

1. Challenger companies

Ameztoi Anaiak, Bodegas Elosegui, Café Fortaleza, Galletas Artiach, Frutas Iru

2. Challenge

How can we connect all the elements of a factory to determine its productivity and be able to manage it in real time? How can data from different types of industrial equipment be extracted, stored and monitored in a uniform and centralised way?

3. Possible applicable solutions

- Data visualisation platforms
- Big Data to gather and structure the information
- MES/MOM systems for production control

4. Background:

For years now, the transformation of the Basque food industry has sought to reduce its environmental impact and generate less waste. Accordingly, implementing digital technologies is generating many opportunities for improvement in companies; those have allowed, inter alia, the quality and traceability management systems to be modernised, and meant better food safety of the products manufactured and/or packed at their facilities.

Furthermore, the ability to **quantify and analyse the variances in the variable costs related to the raw material, workforce and energy used in the production processes** has become essential for the challenger companies.

Identifying and assessing the underlying causes of those variances in monetary terms have emerged as a critical **target in the optimising of efficiency and profitability** in the food supply chain.

This is particularly critical in a context in which food consumption is being affected by inflation and rising interest rates, and where the food industry must be able to **minimise costs to continue being competitive**.

On the other hand, and in a subsequent phase, **integrating factory requirements with the needs of demand** must be addressed. Accordingly, not having accurate information on the productive capacities not only conditions productivity, but also the different management cycles, such as purchasing, supplies or sales.

The challenger companies thus aspire to continue improving and to be able to tackle the different problems set out in the above section. It is therefore essential that they begin to **capture and manage all the data that they generate in their production processes**, in order to convert the data into knowledge and to be able to make decisions in the future based on reliable and objective information.

5. Sub-challenges and targets

Before considering the different challenges in detail, it should be noted that these companies are at different stages of digitalisation. That implies that some of them are operating with advanced and connected machinery and technologies, and that, in other cases (not the most

common), the companies are working with more mechanical machinery and technologies, not connected to the ERP, and greatly contingent on the human factor. That means that several companies are working with equipment that lack sensor or data collection systems, and that the productivity can be restricted by the know-how and expertise of the operator (where it is even sometimes measured based on job orders).

On the other hand, and as regards production lines, it should be stressed that there is a myriad of product references and turnover, which implies changes to their configuration; this aspect is particularly important in the packing/bottling/packaging phase. Finally, it should be noted that part of the equipment operates in standalone mode or has different origins and generates heterogeneous data; they are therefore not observed overall. That all results in:

- Lack of knowledge of current real productivity, the idle capacity and the potential capacities of the machines and, to a lesser extent, of the operators
- Lack of control of the critical variables of the production processes.
- Lack of information on the causes for shutdowns
- Need to reorganise production at the plant

Thus, the main goals of applying digital technologies are to:

- Eliminate paper and digitalise the production management tools
- Maximise production and make optimum use** of machines and lines
- Identify and **quantify shortfalls**
- Continuously improve the processes and products**
- Cut manufacturing costs**
- Increase the reliability and **strengthen the quality and traceability systems**, and, therefore increase food safety
- Optimise **production planning**, and stock management

And, therefore, technologies such as the following are envisaged for less advanced companies:

- Sensor systems and IoT applied to machinery for data capturing and platforms for their visualisation
- Big Data platforms for the storage and future processing of data

And, in the case of those companies with a greater degree of digitalisation, the focus is on MEM/MOR systems or other technologies that allow machines, systems, operators and processes to be connected, and thus:

- Control in real time the critical process points (e.g., temperature), by means of which trends and variances from the set nominal will be controlled
- Display the information in real time at the level of the plant KPIs: Quality, Productivity and Costs, per section, line family and product and their variances
- Calculate cost variances by MOD and shortfall (process, overweight and purchase price), along with the cause of the variance in monetary terms
- Plan production predictively and optimise the use of space in plant
- Improve stock management due to better planning