

ARTICLE

Boosting the future of industry: innovation in the area of industrial equipment

- *In a constantly changing landscape of technological innovation and research, development centres are playing an essential role with regard to developing advanced solutions to further industrial progress. For several decades, Tekniker has not only accumulated extensive experience but also in-depth knowledge and a command of a range of technological disciplines that can anticipate and adapt to emerging trends.*

In what is nowadays a constantly evolving technological environment, research and development centres are playing a fundamental role with respect to generating innovative solutions to further industrial progress.

Tekniker's success is based on several decades of experience supported by a solid command of a wide range of technological disciplines. Our capacity to anticipate and adapt to emerging trends is underpinned by solid know-how covering areas such as, among others, precision mechatronics, advanced control and digitisation.

In our industrial environment, no relevance has been lost with regard to mechanics from the innovation perspective thanks to the electrification and "smartisation" of devices as demonstrated by sectors such as transport, energy and manufacturing. Less mature sectors characterised by a strong growth potential are increasingly searching for new developments in areas such as mechatronics.

Consequently, new research and development opportunities are appearing in emerging areas such as astrophysics, aerospace, scientific infrastructures, renewables and biomedicine.

In this ever-changing environment, sustainability is one of the trends that is rapidly gaining ground. The ultimate goal is to innovate with an approach focused on aspects such as part reutilisation, 'Designing for Less' and resource optimisation to minimise environmental impacts.

At Tekniker, an organisation that is fully aware of its environmental commitments, we know that we have a responsibility as a driver for innovation in an attempt to reduce our environmental impact and foster practices that will help to improve the health of our planet.

Another aim is to actively reduce our consumption of natural resources, minimise waste and maximise energy efficiency in all the stages of our projects. We are also looking into alternative manufacturing materials and processes that are more environmentally friendly although never compromising the quality or performance of our products.

Capabilities and constant updates

As our knowledge and capabilities must stand fully in line with the industry's current and future demands, we have to constantly adapt and update.

For projects dealing with scientific infrastructures, for instance, we must possess knowledge related to technologies that can be applied under extreme conditions related to vacuum, radiation, temperature and cleanliness and identify coatings and materials that are compatible with such conditions. As regards biomedicine, there are other critical aspects to be borne in mind such as regulations, biocompatible materials and designs adapted to fulfill the specific properties of products used in the medical sector. Leading sectors of this kind enhance our capabilities that must be transferred to other industrial sectors present in our environment.

If we want to be competitive, we must optimise our processes by constantly searching for new ways of improving the efficiency and quality of our in-house developments. Since my early years as a mechanical designer when pantographs were still in use, we have moved towards regenerative designs using AI. Optimisation can be achieved, for instance, by incorporating simulations and analyses to design stages, through collaborative designs that use cloud platforms or by automating repetitive tasks. We could also add product life cycle and data management platforms, CAD-CAM and additive manufacturing to this list.

We believe that a good design must be based on a suitable approach. This does not only mean that requirements must be fully defined, but also that agility and resilience are necessary whenever potential changes must be dealt with. We are currently implementing agile methodologies to produce rapid iterations when addressing possible changes requested by customers or the market. The onset of digitised design and 3D printing capabilities has made

it easier to validate concepts with functional prototypes so that highly valuable information can be incorporated to the initial conceptual stage to adjust requirements as a function of these trials.

Major uncertainties appear in the conceptual stage of a solution. Significant savings could result from spotting biases in the early stages of a project. This approach should not only focus on functionality and performance parameters as aesthetic and ergonomic features must also be addressed to check that products are effective, attractive and easy to use to produce an optimum user experience.

Anticipation, adaptation and specialisation, therefore, are key elements to manage these trends and address innovation challenges properly.

As regards product design and development, everything has to be person-centred. We know that no progress can be made if things are done individually. Therefore, we do not only encourage active actions to be carried out by our team at Tekniker but also by external partners such as companies, universities and other research institutions. We believe in the power of collaborative actions with regard to boosting innovation and materialising our ideas.

One of our strengths is related to Tekniker's diverse capabilities and the support provided by its different technological units to address a wide range of market challenges. Thanks to our structure, we are able to combine research and science profiles with those of other specialists more focused on the industry and this makes it easier to incorporate and apply technology. Our organisation also has cutting-edge infrastructures, specialised equipment and advanced technology.

This does not only place us in an outstanding position in the market but also allows us to offer our customers levels of quality, efficiency and innovation that are difficult to beat.

TITAN: From the conceptual stage to manufacturing

The TITAN machine, a 100% in-house development to be presented by Tekniker at the International Machine Too Biennial 2024, offers a tangible example of the work done by the Design, Manufacturing & Assembly Unit.

This unique additive manufacturing machine can produce large parts using materials such as titanium that needs an inert environment to prevent oxidation. We have created a vacuum environment inside a large chamber that minimises the consumption of inert gas which produces direct benefits for the mechanical properties of the parts to be manufactured.

The key concept that characterises this equipment initially focused on identifying what the market needed: in certain areas such as aeronautics or aerospace for instance, expensive materials are used. This means that the use of raw materials must be optimised during the stage when parts are being produced. We are dealing with parts characterised by complex geometries that are difficult to produce when other more conventional processes are used.

During the subsequent development stage, research actions focused on the process and its requirements. Once project feasibility had been established, the machine was defined and a multi-disciplinary workforce was set up to fully develop the unit based on a number of capabilities available at Tekniker.

To carry out this project in full, we knew that we had to compile knowledge on the process, on the technology and the parameters related to mechanical and electric design issues as well as anything related to the software required to produce vacuum in addition to mechanical simulations and comply with aesthetic design parameters

Once the initial definition stages had been covered, the focus then shifted towards the manufacturing, assembly and commissioning phases. Machine inspections and validations were performed during the commissioning phase to ensure that accuracy requirements were met and that all the components that form part of the machine were operating correctly.

Constant innovation in industrial equipment

Although we are living in a technological environment that is not only constantly evolving but is also influenced by a global market and rapid technological obsolescence, I still believe that we have enough capacity to address these challenges with determination thanks to the support of my highly professional team.

At Tekniker, we are deeply committed to playing our role as leaders with regard to innovating and developing advanced technological solutions that do not only boost industrial innovation

in terms of efficiency, sustainability and execution, but that are also transforming the world into a much more sustainable and prosperous place for future generations.

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