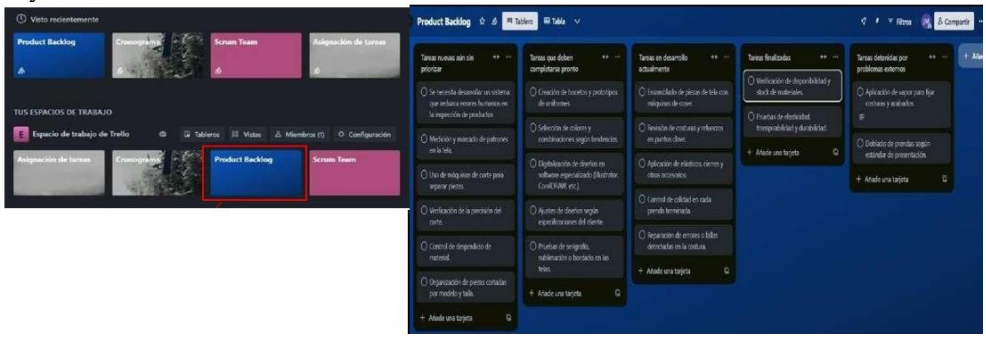

Fig. 16. Product Backlog Prioritization and Task Distribution (2025)

With this strategy, an improvement in the planning and organization of work was achieved, increasing the volume of tasks managed by 150%; likewise, errors due to misallocation of activities were reduced, bottlenecks were avoided and compliance with the objectives defined for each Sprint was improved. The Backlog also made it easier to track progress and detect lagging tasks early.

Strategy 6:	*Weekly workload monitoring using Sprint Reviews*
Problem:	*Inefficient distribution of the workload.*

Weekly review meetings called Sprint Reviews were implemented, where compliance with the goals set in each work cycle was evaluated. The activity consisted of a scheduled meeting of the entire production team, coordinated by the Scrum Master, in which weekly progress was analyzed, blockages were identified and workloads were adjusted equitably. All team members participated in these sessions, in order to review completed tasks, analyze those that remained pending and discuss the causes of delays or failures.

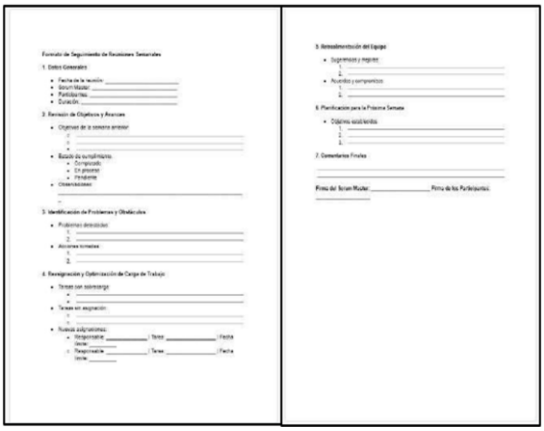

Fig. 17. Sprint Review: Weekly Meetings (2025)

Documents printed from Google Docs (See Fig. 17) were used, allowing real-time visualization of the progress of each task. Indicators such as workload per person, task completion rate, and obstacles encountered during the week were evaluated. The data collected was analyzed by the Scrum Master, who then redistributed tasks based on the capabilities and availability of each employee.

This strategy allowed for more effective workload monitoring, detecting overloads, bottlenecks, or areas with poor performance in time. Thanks to this, tasks were redistributed equitably and objectives were readjusted according to the real capacity of the team. A reduction in downtime and the use of human resources was optimized. Likewise, a space for active feedback was generated among the team members, who were able to express proposals for improvement and provide support to the most loaded areas.

The constant application of this practice contributed to the reduction of the perception of the "Excessive Workload" of work by 66.7%, thanks to the balanced distribution of activities. It also generated a formal space for the recognition of effort, the identification of good practices and the formulation of commitments for the next Sprint.

Strategy 7:	*Use Trello for project management and balanced distribution.*
Problem:	*Inefficient distribution of the workload.*

In addition to task tracking, the benefits of the Trello platform as a planning tool for general project management were used. Boards were created organized by functional areas, with specific lists for cutting, sewing, packaging and quality.

The use of Trello made it possible to clearly visualize the distribution of tasks within the teams, ensuring that the workload was equal and avoiding overload or inactivity. For its implementation, digital boards were created organized by projects or departments (See Fig. 18), in which each task is assigned a person in charge, a due date and a progress status. Each task was categorized into three possibilities: pending, in progress, and completed.

Fig. 18. Sprint Planning: Task Tracking (2025)

In (Fig. 19), it can be seen how each task was assigned according to the profile and experience of the personnel, seeking to avoid saturation or underutilization of human resources. Limits were set per column (WIP - Work in Progress) to prevent unfinished tasks from accumulating. Team leaders review the distribution of tasks weekly to avoid overloads.

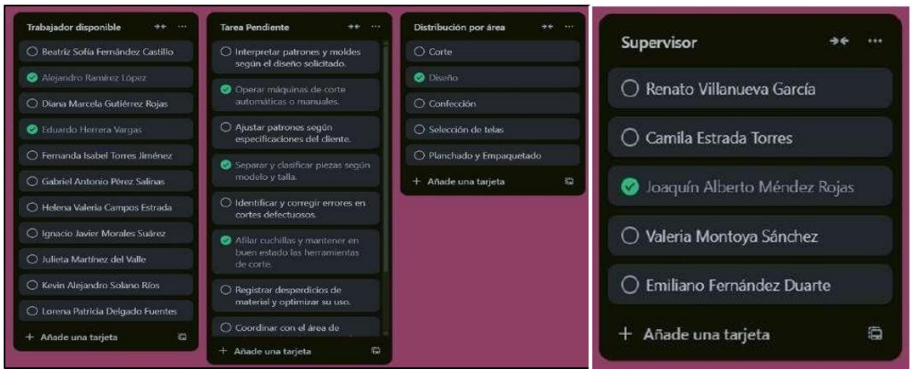

Fig. 19. Sprint Planning: Worker Profile (2025).

Team leaders conducted daily reviews of the dashboard to ensure balance in workload. In addition, staff were trained on the proper use of Trello, ensuring their active participation in updating the status of tasks.
This strategy contributed significantly to the 80% improvement in overall production efficiency. Clarity on responsibilities was increased, conflicts due to duplicate tasks were eliminated, a more balanced management of time and available resources was promoted. It also contributed to improving coordination between teams, reducing idle time and increasing individual responsibility for the assigned objectives.

Strategy 8:	*Implementation of more detailed production schedules, using Trello.*
Problem:	*Poor workflow organization, affecting production and customer satisfaction.*

Detailed timelines were drawn up for each Sprint, using the Trello platform as the main planning tool. The schedules contain the specific dates, estimated times per task, those responsible, necessary resources and dependencies between activities. These were designed in conjunction with the team, taking into account the goals of the Product Backlog and the actual availability of resources (See Fig. 20).

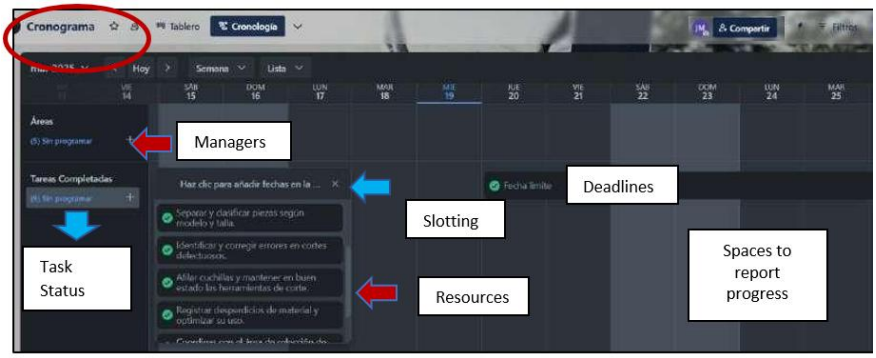

Fig. 20. Production Schedules (2025)

Each task was organized chronologically and realistic deadlines were set based on the team's historical performance. Assignees were assigned by activity and automatic reminders were activated to alert about upcoming deadlines. In addition, spaces were included to report progress and record any incident that could delay compliance with the schedule.

As a result, a 41% improvement in delivery time was achieved. The pressure on supervisors was also reduced, as the team had clear planning and could self-regulate more effectively; it also made it possible to anticipate bottlenecks, optimize workflow and improve punctuality in product delivery.

Strategy 9: *Preparation of guides with clear descriptions of functions by area.*
Problem: *Lack of clarity of the work roles and the work activities to be carried out.*

Guides - operating manuals were produced, with detailed instructions on the specific functions of each position on the production line. These documents included daily activities, standard procedures, quality criteria, estimated times, safety precautions, and sequential steps to properly execute tasks.

Subsequently, the implementation of the function guides was carried out using the Notion platform (See Fig. 21). The Product Owner in collaboration with the Scrum Master, held departmental briefings to explain the structure and content of the guides, and employees were encouraged to review them and provide feedback through Notion's feedback feature. This review stage allowed us to identify areas for improvement and ensure that the descriptions were understandable and accurately reflected the reality of daily work.

Fig. 21. Job Roles (2025)

The guides were distributed in printed format and also placed on workstations. In addition, explanation sessions were held to ensure that all workers understood and applied the information correctly.

This strategy led to a 39% improvement in understanding about the execution of functions. It facilitated the training of new employees, reduced reliance on direct supervision, and promoted operational autonomy.

Strategy 10: *Using the Eisenhower Matrix to Prioritize Tasks.*
Problem: *Unequal distribution of work, generating overloads in some areas and downtime in others.*

The Eisenhower Matrix was implemented as a strategic time management and task prioritization tool, it sought to provide a structured framework for employees to discern the importance and urgency of their daily responsibilities, thus contributing to a better understanding of their roles and the efficient flow of activities.

The team was trained to apply the Eisenhower matrix as a decision-making tool in task prioritization. This matrix divided the activities into four categories: urgent and important, important non-urgent, urgent not important, and neither urgent nor important; as can be seen in (Fig. 22):

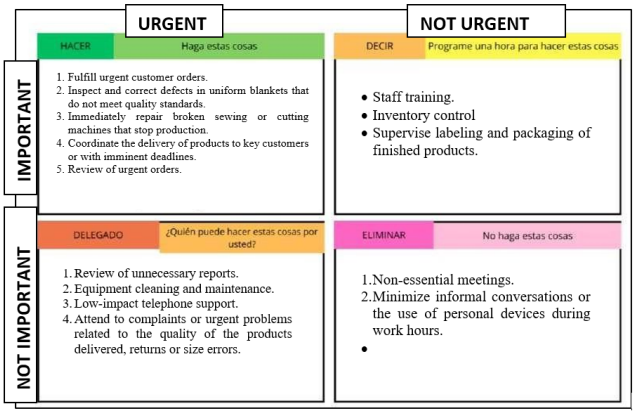

Fig. 22. Eisenhower Matrix (2025)

With this classification, it was possible to focus efforts on the most relevant tasks and postpone or eliminate those that generated little value. It was mainly applied at the beginning of each Sprint, during planning sessions, and also as a guide to respond to unforeseen events during the week.

Thanks to this strategy, a 43% improvement was achieved in the prioritization of activities and time management. Workers reported reduced stress from task accumulation, as well as greater clarity on which activities to tackle first.

Strategy 11: *Conducting employee surveys on Sprint goals.*
Problem: *No employee involvement in goal setting.*

Brief surveys were applied to the staff at the end of each Sprint to know their perception regarding the clarity, realism and relevance of the weekly goals (See Fig. 23). The surveys were anonymous and analyzed together during the retrospective meetings. Once the information was collected, a quantitative and qualitative analysis of the data was carried out to detect patterns, identify adjustment needs and propose improvements to the established goals. The results were presented to the team during the planning meeting for the next sprint, where possible adjustments were discussed based on the feedback received. This feedback was key to adjusting the focus of the following Sprints. Goals that were unrealistic or poorly understood were identified and redesigned with greater team involvement. Participatory leadership and the culture of active listening were also reinforced.

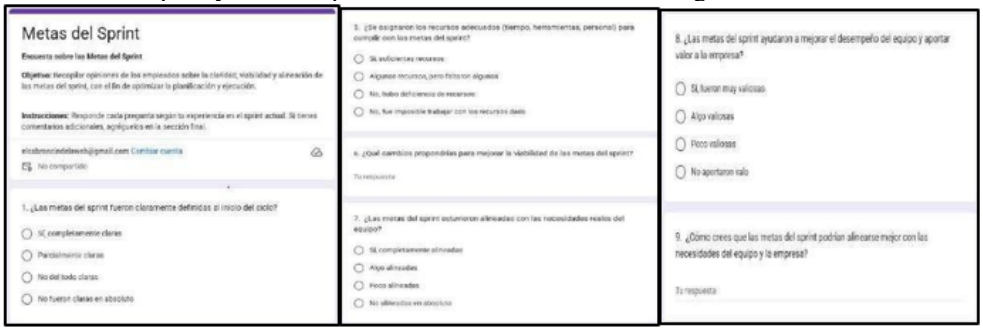

Fig. 23. Sprint Goals (2025)

This strategy contributed to a 35% improvement in the alignment between the goals set and their practical execution. The team felt more valued and committed to the project's goals.

Strategy 12: *Establishing a seamless workflow.*
Problem: *Poor workflow organization, affecting production and customer satisfaction.*

Fig. 24. Control in the Workflow (2025).

A strategy was implemented aimed at establishing a continuous workflow within the company's production area. The activity focused on identifying the critical points where frequent interruptions occurred, through direct observation and brief interviews conducted by the Scrum Master during the working day (See Fig. 24).

Based on the findings, the sequence of tasks was reorganized and fixed times for meetings were established, avoiding unscheduled interruptions. Structured operational breaks were also defined for the preparation of reports, in order to avoid spontaneous interruptions in the middle of the production process. The entire production processes were mapped to identify points where frequent interruptions occurred. Then, protocols were designed to avoid unnecessary pauses, such as guaranteeing the supply of materials in advance, establishing coordination between areas and defining those responsible for resolving blockages.

The concept of continuous flow was promoted, ensuring that each stage of production received and delivered its share without delays or accumulations. In addition, visual indicators were installed to monitor the status of the flow in real time. (See image 23). This strategy contributed to a 44% improvement in operational continuity. In addition, production gained stability, minimizing downtime and strengthening the company's overall productivity.

4 Analysis of results

The analysis of the results obtained after the application of the Scrum methodology in the production processes of Multideportes Pachuca S.A. de C.V. demonstrates a significant improvement in the key indicators defined in the research hypotheses. Through the implementation of twelve practical strategies, organized around the Scrum structure, measurable advances were achieved that positively transformed the internal functioning of the company. Below, (Table 5), shows the indicators associated with the research problem, indicating the before and after of each of them. The percentages of improvement were obtained through proportional differential calculations, through the following formula:

$$\text{Percentage of improvement} = ((\text{Initial Value} - \text{End Value}) / (\text{Initial Value})) * 100$$

Table 5. Analysis of indicators Optimisation of production processes: Before and after the intervention

Dependent variable:	**Optimization of production processes**		**Proportional differential**
Analysis indicators	**BEFORE**	**AFTER**	**IMPAT**
Internal Communication	Employees' perception of communication: top-down, bottom-up, and horizontal using Likert scale (E,B,R,M,P) "Poor" category: 75% (12 workers) Category "Regular":0% (0 workers) Category "Good" 25% (4 workers)	Employees' perception of communication: top-down, bottom-up, and horizontal using Likert scale (E,B,R,M,P) "Poor" category: 6.2% (1 workers) "Regular" category 25% (4 workers) Category "Good" 68.7% (11 workers)	A 43.7% increase in the perception of "Good" was achieved Rate of Improvement: The group of workers who evaluate communication as "good" had a growth of 175%, achieving that 68.7% of workers are located in this category.
Task assignment	Total volume of tasks: 3 group tasks + 1 individual task Ratio per worker: 4 tasks/16 workers: 0.25 tasks per employee	Total volume of tasks: 7 group tasks + 3 individual tasks Ratio per worker: 10 tasks/16 workers: 0.62 tasks per employee	An overall increase of 150% in the volume of tasks was observed managed and 133% in group tasks.
Material Waste: Shrinkage	The frequency of occurrence of loss of materials was 8 pieces every 2 activities	The frequency of occurrence of loss of materials is 3 pieces every 2 activities	Initial Loss: 8p Final Loss: 3p Absolute difference: -5p (savings) Percent Improvement (Reduction) 62.5%
Perception of the Distribution of Task Loads	Employees' perception of "Workload Distribution" is: Category "Excessive" 75% (12 Workers) "High" category: 12.5% (2 workers) "Normal" category: 12.5% (2 Workers)	Employees' perception of "Workload Distribution" is: "Excessive" category 25% (4 Workers) "High" category: 25% (4 workers) "Normal" category: 50% (8 Workers)	Reduction in employees' perception of the "Excessive" category 66.7% (Saturation) Improvement in the "Normal" category 300% (Well-being)
Downtime	Employees' perception of downtime: "High" category (+40 min) 43.7% (7 workers) "Moderate" category: (29 to 40 min) 43.7% (7 workers) "Low" category (0 to 19 min) 12.5% (2 workers)	Employees' perception of downtime: "High" category (+40 min) 25% (4 workers) "Moderate" category: (29 to 40 min) 56.3% (9 workers) "Low" category (0 to 19 min) 18.7% (3 workers)	"High" category: inefficiency is reduced by 43% of employees who perceive "Excessive" downtime "Moderate" category in displacement with 28.57% "Low" category: visible improvement in productivity. A 50% increase in the number of workers with minimum downtime.

Own elaboration (2025)

In (Table 6), the general impact on the indicators that measure efficiency in the production area of the analyzed company can be seen, calculating the average overall improvement, obtaining the following:

Table 6. Overall Efficiency Analysis

Overall Efficiency		
Indicator	**Effect achieved**	**Upgrade**
Productivity (Task Assignment)	Increase	150%
Quality (Loss Reduction)	Reduction	62.5%
Time use (decrease in "high" category of inactivity)	Reduction	43%
Distribution (Reduction of excessive loads)	Reduction	66.7%
Average Improvement = (150 + 62.5 + 43 + 66.7) /4 = **80.5%**		

Own elaboration (2025)

5 Conclusions

The following are the most relevant conclusions derived from the implementation of the Scrum methodology and the accompaniment of Trello, on the indicators of the variable: Optimization of production processes in the company Multideportes Pachuca S.A. de C.V., highlighting the measurable effects achieved based on the analysis of data obtained before and after applying the intervention strategies:

Improved internal communication

One of the main problems identified at the beginning of the project was poor communication between production team members. The strategy based on daily meetings (Daily Stand-Ups) and the use of the digital tool Trello as a coordination board made it possible to improve interaction between areas, to follow up on activities in a timely manner and to clearly share the progress and obstacles of each worker. As a result, a **43.7% improvement in the perception of internal communication** flows was achieved, which significantly reduced errors due to misunderstandings, improved the organization of tasks and strengthened collaboration between teams.

Downtime

The company faced multiple interruptions during its production day due to lack of coordination, material absences, and disorganization in the assignment of activities. By implementing more detailed production schedules and establishing a continuous workflow, **downtime for the "high" category was reduced by 43%.** Tasks were scheduled efficiently and each area knew its deliverables and schedules, which avoided unnecessary delays and allowed a constant pace of production to be maintained.

Reduction of material waste: waste

Material waste was one of the main sources of loss for the company. Through weekly meetings to detect waste patterns and the creation of a bank of reusable materials, it **was possible to reduce material waste by 62.5%,** this being one of the most notable results of the project. This improvement was achieved by identifying recurring errors in the cutting, sewing, and material handling processes, and by implementing concrete corrective actions that were continuously monitored. In addition, a culture of use and responsibility for the use of inputs was fostered.

Improved task assignment and distribution

Before the implementation of the project, the distribution of tasks was disorganized, which generated overload in some workers and low productivity in others. It was possible for 8 workers to get out of an "excessive" perception in their distribution of workloads. Although the volume of tasks managed increased by **150%,** half of workers (50%) now feel that their workload is "normal" and the perception of **"Excessive" was reduced by 66.7%;** This could be explained by the move to 7 group tasks, allowing the individual load to be diluted. Thanks to tools such as the Product Backlog, the Eisenhower matrix and visual management in Trello, the planning and distribution of tasks was improved. Now, activities are assigned based on the skills, availability, and workload of the staff, which generates greater efficiency, balance, and clarity in individual and collective responsibilities.

Increased overall efficiency

Overall, the application of the 12 intervention strategies generated a direct impact on productivity (tasks), an optimization in the use of materials (reduction of waste), a reduction in downtime and an improvement in the balance of workloads, thus achieving an average increase in overall efficiency of more than **80**% (See Table 7). At the same time, after the intervention, the fulfillment

of the objectives and achievement of weekly goals is observed, the team demonstrated a greater capacity for self-management and adaptation, which reduced the need for constant supervision and raised the morale of the staff.

Other scopes:

- The fulfillment of weekly objectives went from 60% to 85%, which reflects a significant improvement in the planning and execution of the Sprints.
- The bank of materials made it possible to obtain a use of 45% of the reusable resources. There is no precedent.
- The use of detailed schedules contributed to a 41% improvement in delivery times, because each task was planned in terms of date, estimated duration and defined responsible, which favored the operational organization.
- A 43% improvement in the prioritization of activities was achieved through the implementation of the Eisenhower matrix, which made it possible to strategically address urgent and important tasks, optimizing time management and reducing operational stress.
- Understanding of how to execute the functions of each area was improved by 39%, thanks to the development of job guides and manuals that made it possible to standardize procedures and facilitate the training of new personnel.
- The alignment between Sprint goals and their actual execution increased by 35%, as a result of applying internal surveys to adjust weekly objectives based on the team's perception and capacity.
- Strategies associated with the reorganization of task sequences, establishment of schedules, reporting and process mapping, protocol design; Together, they enabled a 44% improvement in operational continuity.

All these improvements were possible thanks to the correct execution of 12 strategies structured according to the principles and artifacts of the Scrum methodology, which made it possible to transform the way in which productive tasks were planned, supervised and executed. The strategies with the greatest impact were the implementation of the Product Backlog, the continuous workflow, monitoring through Sprint Reviews and digital management with Trello, which offered measurable and replicable results.

The Scrum methodology encouraged staff participation, strengthening the autonomy of the teams and creating a culture of continuous improvement and feedback. Regarding the work environment, workers said they felt more listened to, organized and motivated. The perception of equity in the workload, clarity in their tasks and the fulfillment of goals improved significantly during the intervention period. It was proven that it is possible to adapt Scrum to a manufacturing company, even without a complex technological structure, prioritizing communication, iterative planning and constant review of results.

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