# A message for the special issue on “Automotive Products for Electric, Autonomous and Low Fuel Consumption”

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The automotive industry is facing a huge transformation period. All the companies in the world associated with automobiles are in the midst of fierce competition in technology, performance and cost, in an industry which is swept away by the market trend characterized by “CASE,” such as the agreement of controlling global average temperature at the COP 21 Paris Agreement, electrification to improved fuel economy as a response to global warming, autonomous driving providing improved safety and the idea of a shared economy.

We are a bearing manufacturer with 100 years of history since its foundation; however, we have been proactive in advanced development ahead of the market trend so that we can achieve “sustainable growth” and be a “surviving company” into the next generation. The origin of **NTN**’s development is our core competence including tribology technology but we have also expanded our development philosophy from original development to partnership with third parties.

Our foundation is our core competence in tribology. We think that this core competence continuously enhances the companys value when it is applied to new products. In our company, the Advanced Technology R&D Center is in charge of core technology, New Product Development R&D Center is in charge of new product development and the Process Engineering R&D Center is in charge of manufacturing technology. The **NTN** Next Generation Research Alliance Laboratory at Osaka University was founded in 2017 for research of next generation technologies which are expected to grow in the future such as AI and IoT. The **NTN** Next Generation Research Alliance Laboratory is responsible for incorporating those technologies as our new core competence, and for the training of our researchers. In addition, the CAE R&D Center was newly founded in October, 2018. Its purpose is to advance simulation technologies we have been developing to work on tasks such as engineering challenges of all **NTN** groups, faster development/refinement and accuracy improvement. Since simulation technologies are a research area to be further actively pursued, we are continuing our research at the **NTN** Next Generation Research Alliance Laboratory, as well as elevating the applicability of these technologies to our development and using them in our products.

We have also realized vehicle autonomous driving and electrification, with advanced development of module and system products, which increased our value in the industry. Those products include IWM (In-wheel motor systems), among others, such as electrical module products that can be used for electrical accessory devices such as oil pumps, water pumps and vacuum pumps. There are also multifunctional products such as eHUB and sHUB, which consist of axle bearings (our main product), motor and controller. We are also contemplating development of “sensorized bearings” . With the integration of special sensors, we can transform wheel bearing operations offering service solutions such as status monitoring and fault prevention using the output of those sensors and analyzing them with advanced programs equipped with an AI algorithm.

We have been preparing for the drastic transformation of the automotive industry by reorganizing our R&D and production systems. We believe that the success of our challenge of “sustainable growth” and being a “surviving company” depends on how we can achieve competitive products fast, taking advantage of the technologies and know-how accumulated so far. The foundation for this challenge is our mid-term business plan “**NTN**100” of 2015. In “DRIVE **NTN**100” of 2018, we set a plan to promote new products.

We would be grateful if these plans can contribute to further development of the entire industry.