

Nitin Pai

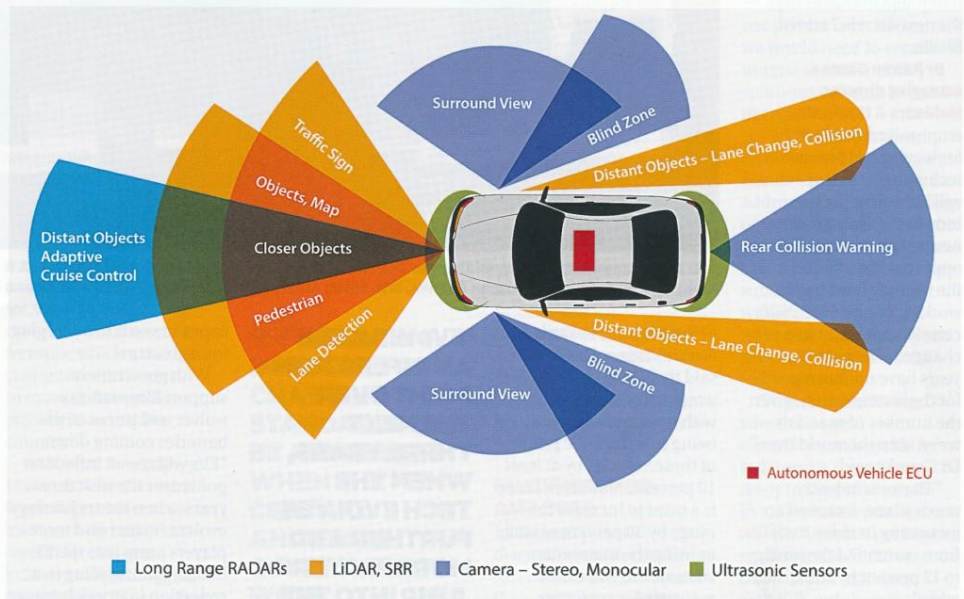
Automotive contributes to around 50 percent of business to **Tata Elxsi**, which works with 14 of the top 20 global OEMs and 35 of the top 50 suppliers. **The senior vice-president (Marketing and Strategy)** reveals how the company is deploying artificial intelligence to develop solutions for OEMs and suppliers, new trends in India and globally. An interview by Nilesh Wadhwa.

What are the new areas in the automotive sector where Tata Elxsi's products and solutions have application?

Tata Elxsi offers end-to-end design, engineering, automotive electronics and software system design services for the automotive industry. Currently, we are focussing on the following three broad areas:

Connected cars – Here, Tata Elxsi mainly focuses on two key segments – In-Vehicle Infotainment (within the car) and telematics and V2X (the car and its behaviour with the external environment). Tata Elxsi has also developed an integrated eCockpit solution, which enables ECU consolidation. To enhance the existing system further, we have done significant research and investment on development of secured gateways, multi-modal HMI, OTA solutions, prognostics and diagnostics and AI-based personal assistants for cars.

Driverless cars – We have been working on driverless car solutions for the past few years now and have come up with our own intelligent autonomous vehicle middleware platform called 'Autonomai' – an AI-based solution. This platform's sensor fusion algorithm combines inputs from Lidar and other sensors and leverages AI and deep learning to come up with various use-case



scenarios of driverless cars. We have recently licensed this software to a global Top 5 OEM and field trials are currently ongoing in Europe.

We also have ready-to-deploy ADAS algorithms such as 3D-Surround View System, Camera Monitoring System and Driver Monitoring System and more, which address the current need of L1, L2 and L3 levels of autonomy.

In order to test whether Autonomai functions as per requirements and expectations, we have also developed 'V Drive' – Tata Elxsi's IP solution that provides a complete lab-based environment

Advanced autonomous vehicle middleware platform 'Autonomai', with deep learning and AI capabilities, is designed to help OEMs and system suppliers build, test and deploy customisable autonomous vehicle applications.

'WE HAVE READY-TO-DEPLOY ADAS ALGORITHMS WHICH ADDRESS THE CURRENT NEED OF L1, L2 AND L3 LEVELS OF AUTONOMY!'

validation of autonomous driving and ADAS algorithms.

Electric + Hybrid – For electric and hybrid vehicles, Tata Elxsi has been at the forefront of hybridisation and electrification projects with leading OEMs and suppliers. This includes software, system development and validation for battery management system (BMS), charging systems, hybrid control units, range extenders, DC-DC converter, inverters and more. We have developed a modular and scalable BMS software with optimised cell-balancing system that

can address all the future electrification needs. We are also working on an automated e-mobility HILS for validation of EVs.

With our design and technology capabilities, Tata Elxsi is uniquely placed to address these areas effectively and offer integrated solutions to OEMs and Tier 1s.

In June 2017, the company had signed a licensing and integration support deal for Autonomai with one of the largest global OEMs for their driverless car program. What is the status on this and have you got more users for Autonomai?

The development of

Autonomai, our trademark software stack, was initiated three years ago. This was when we decided to invest in our own software. It is a fully autonomous middleware platform, which was launched last year and has been licensed to one of the top five automakers globally. While we work with other customers too, this is our flagship client.

As mentioned earlier, currently, this automaker is running the prototype solution on test tracks in Germany, and the solution will be ready to be on roads in a few months.

What is the contribution percentage-wise between the automotive and non-automotive business? And at what rate is the automotive business growing?

The automotive segment is one of the core focus areas for Tata Elxsi and it is also the top revenue generators for the company. Tata Elxsi's automotive business contributes to about 50 percent of the company's revenue.

Who are your major clients in the automotive space (OEMs, Tier 1, Tier 2)?

The automotive segment is one of the core focus areas for Tata Elxsi and it's also the top revenue generators for the company. We have a strong portfolio of clientele in this segment; as we are bound by very strict NDAs, we would not be able to

'WE ARE ON A PROGRESSIVE PATH TOWARDS DEVELOPING A FULLY AUTOMATED, 100 PERCENT ACCURATE HMI AND AN AUTONOMOUS CAR PROTOTYPE SOLUTION.'



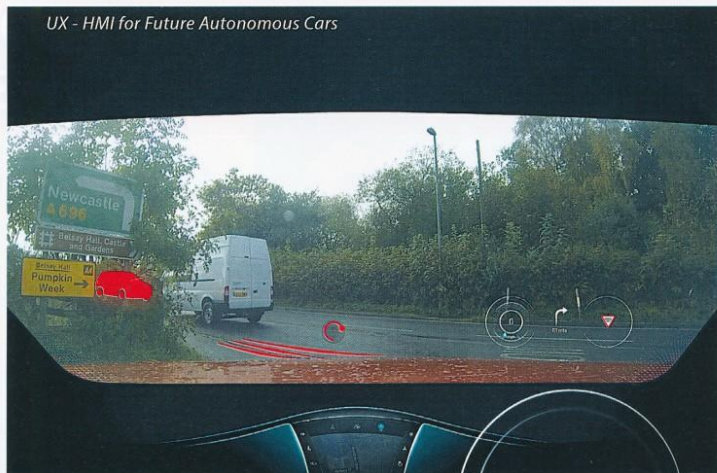
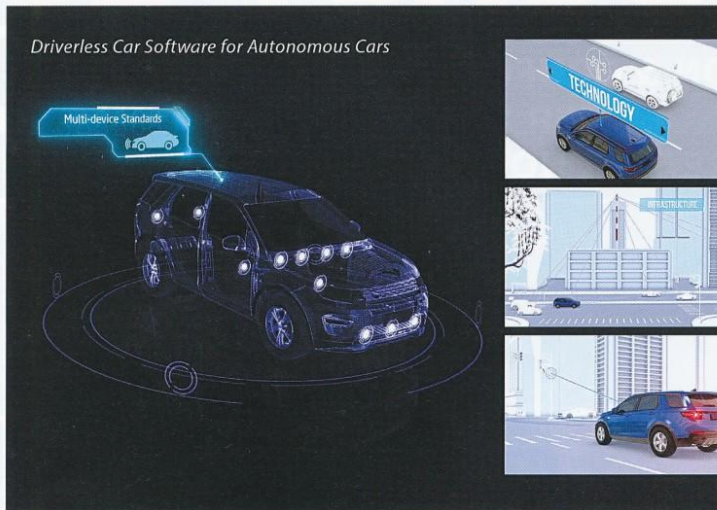
name our major clients. Having said that, it would be interesting to note that in the automotive space, we work with 14 of the top 20 OEMs in the world, and in the case of suppliers, we work with 35 out of the top 50 companies. Also, about 90 percent of our revenues come from overseas. Therefore, we are truly a global organisation with a global clientele.

Tata Elxsi started working on HMI and autonomous driving technology at a very early stage. What has been the progress thus far and how do you view the road ahead?

We have been leveraging our integrated design and technology capabilities to help automotive brands to create great user experiences against a background of increasing complexity to connect with customers. Today, mobility is all about personalisation and customisation. We have designed and developed an innovative next-gen eCockpit powering both instrument cluster and infotainment and developed complex multi-modal HMIs like voice, touch / gesture-enabled interfaces, to designing concept car HMIs showcased at various auto shows globally for international OEMs and Tier 1 suppliers.

Apart from that, we are working on digital visualisation technologies like AR / VR and MR to drive innovation, increase operational excellence, enhance productivity, create personalised customer experiences and bring business transformation.

The past three to four years, since the initiation of Autonomai to its launch last year, have also been a transformational journey and a learning curve for Tata Elxsi. We have successfully developed algorithms for most of the AI-based functions that



need to be performed by autonomous technology, including our own traffic recognition algorithm. We are on a progressive path towards developing a fully automated, 100 percent accurate HMI and an autonomous car prototype solution.

In terms of adoption, the industry expects shared mobility and fleet aggregators to be the initial adopters for autonomous driving technology. However, the Indian government has expressed reluctance for its introduction in India. What are your thoughts on this?

'SECURITY IS A MAJOR CONCERN WHEN IT COMES TO NEW-AGE TECHNOLOGIES, ESPECIALLY WITH THE RECENT DEVELOPMENTS IN CONNECTED CARS AND AUTONOMOUS VEHICLES.'

India is currently in a position where the country is in urgent need of solutions for far more pressing / concerning issues such as lack of safer and better roads, introduction of environment-friendly modes of transport and curbing over-consumption of fossil fuels. Therefore, 'reluctance' is possibly not the right way to look at it. In my opinion, the government has to first prioritise these issues over adoption of autonomous driving technologies.

Our government's political will to reduce

pollution by promoting electric vehicles and shift to full electric mobility by 2030 is a great step. However, the key challenge is to get the entire ecosystem to come together.

Is Tata Elxsi also working in collaboration with Tata Motors and Jaguar Land Rover for their new models and autonomous driving tech?
Yes. Tata Elxsi is working with Tata Motors and Jaguar Land Rover, along with other key leading automotive customers.

What has been the investment in terms of R&D for Tata Elxsi?

Investment in R&D is imperative at Tata Elxsi, as this keeps us relevant in the industry and ahead of our competitors. Approximately, 2 to 3 percent of our annual revenues are spent on R&D, while we spend a lot more on training our technology teams on latest technologies and processes.

What are the new key trends that you see in the Indian and global auto industry?

The key trends in the automotive industry at large can be broadly classified into two broad areas: Technology trends and a significant shift in business models.

Technology trends mainly pertain to the development of connected cars, electric vehicles and autonomous / driverless cars. The shift in business models is another horizontal trend that encompasses a rise in ride sharing and taxi fleet aggregators.

With regards to the global scenario, these past few years have been the year of pathbreaking trends in the auto industry such as IoT-enabled connected cars, EVs and 3D printing used in automotive manufacturing among others. Autonomous vehicles have already entered the global scene and the testing

and validation of these technologies on foreign roads are underway. It is being led by countries such as the United States, Japan and Germany.

Coming to the Indian automotive scene, it is currently at a stage where transformation is at the apex. It has been crossing milestones with regard to production, exports and sales of various categories of vehicles.

Also, lower costs of production and increasing growth in digital technologies pose a huge potential for the Indian automotive space. However, as regards the developments in the autonomous technology space, the Indian auto industry is still a long way behind in terms of adoption and usage of connected and driverless vehicles mainly because of the lack of the necessary infrastructure and ecosystem.

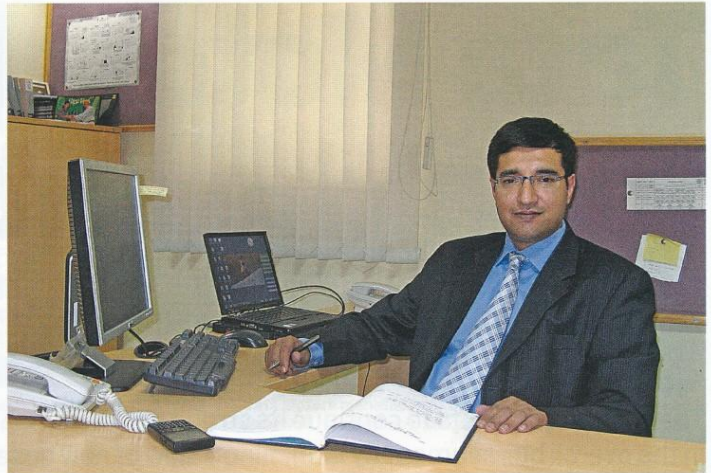
With the trend of electrification, autonomous and connected vehicles at the forefront, many OEMs, startups and technology companies are looking to take a lead in the space. How do you see this competitive landscape and how do you plan to take

the lead in terms of being the preferred partner for the automotive industry?

The world is at the forefront of technology development and transformation. We are in the middle of a massive disruption across the globe. This is the right time, the right place and the right environment to develop and grow in the technology and design space.

Tata Elxsi has been extensively working in the research, design, technology and innovation space with some of the leading players across industries, and we expect to continue the same with added growth in the coming days.

Currently, we are working with top OEMs to design and develop distinct solutions that are planned out and crafted based on our customers' needs. Our V2X emulator, middleware platform for autonomous technology for cars (Autonomai) and equivalent test and validation system 'V-Drive' that provides a complete lab-based environment validation of autonomous driving and ADAS algorithms are some IP solutions that we have worked on. In addition to these, we also work on engineering services,



Nitin Pai: "Lower costs of production and increasing growth in digital technologies open up huge potential for the Indian automotive space."



Apart from tech solutions, the company is also working on vehicle engineering and body electronics.

body electronics, better infotainment systems, and designing exceptional interiors for our customers.

We have also partnered with global leaders in different domains to bring in specific elements into our design and technology solutions.

As electronics and AI become more dominant in vehicles, there will be a major need for standardisation of security protocols. How do you foresee this shaping up and are you looking at tying up or inking JVs with any players? Security is a major concern when it comes to new-age technologies. Especially, with the recent developments in connected cars and autonomous vehicles, ensuring regulated security protocols is of prime importance for everyone.

We have collaborated with Irdeto, a cybersecurity leader to provide automakers with secure in-car display systems for automobile. Similarly, with BlackBerry, we collaborated to help OEMs design, develop and secure secondary car software using BlackBerry QNX technologies.

We have taken these steps in order to be able to provide a seamless and ideal solution to our customers, and this is what makes us an industry leader and preferred partner for our clients in this industry.

Lastly, what are the new areas of focus and investment plans for Tata Elxsi? What is the targeted turnover for FY2019? Tata Elxsi is a \$250 million company and we have been growing at CAGR 20 percent year on year for the last five years. Some of the key industries / areas of focus for Tata Elxsi are automotive, broadcast, communications, and smart homes. In addition, we are also focusing on building strong pipeline of products and solutions. We are also looking at exploring emerging opportunities in healthcare and smart cities. ■

