



## NTN-SNR, INNOVATION AS AN ENGINE OF DEVELOPMENT

**In light of the many trends that affect the industrial world daily, NTN-SNR, global leader in automotive parts, uses its 100 years of know-how to focus on innovation in order to offer products that always perform better and are more respectful of current and future preoccupations.**

### THE TRENDS THAT INFLUENCE INNOVATION

Innovation policies globally are affected by the emergence of 7 structural trends, called megatrends: environmental change, urbanisation, population growth, rarefaction of resources, connectivity, high-tech, and emerging markets. These key factors, which influence innovation on a daily basis, are constraints that must be integrated to respond to societal developments.

Directly linked to these megatrends, 4 trends that are specific to the automotive industry have emerged: mobility, electrification, automation and digitalisation. The challenges and stakes that they represent are unavoidable for all actors of the industry of which NTN-SNR is a part. To respond to demand, automotive innovation must be focused on electrification, the reduction of friction, making vehicles lighter, developing new sensors, simplifying maintenance and the use of "green materials".

#### KEY FIGURES

- **2021:** 95 g/km of CO<sub>2</sub>, new regulation of average emissions authorised for cars sold by the manufacturers
- **2040:** 67 times more electric vehicles in the global fleet

### INNOVATION AT THE CORE OF NTN-SNR'S DNA

Leader in its market, NTN-SNR has taken the strategic decision to position itself in the premium segment and bet on innovation. In particular, the automotive supplier continues to develop mature technologies like the Gen 3 wheel bearing and the ASB® speed measurement in order to defend its position in this market against new, mostly low-cost market entrants. At the same time, it is also introducing new approaches, like the high-resolution angle sensor for the LIDAR sensors of autonomous vehicles or the pilot sensor of electric motors for different hybridization solutions (48 V and above).

With this strategy, and thanks to the more than **4%** of revenue reinvested every year into R&D, NTN-SNR today is among the global **top 3** OE manufacturers and is ranked the **46th company**<sup>1</sup> for most registered patents, with an average of 35 patents registered per year in France (in all sectors: automotive, industry and aerospace).

#### MOST RECENT AUTOMOTIVE INNOVATIONS

- **2017:** Tensioner pulley for "stop & start" engine, finalist at the "Grands prix de l'innovation d'EQUIP AUTO" innovation competition
- **2019:** Launch of the new compact chain tensioner at the Tokyo Fair
- **2019:** Bearing sensor for electric motors, finalist at the "Grands prix de l'innovation d'EQUIP AUTO" innovation competition

<sup>1</sup> INPI ranking of June 2020

NTN-SNR is also the **2nd Japanese investor**<sup>2</sup> in France. The Product and Process R&D in Europe has **400 employees** working together with the North American and Japanese teams. As the group seeks to maximise the exchange of skills between its different R&D centres, solutions originating in Europe may be industrialised in Japan, and vice versa. The objective is the pooling of know-how and knowledge. **Today 9 out of 10 of the best-selling vehicles** in Europe are equipped with CHASSIS, POWERTRAIN or DRIVELINE products developed by NTN-SNR.

In synergy with the one based in Japan, the European Centre for Research and Innovation located in France enables studying and responding to the needs of this very dynamic market in terms of actors and innovations, particularly in the automobile industry.

## A MULTILEVEL RESEARCH AND DEVELOPMENT STRATEGY

In order to respond to the needs for mobility, electrification, automation and digitalisation in the automobile market, NTN-SNR relies on its know-how to offer new bearings, transmission joints and other modules. Better performing and more environmentally friendly, they enable various measurements that feed into the on-board computers.

### 1. Mobility

In light of the new environmental restrictions facing mobility today, NTN-SNR, the only supplier to design and manufacture wheel bearings and transmission joints within the same group, is working on re-designing wheel assembly, greasing and sealing. Always more reliable, these products will thus satisfy European and global norms aiming to reduce vehicles' environmental impact.

Leader of the "corner wheel" market, the supplier is also rethinking how the suspension buffers come into contact with the suspension spring for optimal functioning. By choosing to introduce an aluminium component, NTN-SNR is responding to requirements both in terms of environmental responsibility and in terms of costs, while simultaneously improving the mechanical performance of the items.

More globally, as part of a drive to become more environmentally friendly, NTN-SNR is reviewing its industrial processes to ensure that they too are environmentally responsible. 99% of waste is recycled at the plants, and non-destructive control methods based on an aqueous product are used, for example.

## E-BIKE

With bearings and sensors similar to cars, the motor of an e-bike is complex and requires both reliable components and precision instrumentation.

Today NTN-SNR provides its high-resolution angle measurement technology, used by the LIDAR sensors in some vehicles, to optimise motor performance of e-bikes.

## 2. Electrification

Conscious of the strong growth of the electric and hybrid markets, but also of the constraints on electric motors and associated reducers, NTN-SNR is developing high-performance bearings that in particular take into account the very high operating speed of the engines and the issues of electric insulation.

At the same time, NTN-SNR is working on diversifying on-board equipment as well as on new architectures with bearings that are increasingly compact and high performing, which allows speed and angle measurements as required by the new engines. Materials and coatings, more or less conductive lubrication, sealing and geometry of the bearing are some of the areas where new ideas are being developed for optimised and reliable electric motors.

## 3. Automation

Autonomous vehicles are a future market of the automotive industry.

As data and telecommunication are at the heart of the operation of this technology, NTN-SNR is now working on mechatronic requirements, in particular for angle sensors or monitoring. NTN-SNR's predictive maintenance offering is based on its ASB® know-how and specific algorithms.

## DIGITISATION: Monitoring

As in all other fields, digitisation has been simplifying everyday life and influencing the automotive sector for many years.

Today NTN-SNT is working on designing a form of monitoring that allows detecting failed bearings in order to facilitate the maintenance of a vehicle or machine.

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<sup>2</sup> BusinessFrance ranking of June 2020

## CRÉA'LAB: AN INITIATIVE FOR INNOVATION

An internal structure for participative innovation, the Créa'Lab launched by NTN-SNR aims to accelerate innovation by supporting employees in developing their creativity and realising their ideas.

NTN-SNR is building an interaction network bringing together NTN-SNR employees, partner companies, public and private laboratories, as well as start-up companies. Créa'Lab leans on this network to enrich and accelerate the maturation of ideas.

For every project, participants from various fields are invited to discuss and provide pertinent and original answers to the posed problem through technique, practice or marketing.

Thanks to the internal provision of financial support and tools, inventors can quickly create models of the proposed solutions with the help of Créa'Lab in order to validate the proof of concept (PoC) during a demonstration session. When a solicitation originates in a client requirement, the client is invited to attend the presentation of the PoC and participate in the validation of the project in order to ensure the most relevant solution possible.

Créa'Lab was created with a real desire to sustain a fast rhythm. No more than 3 months should pass between the start of reflection and the first PoC (proof of concept). Once the PoC has been validated, the design is reviewed to ensure that it is in conformity with the norms of the market.

Several products for the automotive market have already seen the light of day. Créa'Lab supported the inventors of a new family of wheel bearings conceived to improve sealing while reducing friction in order to reduce CO<sub>2</sub> emissions: the low-torque and large-diameter sealing. Other more strategic issues, such as the post-Covid-19, short-term opportunities, have been addressed in order to feed into the reflections of COMEX. A working group consisting of employees from the Process, Product, Applications, Range and Innovation departments, as well as from other group divisions, also looked at how to improve the precision and performance of the last generations of wheel bearings.

Initiated in 2018 with one workshop per month, Créa'Lab has been very successful. In addition to the opening of a physical space entirely devoted to creativity at the NTN-SNR site in Haute-Savoie, the number of creativity workshops has doubled between 2019 and 2020.

## KEY FIGURES

- **3 months** to showcase a working project
- **1st support** for inventors in September 2018
- **More than 100 people** involved in the projects since the launch of Créa'Lab
- **1 to 2 creativity workshops** each month
- **FY 2019:** 10 solicitations, 16 Soleau envelopes, 3 PoC
- **2020:** 4 creativity facilitators

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