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VEHICLE CONNECTIVITY

Demand for connectivity gets Tata Elxsi to innovate

As electronic, software and digital content in cars increases and OEMs enhance their level of in-vehicle connectivity as a key product differentiator, technology majors like Tata Elxsi are bringing together infotainment, driver information, navigation, along with emerging user interfaces such as voice and vision and autonomous too **Page 28**

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Surging demand for tech-laden cars fuels growth for Tata Elxsi

As electronic, software and digital content in cars increases and OEMs enhance their level of in-vehicle connectivity as a key product differentiator, so does demand for technology majors like Tata Elxsi. As **Nilesh Wadhwa** says, it is bringing together current infotainment, driver information, navigation, along with emerging user interfaces such as voice and vision, and autonomous use-cases.

In the digital age of today and tomorrow, where consumer demand for connectivity will be 24/7, the automotive world is already witnessing the all-encompassing reach of connected devices facilitating telematics, infotainment, navigation services, vehicle management, ADAS (Advanced Driver Assistance Systems) and autonomous driving, among other services. Demand from automakers for car connectivity systems, particularly in-car telematics and sophisticated infotainment systems, is so high that the overall connected car market is billed to rise from an estimated US$ 50 billion in 2017 to US$ 842 billion in 2030.

"Traditionally, the relationship between a car company and the actual car owner has many degrees of separation. Equally, the nature of competition is changing from other OEMs to shared mobility players, start-ups and tech companies that ride on their products but threaten their value. Digital and connected cars are powerful ways for brands and OEMs to directly connect to their consumers, deliver value throughout the ownership lifecycle, and create opportunities for new revenue streams for themselves and the ecosystem they can facilitate through this connection. OEMs will be challenged in figuring out

In-vehicle connectivity is about facilitating telematics, infotainment, navigation services, vehicle management, ADAS and autonomous driving, among other services.

what their customers really value, and how they can both assure and monetise that value delivery. That is the unique intersection at which Tata Elxsi plays, bringing its experience and technology capability from across industries, and marrying that with award-winning design thinking and digital capabilities to create that value. All I can say is that we have one interesting ride ahead," explains Nitin Pai, chief marketing and strategy officer, Tata Elxsi, on the new development trends in the automotive industry.

Enabling electronics and software centricity

Bangalore-based Tata Elxsi, one of the world's leading design and technology services companies, has been closely working with OEMs and suppliers to drive the future of mobility. In fact, in the past few years, it has inked a slew of partnerships and collaborations to develop and bring innovative solutions to industry. On September 24, Tata Elxsi announced that it was chosen as the global engineering service partner by German Tier 1 major Schaeffler for whom it would set up a global excellence centre (GEC) in Pune. The GEC will contribute towards Schaeffler's vision of future mobility.

Sharing his views on the partnership, Pai says, "We are actively working with large and global customers to help them meet twin objectives of lowering operational costs for legacy and current engineering, and preparing for a future which is electronics- and software-centric, with digital technologies such as AI, big data and IoT that are reshaping consumer needs, product specifications and value. The GEC with Schaeffler is part of a strategic multi-year engineering services engagement, focussed on software, mechatronics and digital technologies that will accelerate innovation and drive digital transformation and growth for Schaeffler's mechatronics business, in line with their vision for driving Mobility for Tomorrow."

In the past two years, Tata Elxsi has announced tie-ups with Green Hills Software, Blackberry, VR Motion, AEye, Great Wall Motors and Tata Motors. While it

Tata Elxsi's off-the-shelf, platform-agnostic connected digital cockpit solution integrates infotainment, instrument cluster and ADAS functionalities in real-time on a single SoC, for quick product realisation.

Tata Elxsi helped Tata Motors develop a common cloud-based IoT platform across its commercial, passenger and electric vehicles, which has been first introduced in the Nexon EV (below).

has been quite aggressive in its development path, it has remained under the news radar and quietly gone about doing its business.

It is no secret that the year 2020 has brought about a massive change in the world, businesses, people and how things function may very well influence the new normal in the post-Covid era. For the automotive industry, which continues to struggle with sales, the demand for personal mobility has begun to show an uptick.

Pai says, "There has been a smart recovery in auto sales, especially in India. We are seeing a significant uptick from July as compared to last year. This could be partly from stocking up for festival sales and pent-up demand from the last few months. However, I personally believe this is a real case of market expansion, with

first-time buyers who were otherwise depending on shared mobility or mass transportation, families that want a safety backup for emergencies, and all the young IT workers who have moved back to their homes, and now need a motorcycle or a car. The reduced discretionary spend on food, clothes, travel, holidays and outings, has also created extra cash where owned transportation is high on the list of needs. I believe this is not just here in India but a global phenomenon. This should also spike used car sales."

"Connected infotainment, navigation and service convenience is value appreciated by customers, and a way to create revenue streams and direct customer connect for OEMs. We are seeing significant interest from OEMs in enabling

connected cars, including IoT, analytics and intuitive mobile apps and use-cases for car owner convenience and monetisation. Our success with Tata Motors in launching Connected Car services with the Nexon EV, is creating strong demand for our solutions in this space."

"With long-distance travel not immediately on the horizon, EVs will be on top of consumer preferences and OEM priorities as a long-term product portfolio development, starting with select models in the small and mid-segments today. We are also seeing increased interest in specific autonomous use-cases such as auto parking and traffic jam assist, which are more everyday use-cases and easier to implement than full-blown autonomous driving especially in emerging markets," he adds.

Digital cockpits and cyber security

One of the areas that Tata Elxsi has been aiming to bring about a disruption has been the automotive cockpit. It may be recollected that in February 2020, the company joined forces with Green Hills Software to deliver the next-generation of software-driven, highly integrated automotive cockpit solutions.

The company believes that the current analogue clusters and discrete infotainment systems will converge into an all-digital electronic cockpit that is more than just a digital copy. It will fundamentally enable far better driver information and controls, reduce driver distraction and integrate rear-seat entertainment and heads-up displays. This will also drive monetisation for OEMs with location-based services and value-added applications which can be delivered real-time into the car. "We have been working

with Green Hills for over a year now, and Tata Elxsi's Cockpit solution powered by Green Hills secure real-time OS now does all of the above on a single chip — helping OEMs quickly adopt our solution to introduce eCockpits to even mid-segment models rather than being a domain of only luxury cars," reveals Pai.

Tata Elxsi believes that the future digital cockpit will bring together current infotainment, driver information, navigation, along with emerging user interfaces such as voice and vision, and autonomous use-cases. Its eCockpit or Digital Cockpit Controller solution integrates infotainment, instrument cluster and ADAS functionalities onto a single SoC (system on a chip), thereby reducing cost without compromising on the security or the performance requirements. It essentially redefines and integrates infotainment and navigation connected to the internet, provides voice and virtual assistant services, and support for larger HD displays, all-digital instrument clusters, AR-based heads-up displays and other ADAS features like surround-view and eMirror among others that are defining the digital cockpit for tomorrow.

The company says security is a key priority with such connected systems, and its partnerships with Blackberry QNX and Green Hills has allowed it to develop the next-gen software architecture that protects mission-critical applications and allows for continuous monitoring of cyber threats.

Autonomous and Level 1 convenience features for India

Vehicles that drive themselves and instant teleportation have been long a feature of science fiction. While we are

still decades away from teleportation, self-driving technologies have started making their mark in the automotive space. While it may some time before fully autonomous vehicles become a common feature on roads, some technologies, which help replace some manual functionality to autonomous capabilities, have started entering the global as well as the Indian markets.

Tata Elxsi has been working on its advanced autonomous vehicle middleware platform 'Autonomai', with deep

learning and AI capabilities, which is designed to help OEMs and system suppliers build, test and deploy customisable autonomous vehicle applications.

The Autonomai platform provides carmakers and Tier 1 automotive suppliers with a comprehensive and modular solution covering perception, GNC and drive-by-wire systems, to quickly build, test and deploy autonomous vehicles. The solution supports sensor fusion with a variety of sensors from cameras to radar, LiDAR and leverages sophisticated AI and deep learning-based algorithms

The company's V2X Emulator is a comprehensive and customisable test solution for vehicle-to-infrastructure testing. It has an equipment setup which is capable of generating real-time RF and CAN signals inside a laboratory, and can be closely related to real-world scenarios.

Tata Elxsi's eCockpit solution addresses all the requirements of a full-feature vehicle cockpit, supporting infotainment, instrument cluster, HUD and ADAS functionalities on a single SoC (System-on-a-Chip) while maintaining the highest levels of safety, security and performance.

In August, Tata Motors, Tata Motors European Technical Centre (TMETC) and Tata Elxsi joined forces with Israel-based BreezoMeter to strengthen the future of in-cabin safety and management. What are the developments with this technology?

Air quality levels in India have been deteriorating especially in metros, and we are happy to associate with Tata Motors which has always given priority to customer safety. This solution will help drivers see real-time air quality information on their entire journey, and provide alerts when they enter a locality with poor air quality. It will help car owners plan their travel routes to keep them and their families protected. It can also be integrated with the car systems to automatically activate windows, sunroof, AC and filtration systems to keep the vehicle clear of pollutants.

In which areas is Tata Elxsi working with Tata Motors?

Tata Motors has developed its future vision of mobility with a focus on CESS – Connected, Electric, Shared and Safe. At the core of the vision is the Connected Vehicle Platform to connect vehicles, store and analyse the data and build applications for consumers. We helped develop a common cloud-based platform across commercial, passenger and electric vehicles (CVs, PVs and EVs) that has been first introduced with the Nexon EV. Our journey with Tata Motors has been over many years, across design, styling, user experience, mechanical engineering, software development and validation. There are

a number of projects with Tata Motors in areas like connectivity, telematics, infotainment, body, ADAS and electric. We are also working closely with its design studios in Pune and the UK.

Do you think with rising software content in vehicles, India is turning into a major R&D hub for the automotive industry?

India is definitely an attractive option as a best-cost country for fulfilling engineering requirements, especially as electronic, software and digital content in cars increases. India is already a major automotive R&D hub with many global OEMs and Tier-1 suppliers hosting R&D facilities here. We are also seeing a large number of expats working in these centres which shows that the Indian R&D centres are attracting global talent.

There are more overseas companies who want to come to India to leverage the technology talent pool available in our country. We can see these companies setting up not only engineering centres but also test tracks and other capital intensive test and development infrastructure which showcases how far India

'India is definitely an attractive option as a best-cost country for fulfilling engineering requirements, especially as the electronic, software and digital content in cars increases.'

has come.

As a global engineering services provider, we are very differentiated in our capability to deliver a India-centric scaled delivery model in

our engagements with automotive leaders across the world. Going beyond, we have also helped set up global centres for some companies, and are contributing to the

success of Indian R&D captives in delivering value, scale and innovation.

How many new clients have you added in the last two years? Any that you are working with in India and globally?

While we will not be able to reveal the full list here, we have steadily increased our customer base across the world. We have signed large transformational deals like the one with Schaeffler, large platform development activities with US and European customers, Smart gateway and software development with Chinese OEMs like GAC, GWM and are also working with silicon valley and US start-ups such as AEye for advanced autonomous technology activities. This diversity in segment, geography and size, ensures we can deliver on the world-class, world-scale promise to customers.

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

We already talked about Autonomai as an investment and how we are using that for customer programs. Additionally, a big investment we have done


Tata Motors, TMETC and Tata Elxsi have partnered BreezoMeter to provide an in-vehicle service that will allow drivers to see real-time information about the air quality in their vicinity on their car dashboards and empowers them to make informed choices.

is on EV testing where we have invested on a full solution including hardware, lab and our own solution components that will enable validation of multiple ECUs like battery, DC-DC converter, motors and charger modules. We have also invested in enhancing our AUTOSAR stack which is now being deployed into production.

Other investments include a digital cockpit solution, test automation suite called AUTOMATE, and our V2X simulator which we have deployed to multiple customers. In addition to automotive platforms, there are equally great solutions that we have been developing and deploying in the media and broadcast world too, including FalconEye which has been our automation and test automation solution that has been on for the last four-five years now. TEplay is our latest cloud-based OTT platform that we have launched, that enables the rapid launch of new video OTT services.

We have been actively filing patents across industries and areas such as autonomous driving, EVs, automation and multimedia.
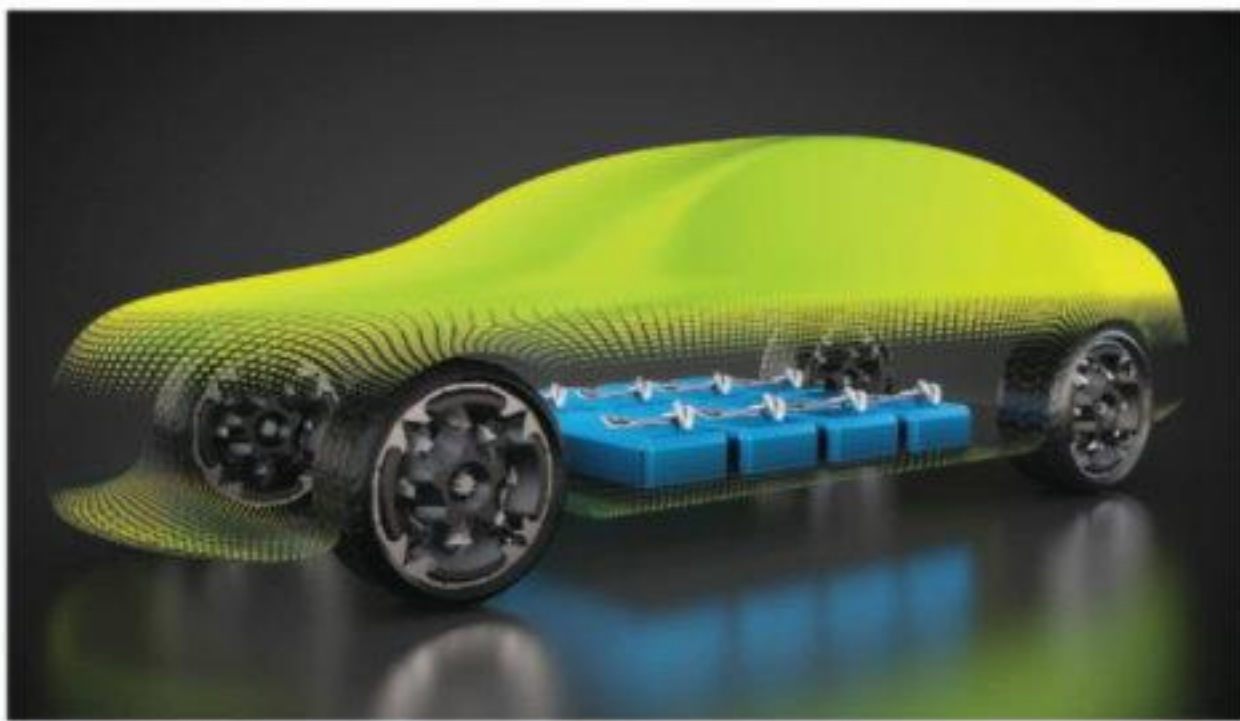
to deliver the complex use-case scenarios expected of driverless cars.

In 2017, Tata Elxsi had signed a licensing and integration support deal for Autonomai with one of the largest global OEMs for their driverless car program. When queried about the project's status, Pai says, "We had licensed Autonomai to the OEM to accelerate their R&D work on autonomous driving back in 2017. That project was carried out in different phases. A team of integration and development experts from Tata Elxsi worked at customer location to help them with integration and field trials while the major activities were driven from our India centre. The speciality of Autonomai is that it is platform-agnostic and can be broken down to multiple individual modules like sensor fusion, path planning and perception system among others. So we are involved with a few other customers where some of these individual software pieces were integrated to their end-system. With this same Autonomai, we have developed a RoboTaxi that

Tata Elxsi works with domestic and overseas OEMs and Tier 1 suppliers in providing mechanical solutions in the area of traction battery for EVs and other EV systems.

Tata Elxsi believes while complete autonomous vehicles will take a long time to be introduced in markets like India, features that deliver driver convenience and road safety will be of highest consumer interest.

enables Level 3+ driving which we have tested in Indian conditions. The RoboTaxi demonstrator was used by our customer AEye who wanted to showcase the capabilities of iDAR, an advanced LiDAR with integrated camera that technically is capable of seeing almost 1km and we built a demonstrator by integrating those sensors, that was showcased at the last CES in Las Vegas. We are seeing active interest in companies wanting to access modules and ADAS expertise to implement L1 and L2 features at scale in various markets."

So how does India stack up in terms of demand for deploying autonomous tech? Tata Elxsi believes that while full autonomy has a long way to go for markets

like India, features that deliver driver convenience and road safety will be of highest interest. "Level 1 convenience features like Adaptive Cruise Control (ACC) and Automatic Parking Assist, as also Automatic Emergency Braking (AEB), Forward Collision Warning (FCW), Lane Departure Warning (LDW) and Blind Spot Detection (BSD) will be highly appreciated by Indian drivers. These technologies that work in other markets might not work safely in India due to our road conditions and driving behaviour. This has to be carefully validated, re-engineered and introduced here so that people appreciate the technology and OEMs do not face liability and safety issues. We have been in the forefront in autonomous software since 2014 with our own software stack Autonomai with which we have developed a Level 3+ concept vehicle which we have tested in specific Indian conditions. We are also working with some global OEMs in delivering Level 1 autonomous features," signs off a confident Pai. ■