RELIABILITY IN A BEVERAGE INDUSTRY:

The Impact of Data Science in OEE
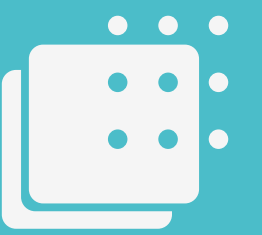
ST-One

CHALLENGE:

The factory felt the need to add external information, such as the type of beverage in production, to the data provided by the machinery since the same line can run different recipes.

SOLUTION:

The Solution embraces the installation of ST-One® Hardware in the machinery for the collection of data produced by the line. Subsequently, START™ is used to classify the main variables used in the production process and, with the help of STRUCT™, these are managed and assigned the appropriate skills. Finally, the data is made available on a dashboard in the STASH Platform™, in a dynamic and intelligent way.

VALUE DELIVERED:

◆ 10% improvement in line efficiency;

◆ 16% increase in the operational quality of the equipment;

◆ Increased reliability of the data collected;

◆ Time savings with the automatic registration of variables;

◆ Easy access to information recorded in a secure cloud structure;

> "In addition to easy access to historical database information, the ST-One™ Solution brought us the security and reliability necessary to make assertive decisions based on the data produced by our production line.
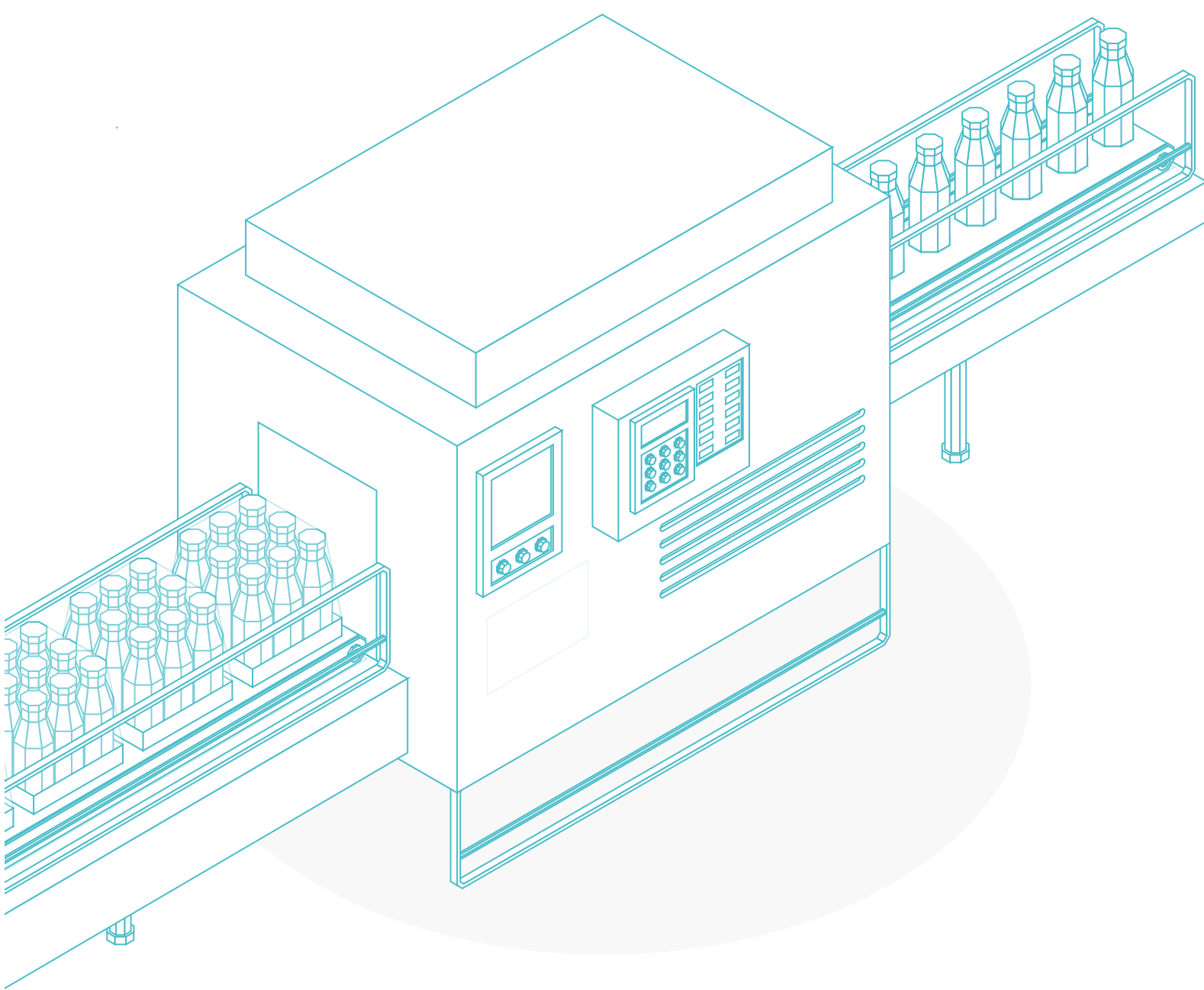>
> The platform's flexibility even allows us to add information external to the machines to the total productivity calculation."
>
> - Manufacturing Specialist
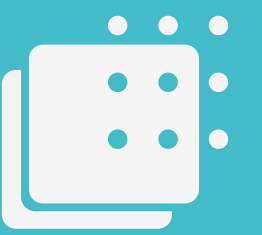
OVERVIEW

The client is one of the largest bottling companies of a multinational in the beverage industry, responsible for approximately 70% of its Brazilian distribution.

Its soft drink production in this country is notable, with 13 factories throughout the country.

The factory in question has production lines capable of producing several different types of carbonated drinks. These production lines include machines such as depalletizers, fillers, warmers, packers and palletizers. Monitoring indicators such as temperature, pressure, and energy consumption of the machines is essential for carrying out quality control.

Tracking these metrics also contributes to predictive maintenance of the equipment and aggregating them helps in the creation of strategies that aim for maximum efficiency.

The project began after the plant compared and realized, using its own system, that the lines were running at different production speeds.Even with manual monitoring, and with the support of some digital tools, the potential to increase production capacity through the ST-One™ Solution was perceived, as well as the opportunity to discover the reason for the low total production performance.

One way to monitor production efficiency is through the calculation of OEE. From this result, it is possible to quickly identify points for improvement and implement continuous improvement methodologies, based on the data-driven decision-making process.

To meet the demand, the OEE application, included in the ST-One™ Solution, was implemented. To measure production efficiency, it is necessary to take into account more than just the data extracted from the available PLCs. The Solution has a functionality that allows the addition of information – in a personalized way, with particular characteristics of each type of form – such as alerts.
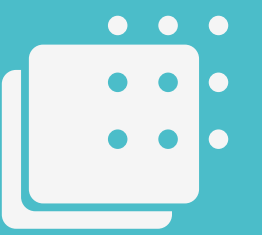
OVERVIEW

By aggregating all the relevant data from each line, whether extracted directly from the machinery or added manually, OEE calculations could be done in a comprehensive and complete way.

In addition to the common challenges faced in the day-to-day operations of the production line, the factory in question had equipment without network configuration, which required greater technical skill for data extraction and integration of these with the rest of the information base.

Before the ST-One™ Solution, the registration of information was done manually. Data was collected hourly by the employees and transcribed at the end of the day in a digital system. Also, specifically for the production

process of these carbonated beverages, it is necessary to classify all line interruptions as either micro or macro stops (below or above 10 minutes).

> Due to the high complexity of extracting and compiling all the necessary information from the production lines, the plant search for solutions that could provide reliability and double-checking of data collection.

In this context, it was also the plant's objective to understand the impact and reasons behind micro and macro stops, as well as their frequency and other aspects of their behavior.
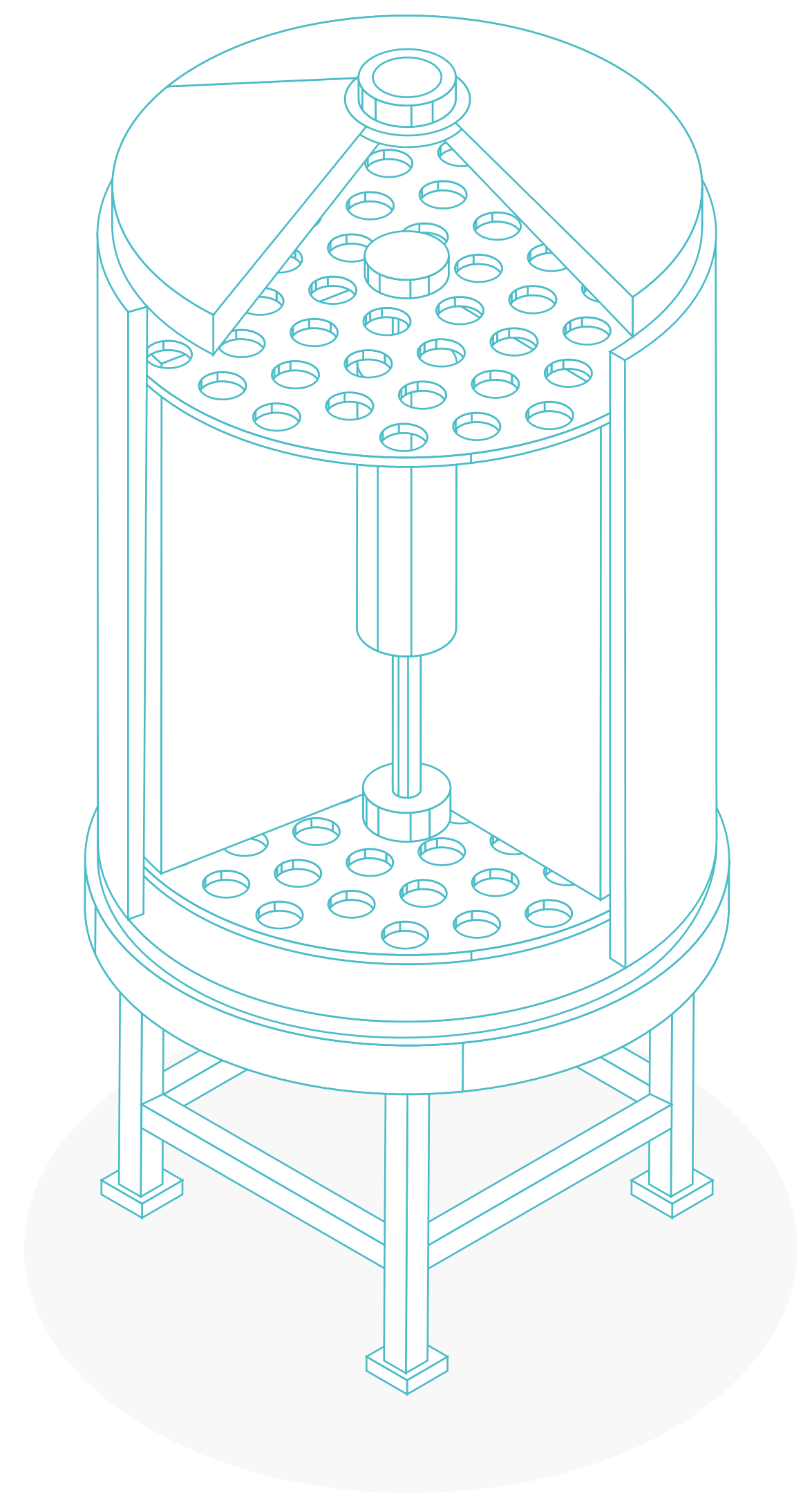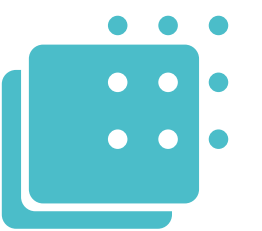
PART II

ST-ONE DEPLOYMENT

The ST-One™ Solution was installed to transform the manual data recording process and obtain a reliable data history, used as a basis for decision-making and implementation of new strategies aimed at increasing OEE. This Solution relies on data collection through the ST-One® Hardware, which, in this factory, was connected directly to the PLC of each machine. It also allows clustering, using intelligent algorithms, from START,™ and identifies the most relevant variables with STRUCT™.

In addition, it is possible to explore the data collected through dashboards created instantly by the Data Explore functionality, or to customize alerts configured for specific dashboards and setpoints through the STASH Platform™.

Employees were already immersed in a data-driven culture, so the implementation and incorporation of the Solution into the factory's day-to-day operations happened with greater receptivity. After the ST-One team understood the process, both parties worked together to identify the best indicators to be calculated and monitored.

Within just one week after installation, the collected data was already available for visualization. The installed ST-One® Hardware was used to collect the status data of each machine that made up the line. The flexibility of the Solution, increased by the ability of the dashboards to incorporate variables external to the machinery and the possibility of changing the visualization of graphs when necessary, was a key differential.

With the platform, the factory can capture a greater breadth of information and indicators, such as the specification type of revenue that will be produced by the line, machine status, hourly production quantity, total production in a given selected period, nominal and configured speed, and average unit/hour.

PART II

To make this transition, data scientists mapped all the formulas present in the spreadsheet tool used, and then moved them to the platform. One of the factory's purposes was to be able to check the progress of the OEE calculation when necessary. To this end, during the installation process of the Solution, a functionality integrated with the Stash™ Platform was developed, capable of absorbing information external to the machinery, as pointed out by the employees themselves, with dynamic access through the cloud.

This is because data such as the type of recipe that will be processed by the line during a certain time are indispensable for measuring production efficiency, as there are characteristics of each recipe that are included in a complete calculation such as OEE. The different types of notes that can be filled in – such as automatic stop record, loss of cadence, net and gross production, and type of revenue – serve as support for monitoring the behavior of the line, making this process more detailed.

The automation in the process of collecting and recording data also contributed in the accurate analysis of the line's performance. This is because, in the analysis of downtime, the platform can separate the interruption time caused by failures from the ramp-up time, which is the period of gradual increase in production until it reaches its full capacity.

Before the implementation of the Solution, this required

greater effort, as the ramp-up time is very short, resulting in a reduction in cadence.

In addition, this feature has had a positive impact in different ways across several areas. By analyzing indicators such as MTTR (Average Time to Repair) and MTBF (Average Time Between Failures), it is possible to implement improvements in the maintenance area.

This is because the shorter the time recorded between failures, the greater the indication of equipment problems, which can cause unscheduled stoppages. By analyzing the average repair time, it is possible to develop strategies to optimize this process, in addition to identifying existing patterns.
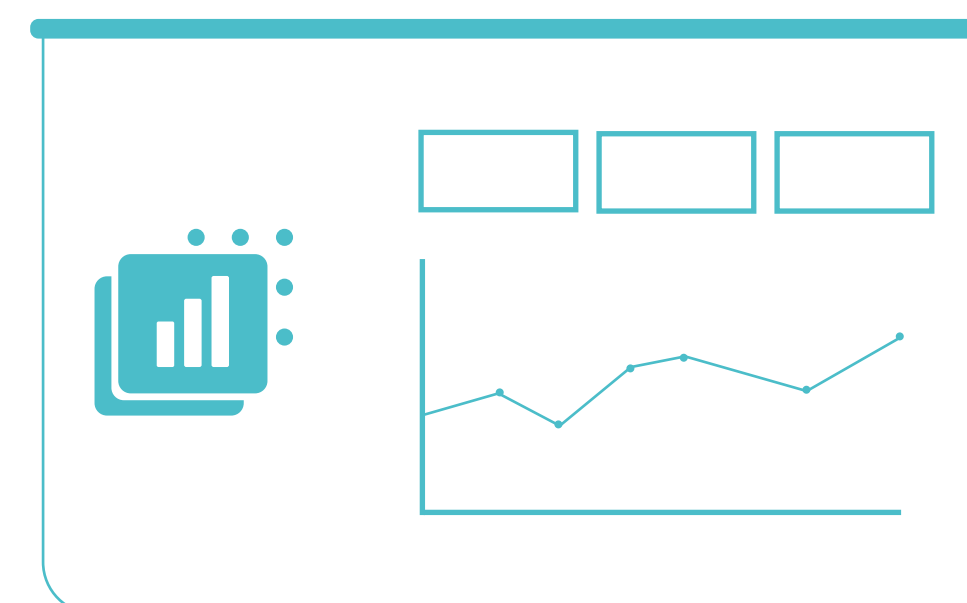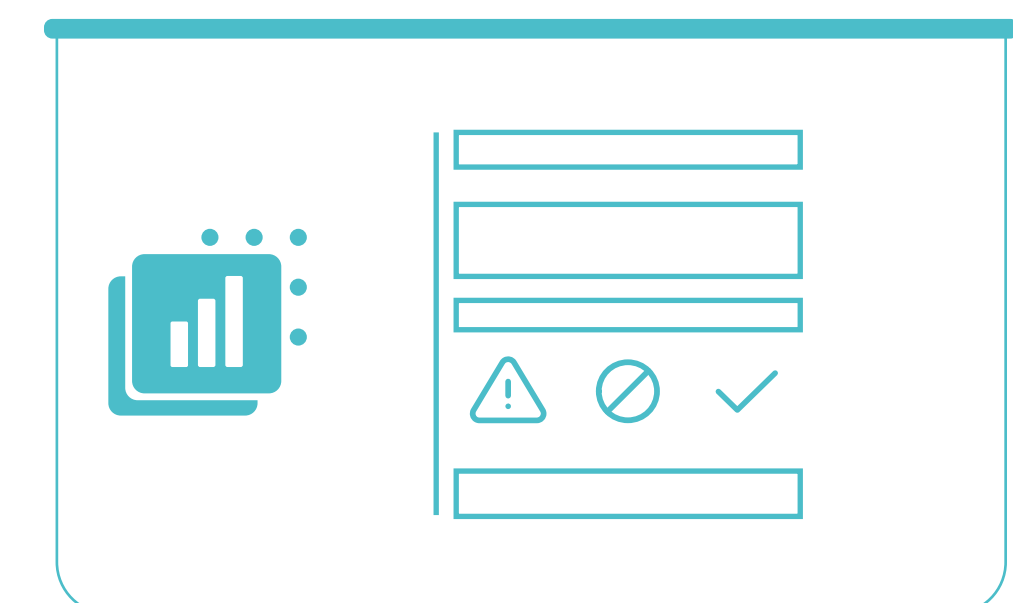

Illustration:
Automatic input

Illustration:
Manual input

Finally, the factory now has personalized alerts for any issues that go beyond the expected status of the equipment. This visibility results in several improvements.

PART III

VALUE
DELIVERED

VISIBILITY OF MACHINES

TIME AVAILABILITY

INCREASE IN QUALITY

DATA RELIABILITY

+10%
LINE EFFICIENCY

Using the data science implemented by the ST-One™ Solution, it was possible to increase the reliability of the data collected.

Through the historical record of indicators related to the status of the machinery, the factory achieved a **16% increase in the operational quality of production.** This means that the line was able to run for more hours in a row without experiencing any stoppage.

This improvement was due to the ability to quickly failures on the line through personalized alerts and patter identification, which enable the implementation of a predictive maintenance process.

By recording information such as downtime in an automated way, there is less risk of human error, which increases the **reliability of the data** collected. With this accurate data, the factory was able to reallocate costs and expenses focusing on a process of continuous improvement.

Additionally, the platform guarantees quick and easu access to information from anywhere. The ability to view data in real-time resulted in a shorter delay in checking the information. Previously, the line supervisor checked the data once a day, but with the Solution, this is now done in shifts, reducing the intermission from 24 to 8 hours.

This means that, in addition to providing real-time visibility for the line operator, the platform also assists at management levels.

The flexibility provided by the new functionality integrated into the Stash™ Platform allows employees to add information external to the machinery to perform the OEE calculation by the algorithm.

By making this process more complete, the line achieved **a 10% improvement in its efficiency.** This happens due to the mapping of all aspects of the production line, which makes the decision-making process more precise.

Finally, the exchange of line data technology resulted in further **time savings.** Data culture is essential for industries seeking an accurate and reliable process for analyzing information from the factory floor.

Through the partnership between the manufacturing industry experience and the expertise of the data scientists, it was possible to improve the OEE calculation and increase the efficiency of the line.

ST-One

UNLOCKRESULTS

ST-One was founded with the purpose of transforming the industry to a new leap of productivity.

The science developed by ST-One is improved with each new challenge, and makes it possible for the digitalization, present in different types of industry, to reach the next stage of connectivity and intelligence.