



Confederation of Indian Industry

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# *Manufacturing technology in the automotive sector: Prospects of eastern India*



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# Foreword

Technological advancements have been reshaping the manufacturing industry, including automotive manufacturing, over the last couple of years. Vehicle features that we could only imagine five years ago have now become a reality. Experiments with driverless vehicles are being conducted around the world. Electric vehicles are fast becoming mainstream products, particularly in India, with active encouragement from governments.

These technologies have created unprecedented opportunities to reimagine the possible. This creates a case for traditional automotive manufacturing companies to collaborate with technology start-ups and create something new for customers. It also brings in competition from new directions.

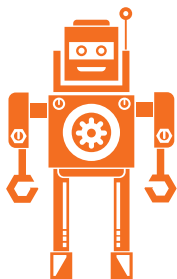
This changing landscape of automotive manufacturing presents an excellent opportunity for manufacturing companies in eastern India to differentiate themselves. India has a vision to become a prominent manufacturing hub in the future. The country also aspires to derive 25% of its GDP contribution from manufacturing activities by the year 2025. It is imperative that the manufacturing industry in eastern India grows fast to contribute significantly in this journey.

Eastern India offers many manufacturing success stories for emulation by others. There are automotive component manufacturers with a business legacy of more than a hundred years. Over the last one year, the eastern Indian states have also improved their state-level ranking on the scorecard for the implementation of business reforms.<sup>1</sup>

Therefore, it is important to deliberate on the essential areas that eastern Indian companies must focus on to improve their capabilities and to grow. There will be four enablers in this growth journey—technology, quality, workforce and the environment. It is also important that automotive manufacturing companies understand the present state of the region in all four areas and the forces of the future that can help them grow.



**Umesh Choudhury**  
Chairman  
CII Eastern Region



1. DIPP. (2017). Business Reforms Action Plan 2017. Retrieved from <http://eodb.dipp.gov.in/> (last accessed on 4 February 2018)

# Introduction

Technology is changing the definition of competitiveness and collaboration in the automotive manufacturing industry. Factories are becoming more digital, with smarter machines that produce smarter products. According to PwC's 21st CEO Survey, there will be greater competition from local 'piranha' companies with their sophisticated marketing and technology skills.<sup>2</sup>

Automotive manufacturing companies, at the same time, are realising value through the adoption of new technologies, and more importantly, through new types of collaboration. Collaboration with technology start-up companies to create a new product line or a new product feature is becoming inevitable. Such collaboration will require new capabilities and foresight to be successful. The result will be better product innovation, higher productivity and more flexibility. The right mix of strategy, collaboration and technology will help manufacturing companies gain this competitive advantage. All these elements need to work in tandem to make a future-ready company.

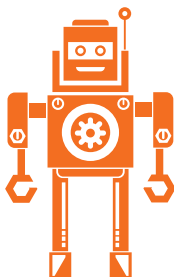
The Confederation of Indian Industry (CII) and PwC conducted a survey through CII's digital platform to understand the views of leaders from the eastern region on these changes and opportunities. About 36 business executives from all five states of eastern India responded to our questionnaire and shared their perspective on several aspects that are critical for the manufacturing industry. They have also shared their views on the prospects of the automotive industry in this region. The respondents represent a wide spectrum of industries, including many small and medium-sized as well as large organisations. In this report, which is based on the survey findings, we have highlighted the factors that can bring about the holistic change needed for long-term growth and evaluate where the companies in this region stand.

In addition, we have tried to capture the views of some large automotive manufacturers of the country and their views on the eastern region's prospects.

We thank all the respondents for investing their valuable time in sharing their inputs.

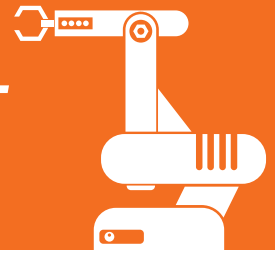


**Arijit Chakraborti**  
Partner, Technology Consulting  
PwC India



2. DIPP. (2017). Business Reforms Action Plan 2017. Retrieved from <http://eodb.dipp.gov.in/> (last accessed on 4 February 2018)

# Technology-enabled manufacturing – looking ahead



## Technology adoption continues to increase

CII and PwC have been jointly carrying out surveys of the manufacturing industry to understand the growth trends in the manufacturing industry in eastern India. Our surveys have revealed that most of the business leaders view technology as the main growth driver for their business. Last year's study<sup>3</sup> delved into the different areas of an organisation, such as workforce and quality practices. Technology—especially digital technology—was found impacting all manufacturing organisations.

Our analysis also revealed that the adoption rate of emerging technologies among the companies marginally increased. However, there was room for more acceleration in adopting these technologies. In last year's survey, nearly 17% of the participants indicated that they had started using the Internet of things (IoT). The figures for technologies such as industrial robots, additive manufacturing and virtual reality (VR) were 4%, 8% and 6% respectively.

A higher percentage of business leaders in the eastern region indicated that they had plans to adopt these technologies in the next 5 years. So, it is expected that the adoption rate will increase in future. Most of the leaders consider these technologies strategically important for their business. Some of the companies in the eastern region have already started creating success stories by successfully adopting these technologies. A few of those success stories were highlighted in last year's report.

In this year's CII-PwC survey and industry study,<sup>4</sup> we have revisited the technology adoption trend and reflected on how manufacturing companies are creating different types of solutions by leveraging the emerging technologies. We have also tried to find applications of these technologies in the automotive industry and to show how an increased footprint of large automobile players in this region can boost the technology adoption rate. Thirty-six executives from various fields of manufacturing participated in this survey and shared their valuable opinions.

## Accelerated pace of technological advancement is driving faster technology adoption



'We are seeing the elements of Industry 4.0 becoming key forces in reshaping the automotive manufacturing factories. Factories are becoming more digital and always connected. Also, we anticipate that Industry 4.0 will create a platform for non-traditional players to enter and compete in this sector.'

- Arnab Basu  
Joint Leader, Technology Consulting  
PwC India

The impact of technology revealed by the CII-PwC survey and analysis of the last two years' responses corroborate the global trend—Industry 4.0. This trend has been mainly driven by a few major factors in the last few decades.

One of the main drivers is the reduced cost of computation, storage and connectivity. These fundamental computational aspects have become exponentially cheaper and more capable today than a few decades ago. Owing to this improvement of fundamental technologies, the prices of sensors, 3D printers and robots have been plummeting. More affordable technology is encouraging companies to gradually start using them. Top information technology companies continue to heavily invest in research on these three fundamental aspects. So, we may expect further price reductions and quality improvement of sensors, devices and other components.

High quality, cheaper Internet connectivity and widespread use of cloud technology is another important driver. Cloud technology allows companies to pay rent for infrastructure or services based on actual usage. This saves companies from major capital expenditure and

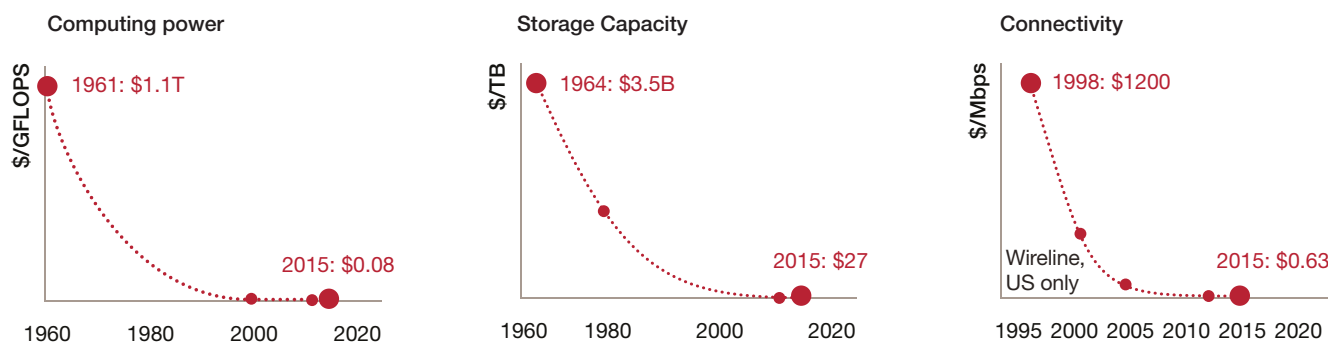
3. CII-PwC report. (2017). Success stories and the road ahead: Technology-enabled manufacturing. Retrieved from <https://www.pwc.in/publications/2017/success-stories-and-the-road-ahead.html> (last accessed on 4 February 2018)  
4. CII-PwC survey in the eastern India, 2018

maintenance cost. It also reduces the risk associated with technology adoption to a great extent. Owing to these advantages, companies are increasingly using cloud technology. Moreover, this technology is one of the fundamental building blocks for many other emerging technologies.

The other important factor is the increased reach of mobile devices, the Internet, laptops and wearables. The total wireless telephone subscriber base has crossed 1 billion in

India.<sup>5</sup> As far as Internet usage is concerned, 60% of urban India and 17% of rural India has access to the Internet.<sup>6</sup> This increased reach and greater comfort are allowing companies to effectively engage their workforce in driving technology-driven changes.

Besides, we noticed from previous surveys that the understanding of emerging technologies is gradually increasing. Companies are starting to build solutions to productively use these technologies.



Price reduction in computing power, storage capacity and connectivity

Source: PwC Strategy& analysis



‘Industry 4.0 is expected to make automotive organisations more cost efficient, agile and productive. We expect faster adoption of advanced technologies by the automotive industry, like connected vehicles, advanced safety and automotive electronics. This will in turn create a new generation of component manufacturers. The supply chain will also become more digitalised and connected with the automotive OEMs.’

- **Kavan Mukhtyar**  
Leader, Automotive Sector, PwC India

5. TRAI. (11 January 2018). Highlights of telecom subscription data as on 30th November, 2017. Retrieved from [http://www.trai.gov.in/sites/default/files/Press\\_Release\\_No4\\_Eng\\_11012018.pdf](http://www.trai.gov.in/sites/default/files/Press_Release_No4_Eng_11012018.pdf) (last accessed on 4 February 2018)

6. Chopra, A. (2 March 2017). Number of Internet users in India could cross 450 million by June: report. Livemint. Retrieved from <http://www.livemint.com/Industry/QWzIOYEsfQJknXhC3HiuVI/Number-of-Internet-users-in-India-could-cross-450-million-by.html> (last accessed on 4 February 2018)

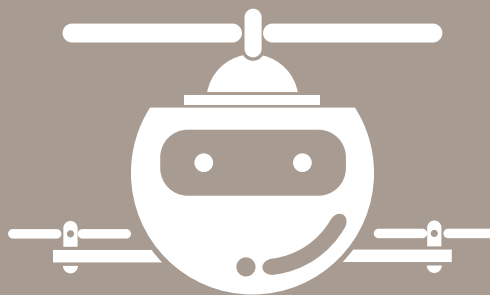
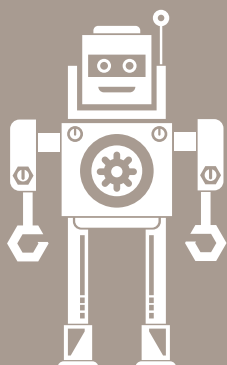
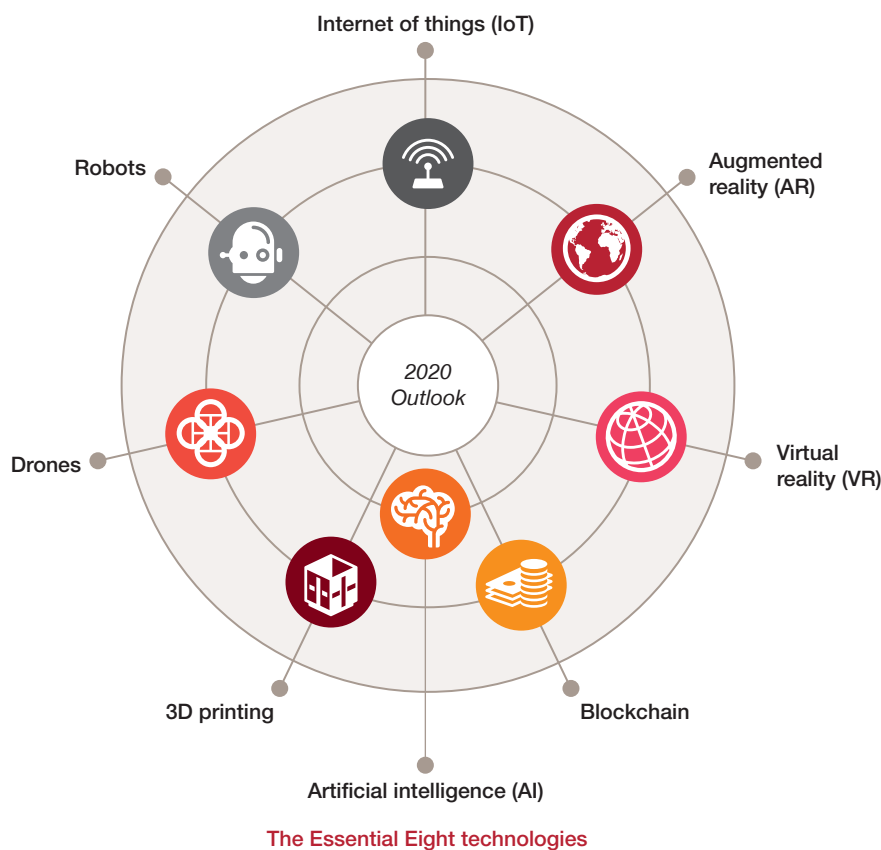
# Technologies that are changing the automotive manufacturing

The automotive industry has historically led many technology and process innovations, which other manufacturing companies followed. Therefore, this report will take a closer look at the usage of emerging technologies in the automotive industry.

PwC has identified the eight most impactful technologies after evaluating 150 new technologies that are being developed today. These technologies are majorly redefining customers, competition and operations across the industries. These ‘Essential Eight technologies’—IoT, robots, 3D printing, VR, augmented reality (AR), drones, artificial intelligence and blockchain—are also redefining the landscape of the automotive industry.

Almost all of these technologies are getting used in the automotive industry today. Companies are creating new solutions by combining these technologies as per their needs.

One example is the use of AR to help a driver navigate by superimposing navigational images on what the driver sees through the windshield.<sup>7</sup> Another example is the use of drones, autonomous robots, driverless transportation and big data solutions to create an ‘autonomous inventory’ where all inventory operations can be automated.<sup>8</sup> The options are many. It is now for companies to decide what technology solution provides the maximum return on investment (ROI) for their business.



7. Harvard Business Review. (2017). A manager’s guide to augmented reality. Retrieved from <https://hbr.org/2017/11/a-managers-guide-to-augmented-reality> (last accessed on 4 February 2018)

8. PwC. (2017). Digital Factories 2020: Shaping the future of manufacturing. Retrieved from <https://www.pwc.de/de/digitale-transformation/digital-factories-2020-shaping-the-future-of-manufacturing.pdf> (last accessed on 4 February 2018)

# Technology-led paradigm shift in business

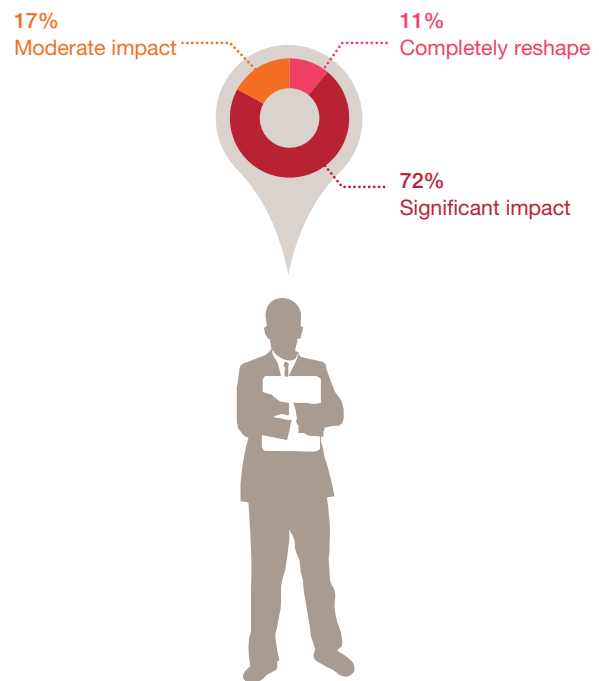
Owing to the unprecedented improvement in technology, automotive and other manufacturing companies are gradually starting to use the Essential Eight in every aspect of business—starting from productivity improvement to generation of additional revenue streams.

Many companies are trying to enhance customer experiences using these technologies. They are also raising the bar of customer expectations to redefine competition and gain a competitive advantage. Companies are leveraging technology to improve product quality, operation planning or even factory design. Some of them are looking for a new model of service delivery using these technologies—such as product as a service.

Simultaneously, the skill and training requirements for the workforce are changing. The workforce of the future will be required to take on a more supervisory and decision-making role instead of repetitive type of work. Therefore, expectations from academia and other skill-building institutions are changing.

Besides, the infrastructure requirements have increased owing to the usage of these technologies. High-speed zero interruption Internet connections are a basic expectation today. Network providers are expected to fulfil this expectation. Similarly, since most of the software systems and data are now moving to the cloud, the business continuity, speed and data security related expectations from cloud infrastructure providers are rising.

Handshaking between hardware and software companies is becoming more important than ever. The new genre of technology solutions will involve both physical devices and software systems working in tandem unlike the software-only solutions. All technology providers are well aware of this fact and therefore, many such companies are coming together to form an ecosystem.



**Question:** In your view, how is technology going to impact competition for your industry in the next 5 years?

Source: CII-PwC survey in eastern India (2018)

This way, technology is driving a paradigm shift which involves not only the IT department of a company but rather the whole enterprise, technology providers, academia, network providers, government and society.

## Fostering technology adoption in eastern India

To stay in the competition globally, eastern Indian companies need to participate in the paradigm shift.

Business leaders in eastern India are completely aware of this fact. In CII-PwC's survey this year, 74% of the business leaders are of the opinion that technology will completely reshape or will have a high impact on competition, while 26% believe that it will have moderate impact.

However, in previous CII-PwC surveys, we found that many small or medium-sized enterprises were seeking a higher ROI from these technology implementations. Besides, the risk of failure is high as the first mover. Small and medium businesses might not find it compelling to take this risk.

Large enterprises can play a pioneering role in remediating this challenge. Large enterprises will be able to get larger benefits out of the new technologies owing to their larger size of operations. This is an encouraging reason for them to allocate a portion of their research budget to research and implement emerging technologies.



In this process, the larger enterprises will create success stories for the smaller companies to emulate. The risk of failure and risk of unknown challenges for the smaller companies will thereby reduce. At the same time, the large enterprises will be able to build up skills into the ecosystem. As a result, the cost burden of the smaller players in terms of skill development of the workforce will reduce.

Besides, such investments on technology adoption from the large enterprises will encourage the technology service providers to invest more in this region. Consequently, investment from very large enterprises can give a much-needed boost to technology adoption in the eastern region.

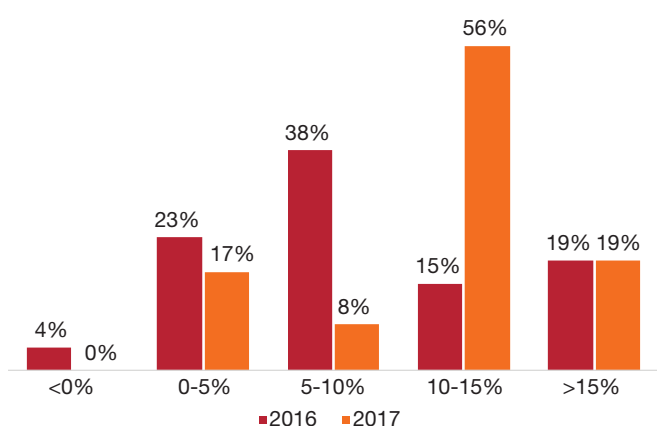
The automobile industry is one of the front-runners in technology adoption. Automobile original equipment manufacturer (OEM) companies are not only very large enterprises, but they invest a good percentage of their revenue in R&D activities. They are good job creators too. Moreover, the eastern region has already benefited from the existing automobile players. An increased footprint of such large automobile player in eastern India can be very beneficial to drive the overall growth of technology-enabled manufacturing.

In this report, we will reflect on the potential of eastern India as an investment destination for the automotive sector and how such investment can benefit the region.

## Positive growth expectation in the eastern region

Our surveys over the last two years showed that business leaders in eastern India are increasingly confident about their revenue growth. This is an encouraging trend for new investors.

In this year's survey, nearly 56% of the survey participants have indicated that they expect 10–15% growth from their operations in the eastern region in the next 3 years. Last year, most of the business leaders expected a moderate growth of 5–10%.



**Question:** By what percentage (CAGR) do you think revenue will change for your company's East India operations in the next 3 years? (responses from the last 2 years)

Source: CII-PwC survey in the eastern India (2017 and 2018)

One of the reasons for such increased confidence is the constant effort by state governments to improve the ease of doing business. The governments are also closely interacting with the business community to try to address their problems and attract more investments.

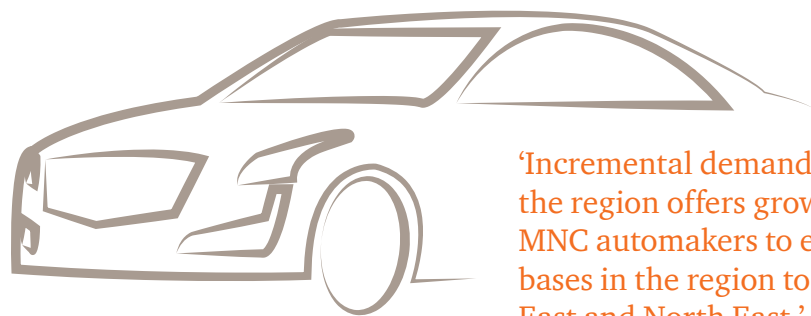
The Department of Industrial Policy and Promotion (DIPP) recently published a list that ranks all states on the basis of the implementation status of process, policy and practice reforms.<sup>9</sup> These reforms, called the Business Reform Action Plan (BRAP), were recommended by DIPP in partnership with the World Bank Group. In this ranking, most of the states of the eastern region are within the top 12.

These are encouraging signs. They might contribute to the growth journey of the manufacturing industry in eastern India by attracting new investments and consequently fostering technology adoption.

Eastern Indian states	Rank	Implementation (%)
West Bengal	4	89.16
Jharkhand	5	88.62
Odisha	11	85.37
Chhattisgarh	12	83.74
Bihar	18	69.92

**Business Reforms Action Plan 2017 – implementation scorecard**

Source: DIPP (<http://eodb.dipp.gov.in/>) as of 4 Feb 2018



**‘Incremental demand for both four- and two-wheelers in the region offers growing opportunities for Indian and MNC automakers to explore setting up manufacturing bases in the region to tap the emerging auto market of the East and North East.’**

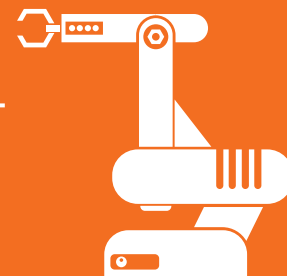
**- S K Behera**

*Vice Chairman and Managing Director, RSB Transmissions (I) Ltd*

9. DIPP. (2017). Business Reforms Action Plan 2017. Retrieved from <http://eodb.dipp.gov.in/> (last accessed on 4 February 2018)



# Technology in the manufacturing sector



Until a few years back, only a handful of companies used technologies like IoT, additive manufacturing, robotics and VR. For others, these were buzzwords. The scenario is changing fast. Widespread use of digital technology across industries is leading to many emerging solutions around these technologies. Some of these solutions are intended to solve company-specific problems. Many other solutions are solving challenges that are common across the industry. In the manufacturing sector, solutions such as asset tracking,

remote monitoring and flexible manufacturing using the latest technologies are becoming increasingly common. These solutions are often a combination of various digital technologies working together to solve critical industry-specific problems.

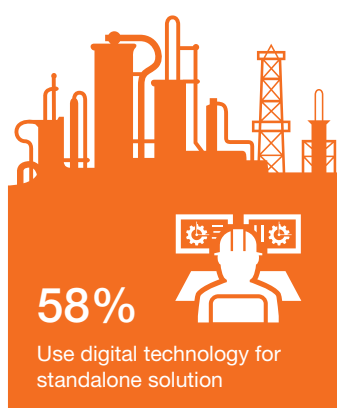
The usage of these solutions is spread across various business areas—factory operations, customer experience, product quality and product design.

## Digitalising factory operations

Factories worldwide are getting digitalised. Companies in eastern India have also started digitalising their factory operations. According to this year's CII-PwC survey, 11% of business leaders are widely using digital technologies in their factories and the factories are partially connected. Most of the leaders (58%) have indicated that they

have started with digital technologies, but the usage is more limited to particular business functions or solving particular problems.

Many solutions based on digital technologies have emerged around factory operations.



**Question:** Which of the following statements on digital factory development best describes the situation in your company?

Source: CII-PwC survey in eastern India (2018)

## Tracking of assets and products

Asset tracking is one of the most common activities in factory operations, especially for companies which are asset intensive. Advancements in technologies are enabling companies to create enhanced solutions to track their assets.

With a large collection of assets within the shop floor and outside, it becomes highly challenging to track and manage each and every asset on a day-to-day basis. Adding to the challenge, these assets are often transported to and from different locations within the enterprise.

A manual system lacks precision and efficiency to handle the number of processes involved in asset inventory management. Digital technology provides a wide range of solutions for asset tracking using technologies such as radio-frequency identification (RFID), sensors, IoT solutions and the global positioning system (GPS).

Combining these technologies, it is possible to provide unprecedented real-time visibility of assets. Through embedded sensors, RFID and GPS, positions, performances, availability and other details of assets can be tracked. Through RFID, products can be tracked easily at various stages of the supply chain without the need to scan barcodes. This saves considerable time and effort.

Such tracking can provide real-time visibility of inventory, allowing companies to provide accurate dates of delivery. It also allows companies to plan for fulfilment, sourcing or production in advance based on the inventory movement of products throughout the distribution channels. This can lead to cost reduction and customer satisfaction.

In the CII-PwC survey, 39% of the participants say that they have the capabilities for real-time location detection of assets, while 14% say that they use RFID technologies for product tracking.

### Remote monitoring of production processes

Monitoring and control of production processes has long been performed by the industrial process control that comprises programmable logic controllers (PLCs), sensors and actuators, and supervisory control and data acquisition (SCADA) systems, among others. While the basic level of industrial process control might still be continued through the established system in the near future, digital technology can bring new advantages.

Digital technology enables companies to send process-related data directly to the cloud and perform many operations with it. This capability opens doors to many solutions. Companies can store this huge volume of process-related data in a big data store and later analyse it to find patterns. They can monitor live streaming from the production process from anywhere in the world through various mobile devices. They can get notifications by email or SMS if required in certain situations.

Companies that have their operations in many locations may find value in capturing operations data from different plants, aggregating them, or slicing and dicing them to find different patterns. This can lead to new insights and help companies to identify potential areas of improvement in the established production processes. Besides, through remote monitoring solutions, executives can have access to appropriate real-time production data anytime and from anywhere—without visiting factories physically or waiting for reports.

### Predictive maintenance

Predictive maintenance is one of the common solution areas using the strength of the new generation technologies. It tries to solve one of the major challenges faced on the factory floor—the breakdown of equipment

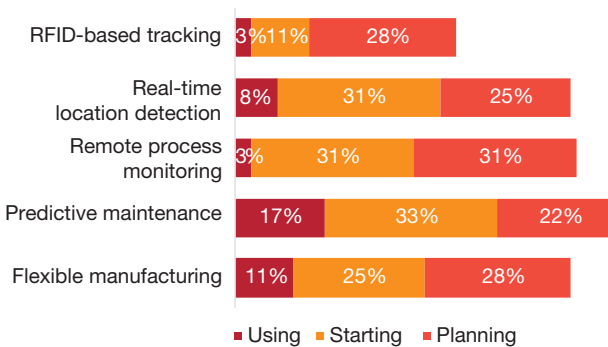
and unplanned downtime. Such downtime can occur due to machine degradation, component wear and other factors invisible to operators. These breakdowns have direct implications for the organisation’s finances, productivity, and reputation. Other challenges include a difficulty in manual monitoring of equipment health which can consume a huge amount of time and productivity. The more asset intensive the industry is, the bigger the impact of challenges.

A predictive maintenance solution takes into account various parameters such as temperature, pressure, vibration, revolutions per minute, and flow rate from machines through the sensors and applies analytics technologies to understand the probable time for failure based on the historical instances of failure and the corresponding parameter values. A match in the streamed equipment data with pre-identified failure patterns triggers alarms and notifications indicating a deterioration of machine health and the potential for equipment failure.

Once a maintenance or service requirement is detected, the solution should be able to trigger a service request to the appropriate personnel so that there is minimal or no unplanned downtime.

Machine learning technology is applied so that the predictive model can learn iteratively from the data and instances of failure. In the CII-PwC survey, nearly 16% of the participants have indicated that predictive maintenance is being widely used in their company.

**Question:** To what extent you have digitised your factory operations?



Source: CII-PwC survey in eastern India (2018)

‘Automation will improve our productivity. We will be able to produce higher volumes and bring down the price. This is going to make us competitive in the market. Often, we find that some of our competitors who are MNCs/foreign companies/associates of foreign companies are ahead of us in this journey. They have been able to bring in more automation and they are our competition. We have to catch up and even be ahead of them to be successful in our business. Automation is the way.’

- Prabal Basu  
Chairman and Managing Director,  
Balmer Lawrie

## Flexible manufacturing

It is very important today for companies to react and adapt to changes fast as per market requirements. To do that, the production process needs to respond accordingly. As a result, flexible manufacturing is becoming increasingly important. Flexible manufacturing is enabled by flexibility in machine capability as well as flexibility in routing. It often involves a material handling system, industrial robots, computer numerical control (CNC) machines and other components.

Advancements in technology are providing a seamless platform for all of these components to talk to each other through machine-to-machine interaction. Besides, unprecedented advancements in robotics are adding to flexibility in factories. They have also led to autonomous industrial robots and cobots. Today, robots are able to perceive the environment they are operating in. They are able to work with human side by side safely. With such robots handling materials and performing tasks intelligently alongside the human workforce, the opportunities for flexibility are limitless.

The other technology that has enabled flexibility is RFID. RFID is used to track products and their movements during the product lifecycle. RFID attached to a product can hold information about the production process needed to manufacture that product. Thereby, it can guide the product through its production process without human intervention. The machines, robots and other components of the production system will follow the instructions from the RFID chip to produce the product.

Manufacturing is getting flexible in many plants in different part of the world, including India's eastern

region. However, the extent of flexibility differs from company to company as per its requirement. The use of technology also differs.

Nearly 11% leaders surveyed said that they extensively use flexible manufacturing, while 25% indicated moderate use.

## AR-based solutions for training workforces

AR-based solutions superimpose a virtual image on the user's view of the real world. Amongst its many uses, this type of solution is getting increasingly important in employee training. In particular, when a set of tasks that a trainee has to perform is complex enough to follow from a 2D drawing or documentation for beginners, an AR-based solution can offer significant benefit in terms of training effectiveness. The real-life experience of AR is much easier to follow.

AR-based training solutions are already used in multiple companies belonging to industries such as automotive, aerospace and logistics. Many other companies are exploring the idea of creating such solutions.

The impact of such solutions on efficiency and quality can be significant. For one of the largest aircraft manufacturers, a group of trainees completed a task in 35% less time using an AR-based solution than the trainees who referred to traditional 2D drawing and documentation. Besides, the number of trainees who could perform the operations correctly the first time increased by 90%.<sup>10</sup>

Companies which need to recruit temporary employees during their peak season will also find such solutions helpful. It will help them meet their basic requirement of quick ramp-up of new joiners.



10. Harvard Business Review. (2017). A manager's guide to augmented reality. Retrieved from <https://hbr.org/2017/11/a-managers-guide-to-augmented-reality> (last accessed on 4 February 2018)

# Technology in product and customer experience

Owing to the reach of mobile devices and high-speed Internet, the expectations of the customer are changing. All possible options are available to the customer in just a few clicks. The way the customer wants to interact and co-create their products is also different. Responding to this shift in customer expectations, companies are upgrading their products and services. In doing so, they are relying heavily on technology.

Products are being designed to capture data about themselves through embedded sensors, processors, software and connectivity. The data can then be sent to cloud and analysed for after-sales product performance. Companies can capture the pattern of how certain products are actually getting used by the customer and this can be a valuable input for future product development. Companies can also respond fast to provide after-sales service to the customer if the captured data suggests any problem with the product. A few automotive, heavy machinery and energy sector companies, among others, have started using such solutions.

In the consumer goods sector, home appliances—ranging from air conditioners to water heaters—are getting smart today. They can be controlled from anywhere over the Internet through mobile devices, and interact meaningfully with other appliances. By doing this, they provide a rich customer experience.

The automobile sector offers an excellent example of how end products are using technology to provide a differentiated experience. Many automobile OEM companies are researching autonomous car technologies. This technology is based on digital platforms that enables cars to use sensors, radars, AI and machine learning technologies to detect other vehicles or objects and make appropriate moves. Vehicle-to-vehicle communication, adaptive cruise control and connected vehicle technologies are a few more examples of digital technology adoption in the automotive sector.

An eastern India based automobile company has formed a partnership with a global technology giant to provide a more connected experience to the customers. The company is also launching a VR-based showroom. This will provide an immersive experience to customers while reducing rental cost.

B2B businesses who are component manufacturers and other service providers are also going through technology upgrades to provide high-quality products to their customer.



## Technology in product design and prototyping



Technologies like computer-aided design (CAD) and computer-aided manufacturing have been used in product design and engineering drawing for a long time. Through these technologies, products can be designed in the forms of 2D or 3D digital models. The design can then be fed into the computer numerical control machines. With the advancement of technology, earlier CAD tools have advanced to digital mock-up tools working in association with the product lifecycle management (PLM) system. This provides enhanced capabilities for 3D design and verification of products and assemblies before they are manufactured. It also helps in managing product-related data throughout the full product lifecycle.

Product design technologies have undergone continuous improvement. Today, with the emerging technologies, more advanced options are applied in this field.

### VR and AR in product development and prototyping

VR takes 3D models outside the screens of 2D devices. This technology simulates and renders all the characteristics relevant to the particular context as precisely and realistically as possible in an immersive environment. The design data saved in CAD and product data management (PDM) systems is often fed into the VR-based solutions to create the model in 3D space.

VR in the product development and prototyping space has its advantage. It provides a close to real life interactive experience. So, engineers can manipulate components as they would in the real world. They can verify fit or compatibility of components and inspect photorealistic 3D objects in virtual space. They can work with the full team to share a single virtual environment—all with a very realistic experience.

AR-based solutions are also used for product development. AR can superimpose the 3D designs on a user's view of reality. Therefore, using such solutions, it is possible to compare life-size 3D holograms generated out of the CAD model with a physical prototype or even a product. This can improve the quality assurance process and provides the ability to discover defects fast during the product development phase. It can also reduce the inspection time during the quality control process. Such a solution has saved nearly 96% of the inspection time for a shipbuilding company.

Automobile, aerospace and some other industries are using such solutions in the fields of product design, development and prototyping.



**‘Quality, resource optimisation, streamlining business process and, more importantly, adoption of modern technology are key to any success in the fast-changing automobile manufacturing domain.’**

*- A B Lall, Head - CVBU, Tata Motors Ltd*

## Digital twin

Digital twins are virtual models of physical assets such as a products, processes, systems or facilities. These digital replicas use data about physical assets to better understand and tighten their performance. Powered by a combination of sensors, IoT, AI, machine learning, and data analytics, digital twins can mirror the physical twin and reveal issues before they occur. To do so, they rely on a range of sensors embedded in the physical world to transfer real-time data about the operative process and environment. The data collected from the connected sensors is then analysed on the cloud.

Digital twins are being used by companies in various ways. Some of the companies are using them to plan, design, and construct factory building and infrastructure. The technology can support testing, simulation and commissioning of factory buildings.

Other companies are using the technology by creating digital replicas of their product. They create digital replica as part of R&D process and link them to the product lifecycle management (PLM) system. The digital twin of the product helps them in product development by helping them to simulate and test the product at an early process stage. Different 'what-if' scenarios can be tested and analysed to take an optimised decision.

Ten percent of business leaders from eastern India have started using digital twins for various purposes. Around 42% business leaders are planning to do so in the next few years.

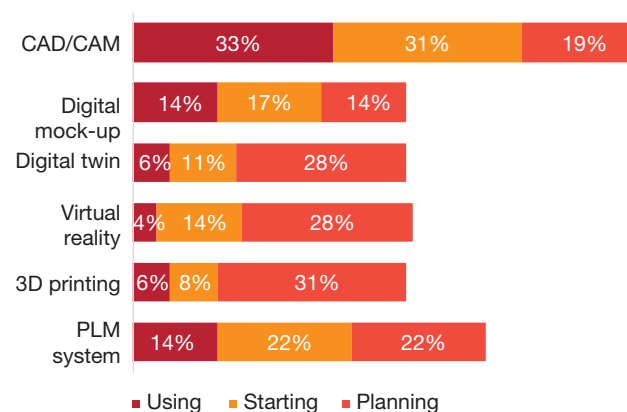
## Rapid prototyping using additive manufacturing

Additive manufacturing offers a cost-effective and faster way to prototype. Often, prototyping for a newly designed product may involve expensive operations like a production run. It may also involve investments like mould alteration before the design is even verified. In such cases, additive manufacturing lowers cost and time. If a 3D digital model is available, it can be printed out without the requirement of complex tools, moulds or any new machine. Moreover, complexity in shapes and design does not add significantly to the time required to print. This advantage provides more speed and flexibility to product design.

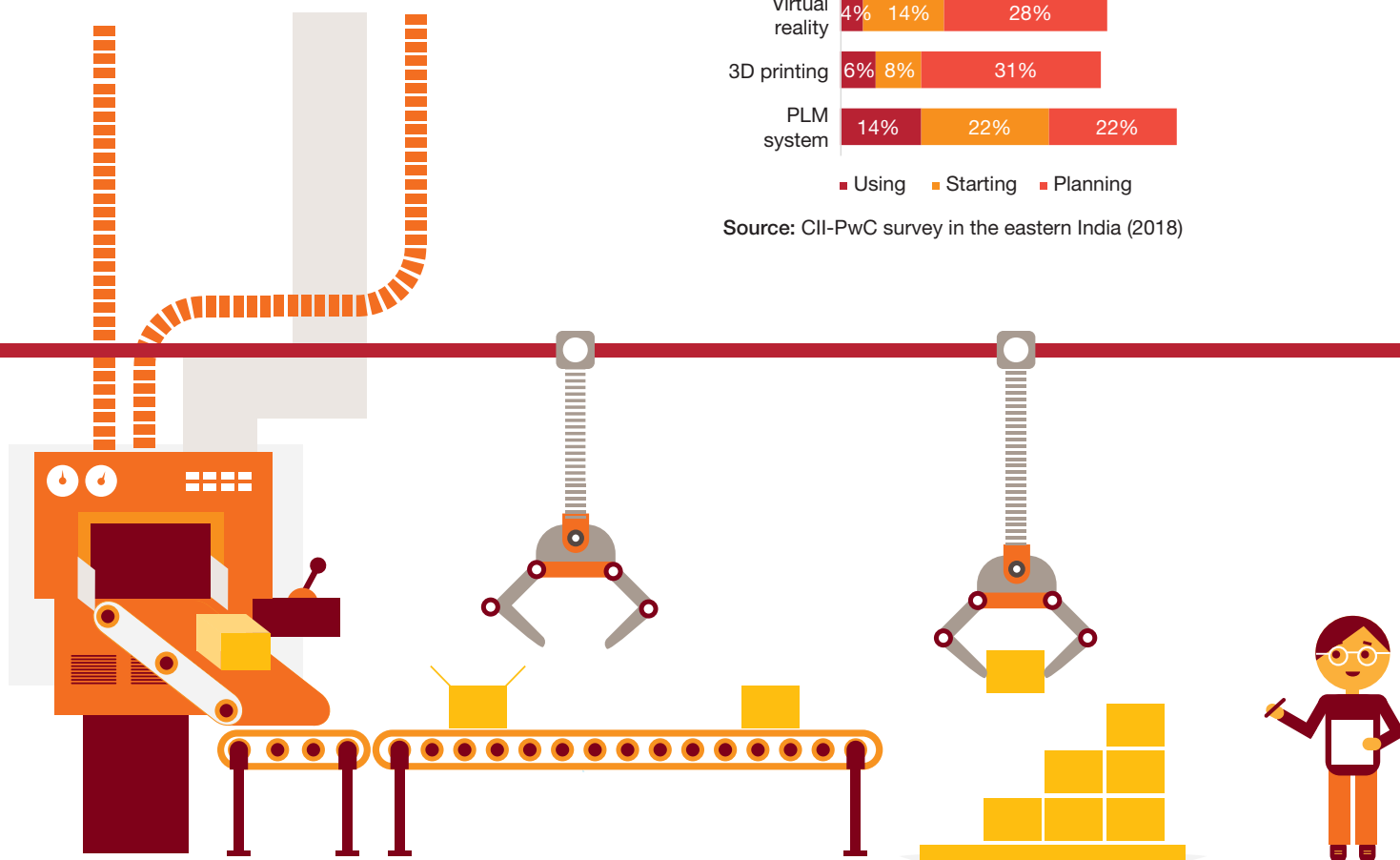
Except for rapid prototyping, additive manufacturing is also used in parts replacement and, to some extent, in component manufacturing. Automotive, aviation, jewellery, food processing and many other manufacturing industries have found applicable use cases for this technology.

In the CII-PwC survey, 16% of the participants have said that they use additive manufacturing in some way in their company. Almost half of the participants in the survey wish to use this technology in the next five years.

**Question:** To what extent have you digitised prototyping and product development?



Source: CII-PwC survey in the eastern India (2018)



## Other solutions

The above-mentioned cases are only a few of the widely used examples of how solutions are getting created to solve problems. Many of the new solutions involve drone technology. For instance, a few companies in eastern India are using drones to monitor and collect data. The data is then processed in various ways to get insights. Cognitive technologies like face detection are also being used in this part of the country to track workforce attendance.

There are companies who have moved forward from creating individual solutions in silos. They are connecting

all assets, products, production processes and enterprise software to create a connected enterprise. Such a connected enterprise calls for big investment. But it can provide big benefits in terms of visibility, control and insight, especially to very large enterprises. It can also provide benefits in terms of automating the full production process. According to the results of our survey, no business leader from the eastern region has indicated an effort towards building such a connected enterprise in their company.

## Digital technology ecosystem

Top technology companies today are providing cloud-based platforms for IoT, big data, AI and machine learning. Through these platforms, it is possible to create solutions to send data from machines, products and devices to the cloud and then perform various operations on this data to generate insights based on requirement. Data privacy, security and support for the platforms are generally taken care of by the technology provider.

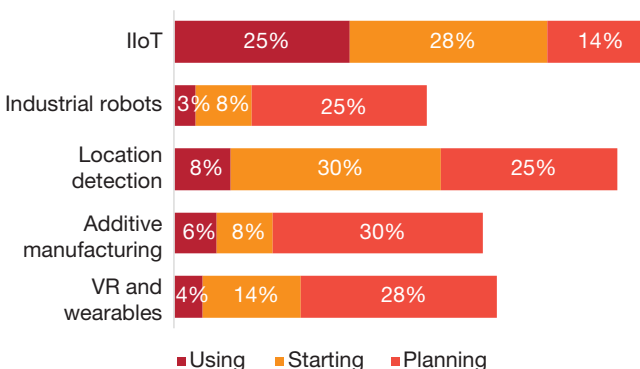
Since the solutions involve hardware and devices to send data to the cloud, it is absolutely necessary that the compatibility and protocols between hardware and software are established. Hardware providers and software platform providers are working closely towards that.

Consulting companies provide technology consulting services regarding the right solutions based on business challenges. Often, they are also able to subsequently develop those solutions. A strong IT and technology consulting industry base in eastern India is an advantage that manufacturing companies can leverage to get the right solutions from the local service providers.

Besides, a few companies in the region are trying to bring cheaper robots to small and medium businesses. This will enable the micro, small and medium enterprises (MSMEs) to use industrial robots without much capital investment. A few renowned robotics companies have their offices in this region.

The number of drone technology providers is growing in this region. This technology is also extensively researched at a premier institution.

**Question:** To what extent are you using these technologies in your business?



Source: CII-PwC survey in the eastern India (2018)

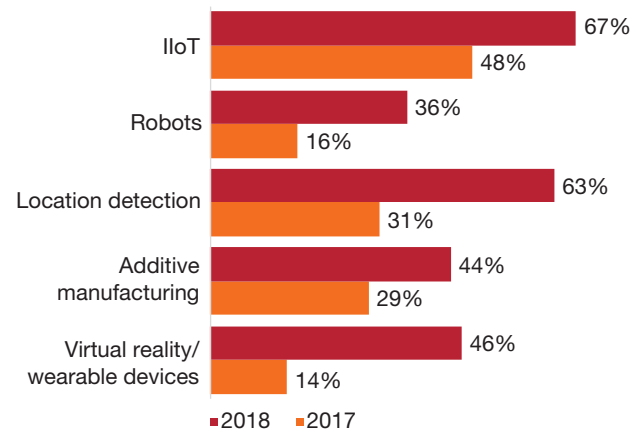


# Technology adoption trend in the eastern region

Technology adoption in eastern India is growing. The percentage of business leaders who say they are exploring, planning or using the emerging technologies has increased significantly for each of the technologies. Many business leaders have also moved from planning to the pilot phase.

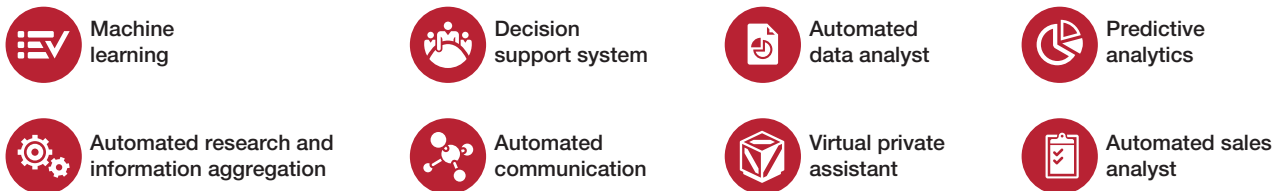
The application of advanced data science is increasing as well. Companies have started to use advanced analytics methodologies to make sense of data and make predictions instead of merely reporting it. PwC conducted a survey to understand the impact of AI-based solutions in different industries in India.<sup>11</sup> From the responses of the business leaders of the manufacturing sector, we found that machine learning, automated research and information aggregation, decision support systems and automated communications are some of the top AI-powered solutions that the manufacturing industry leaders find highly impactful.

**Question:** Are you using/piloting/planning for these technologies?



Source: CII-PwC survey in eastern India (2017 and 2018)

Top AI-based solutions that are highly impactful in the manufacturing industry – indicated by leaders across India



Source: PwC's report 'AI in India - hype or reality' (February 2018)

## Bringing the workforce along

According to PwC's 21<sup>st</sup> CEO Survey,<sup>12</sup> nearly 77% of the Indian CEOs indicated that they are concerned about the availability of digital skills in their company. Nearly 43% indicated that recruiting such talent from the market is difficult.

Business leaders worldwide consider the lack of digital culture and training as one of the challenges to the adoption of the emerging technologies. If companies are not able to bring along the workforce with the changes, technology adoption will surely fail. This can happen for multiple reasons. Inertia or resistance from the workforce is one of the reasons. The fear of being outdated, fear of losing jobs or fear of additional efforts required to fit into the new organisation can cause resistance. Company leadership plays a vital role in sending out the right messages at the time of change.

“The eastern region, especially the industrial areas of Jamshedpur, rarely witnesses IR-related issues. Strikes or unrest by the workforce is a very rare incident in this region. This is unlike many other parts of India, which are witnessing many IR issues in recent years.”

- Killol Kamani, Managing Director, Samarth Engineering Company Pvt. Ltd.

11. PwC. (2017). Artificial intelligence in India – hype or reality. Retrieved from <https://www.pwc.in/assets/pdfs/consulting/technology/data-and-analytics/artificial-intelligence-in-india-hype-or-reality/artificial-intelligence-in-india-hype-or-reality.pdf> (last accessed on 4 February 2018)

12. PwC. (2018). 21<sup>st</sup> CEO Survey. Retrieved from <https://www.pwc.com/gx/en/ceo-agenda/ceosurvey/2018/in> (last accessed on 4 February 2018)

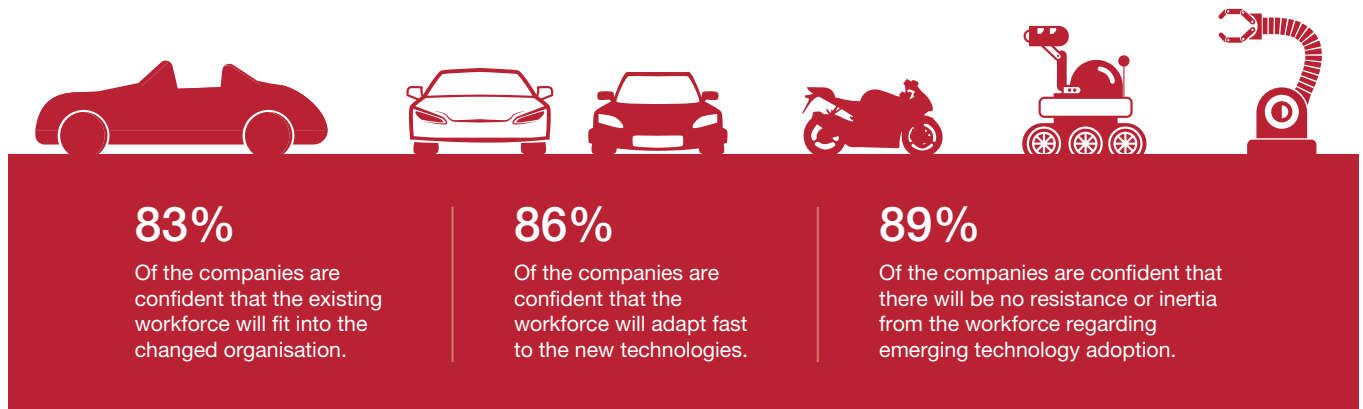


The other reason can be lack of continuous skill development effort. Skill enhancement of the workforce in society is done by companies, academia, the government and other skill development service providers. So, to ensure that the skill development effort is continuous and the content is up-to-date, each one of them has to walk the extra mile.

In this survey, we tried to measure the confidence level of business leaders regarding the fit of their existing workforce in a changed organisational landscape. We mostly received positive responses. Business leaders are confident that they will be able to retain their existing workforce.

They are also highly confident that technology-driven change will be readily received by the workforce without much resistance or inertia. This confidence reflects that positive sentiments and drive already exist within companies regarding the adoption of new technology.

Investment on training is one of the crucial factors that might differentiate a company in its journey towards technology adoption. Training will keep the workforce upgraded and help them understand the value of using the latest technologies. Training will also keep them prepared to use the technologies.

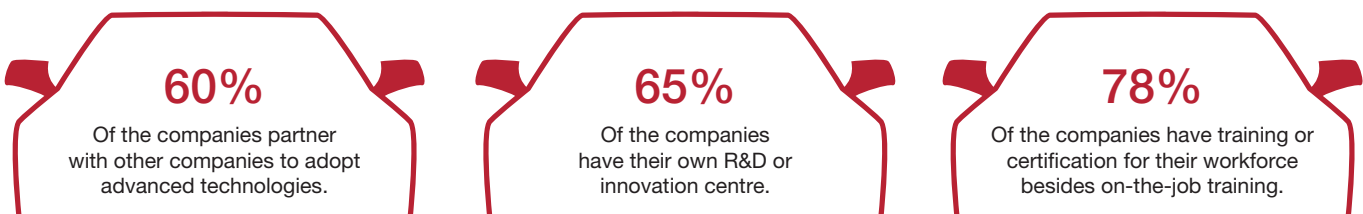


Source: CII-PwC survey in eastern India (2018)

We asked business leaders how the workforce is getting trained in their companies besides on-the-job training. Nearly 78% of the participants responded that their company funds separate training programmes or certification in their companies.

We also asked the about the technology adoption strategy and found that companies follow different

strategies to adopt technology. They may enter into partnerships with local or foreign companies or set up their own R&D centre. Sometimes, they collaborate with educational institutions to work on new technologies. Many of the companies in this region are following a combination of all these strategies.



Source: CII-PwC survey in eastern India (2018)



## Government push for technology adoption

The initiatives of the Indian government, such as 'Make in India' and 'Digital India', are efforts to foster technology adoption and global standards in the industries. The government is promoting the adoption of 'Industry 4.0' and smart manufacturing throughout the manufacturing sector.

One of the premier institutes of India is building India's first smart factory with a seed fund from a global aviation giant. This factory collects an enormous amount of data from literally every object. It even collects data from the posture of a worker, and determines when the worker needs rest after analysing posture data and other data from his working field. In a nutshell, the factory is self-aware.

The Government of India's push for electric vehicles under the Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles in India scheme will help the automotive industry to upgrade their products by using the latest technology. As part of this initiative, the government is procuring electric vehicles from the country's renowned auto manufacturers. It is also bringing electric vehicles under a lower taxation rate. All big automotive OEMs in India are gearing up to use this new technology in their products. The renowned battery companies are researching advanced battery technologies to support these vehicles. The large automobile and battery companies from the eastern region are a key part of this initiative.

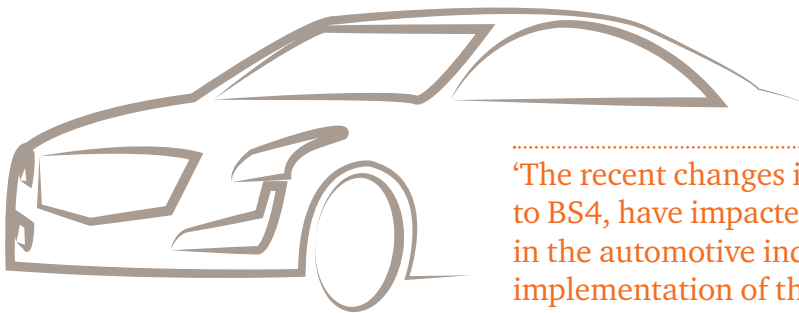
In another initiative to curb environmental pollution, the Government of India has decided to adopt Bharat Stage VI as the minimum standard for automotive manufacturing. Once implemented, this will require a significant step

forward by moving two levels at a time. Bharat Stage V, which was compliant with Euro V standards, will be skipped completely. The implementation timeline is within the next few years. This regulation change and associated implementation are expected to bring technology-driven changes in the automobile value chain, including auto-ancillary sectors which are related to the manufacturing of engine and fuel components.

Moreover, the Government of India's 'Smart Cities Mission' to develop smart cities across India is expected to boost the usage of sensors, connected objects and emerging technologies. It is also expected to provide improved infrastructure. All of these will ultimately benefit the manufacturing industry as well as many other industries.

The Government of India is eyeing 5G network connectivity in India by 2020. The large network service providers in India are working on technologies that can support and enable 5G connectivity. The prospect of 5G connectivity in the next few years will provide a boost to the IoT initiatives across industries.

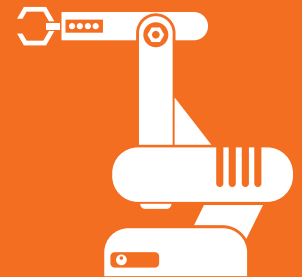
State governments are also taking many initiatives to boost technology adoption. A few state governments have set up partnerships with information technology companies to spread digital awareness, promote technology adoption and develop skills for digital transformation. Some of them are conducting state-level hackathons to develop solutions in challenge areas like FinTech, tourism and transportation. They are also trying to build their states into hubs for selected technologies.



“The recent changes in regulations, from BS3 to BS4, have impacted the entire value chain in the automotive industry. In future, the implementation of the Euro VI norm in the automotive industry will further drive a significant technology-driven change in the industry.”

**- Aditya K Shrivastava**  
Head of Manufacturing Operations/ Sr. Vice President,  
Volvo-Eicher Commercial Vehicles Limited

# Potential of eastern India for automotive manufacturing



## Automotive investment can bring many benefits to the eastern region

The automotive industry has always been at the forefront of technology and process innovation. This includes assembly line, kaizen and just-in-time production. These innovations have transcended the boundary of the automotive sector and benefited other industries as well. The same trend continues today.

To exceed customer expectations, the automotive industry has been investing in autonomous vehicles, vehicle-to-vehicle communication, material science for light-weighting of vehicles, advanced fuel technologies and many other areas. The full ecosystem of the automotive industry, which includes auto component companies, electronics companies, battery companies and software companies, is involved in shaping these advanced technologies into a reality.

Consequently, the innovations that are fuelled by the auto industry today will not be limited to the industry alone. They will benefit all the industries in the ecosystem and even outside it. In the other words, these innovations will foster technology-enabled manufacturing.

Moreover, these benefits will go beyond the field of technology.

The automotive industry exists alongside and is supported by many other industries, both upstream and downstream. This includes metal and mining, fuel, electronics, rubber, and auto components. Thus, it has a multiplier effect on the growth of the economy. A bigger footprint of auto OEMs in eastern India will generate more upstream and downstream businesses and thereby boost the economy further. Governments in turn stand to benefit from the tax collected from such companies.

Besides, automotive companies and associated ecosystem are big job creators. Nearly three crore workers are directly or indirectly employed by the automotive industry in India. The expansion of the automobile industry will create more jobs in this area.

In our survey, we asked existing business leaders (from diverse backgrounds such as auto ancillary, engineering, chemical, metal and mining, and oil and gas) how new

*'A region's aspiration to become an automotive manufacturing hub could be fulfilled by satisfying three important factors—market size, flexibility to accept and deploy technology-led manufacturing systems, and ability to develop and attract workforce with relevant skills. The regions that satisfy these criteria have seen the benefits realised faster.'*

*- Dipankar Chakrabarti  
Executive Director, Advisory, PwC India*

automotive OEMs can benefit their business. Almost 56% of them say that they can directly sell products to the OEMs. Further, 22% of them expect to be a part of this bigger ecosystem. Therefore, the positive impact of an increased automotive footprint is expected to be widespread.

**Question:** What is the top benefit for your business if a large OEM sets up operations in this region?



Source: CII-PwC survey in eastern India (2018)

## Automotive footprint yet to catch up in the eastern region

The automotive sector in India is one of the largest in the world. India holds a leading position globally in tractor, two-wheeler, bus and passenger car manufacturing. The industry produces nearly 24 million vehicles annually.<sup>13</sup> The market has witnessed an upward growth trajectory in the last couple of years.

Eastern India, which is home to a few OEM companies and their tier 2 and tier 3 suppliers, is yet to fully participate in this growth story. Although the region also contributes to the automotive value chain as a source of raw material input, most of the automotive plants are located in western, northern and southern India.

## Major strengths of the eastern region

The eastern region has many strengths that that can be leveraged to make it an attractive investment destination. The region is a hub for steel and easy availability of steel can be beneficial to an auto ecosystem in this region.

Besides, the eastern region already has an auto ancillary ecosystem. An automotive cluster comprising more than 600 auto ancillary companies has been set up in Adityapur. Besides the MSME cluster, some big suppliers are also present around this region. They have top-level quality accreditation and cater to the needs of automotive part manufacturers across various geographies.

Quality of workforce is another strength of this region. Our study last year showed that business leaders' had a positive view of the workforce in this region. Nearly 85% of the survey respondents last year indicated that the workforce learns fast. More than 70% said that they could adopt to a changing environment. Finally, nearly 77% said that the attrition rate in this region was lower compared to other geographies. Additionally, the automotive industry existing in this area has not seen labour unrest, unlike many other automotive plants in the others parts of India.

Finally, the region is well positioned to access the markets of various states in north-eastern India, and multiple neighbouring countries. The presence of international

*'The eastern region needs a big player to set up its operations, and everybody here is eager to see that happening. Whoever takes the decision first will certainly get a significant first-mover advantage. The region has skilled manpower and natural resources.'*

*- Prabal Basu  
Chairman and Managing Director,  
Balmer Lawrie*

ports such as Kolkata, Paradip and Haldia can help connect to the markets of the Far East as well. The region is also well connected to all major manufacturing sites within the country through a road network.

13. DIPP. (2016). Make In India Automotive Achievement Report. Retrieved from <http://www.makeinindia.com/article/-/v/automotive-achievement-report> (last accessed on 4 February 2018)

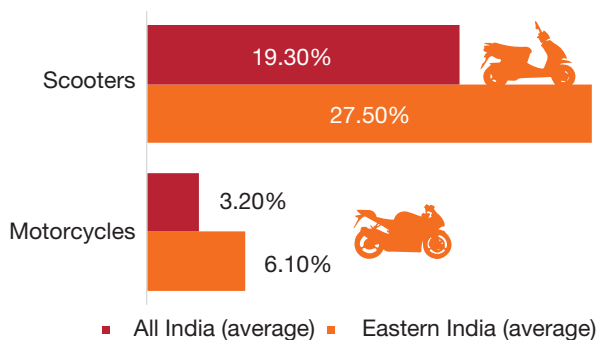


# Eastern India offers opportunities for OEM players

The eastern region comprises nearly 25% of India's population. GDP per capita of this region is expected to increase due to improved logistics and infrastructure. Currently, the per capita automotive ownership in the eastern region is significantly lower than the per capita automotive ownership in the country. Owing to the expected increase in per capita GDP, the per capita automotive ownership can increase in future.

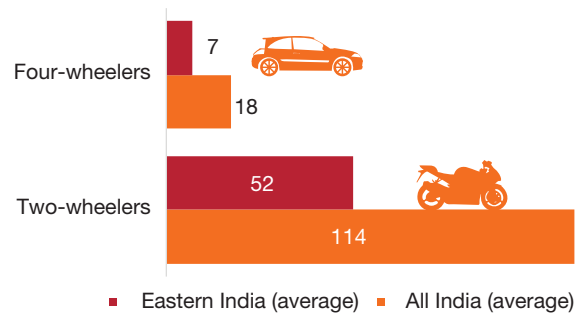
Besides, due to the unique market characteristics and demographics, the eastern region is ahead of other regions of the country in terms of two-wheeler sales. There is a sizable market for two-wheelers in the eastern part of India. Moreover, although sales are rising, no two-wheeler manufacturing unit has been established in this region thus far. Setting up a plant in eastern India may give a two-wheeler manufacturer proximity to this growing market.

## Two-wheeler volume growth (CAGR, FY11-16)



Source: Spark Capital (June 2016)

## Automotive ownership in eastern India vs. all India (penetration per 1000)



Source: Spark Capital (June 2016)

Moreover, agriculture is a key sector in a few states. Consequently, there is a market for tractors. Setting up tractor plants in eastern India can ensure proximity to market. The governments continues to emphasise its commitment to agriculture. Union Budget 2018 announced several measures that will enable farm income to double by 2022. This is expected to boost the demand for tractors and two-wheelers in future.<sup>14</sup>



‘Considering the need to be closer to OEMs, leading automotive components and aggregate manufacturers have set up facilities, especially in Jharkhand and West Bengal. Therefore, this competitive advantage is already available for prospective OEMs exploring this region to establish their manufacturing operations.’

- *S K Behera*

*Vice Chairman and Managing Director, RSB Transmissions (I) Ltd*

14. PwC. (2018). Sectoral analysis: India riding the growth wave. Retrieved from <https://www.pwc.in/assets/pdfs/budget/2018/sectoral-analysis-india-riding-the-growth-wave.pdf> (last accessed on 4 February 2018)

In the CII-PwC survey this year, we asked business leaders about the advantages of setting up an automotive plant in the eastern region. Most of the leaders said that the possible benefits would come from access to market, a skilled workforce and cheaper resources.

**Question: What are the top 3 advantages of setting up an automotive factory in the eastern region?**



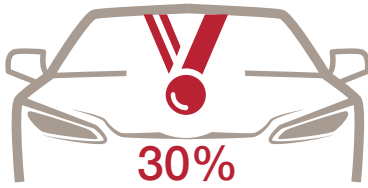
Source: CII-PwC survey in eastern India (2018)

We also asked business leaders about their top business offering to an automotive OEM if a plant were to be set up in this region. The top offerings indicated are high-quality products, advanced technologies, and cheaper products and services compared to other geographies.

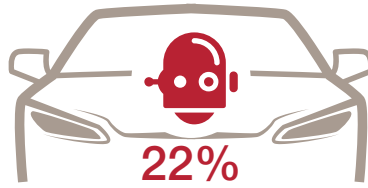
*‘The eastern region is the right place for a two-wheeler automotive OEM to set up operations. All the components that a two-wheeler OEM needs are being manufactured by the ancillary base in this region. Besides, 65% of the two-wheeler sales in India happen east of Kanpur. Unfortunately, there is not a single manufacturing unit of two-wheeler vehicles in this area.’*

*- Killol Kamani  
Managing Director, Samarth Engineering Company Pvt. Ltd.*

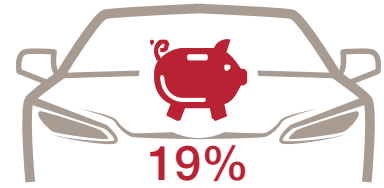
**Question: What are the top value propositions from your business to encourage investment from automotive OEMs in this region?**



High-quality product: My business has ISO or other quality certifications



Advanced technology that an OEM will need in its new factory



Cheaper products/services than my competition in the other geographies

Source: CII-PwC survey in eastern India (2018)



# Eastern India can contribute to the automotive value chain in various other ways

Eastern India's participation in the automotive value chain is not necessarily limited to the setting up of OEMs. Nowadays, OEMs and tier I suppliers tend to distribute various elements of the value chain in different parts of the country by taking into account demographic, geographic and customer perspectives. Improvements in IT infrastructure and enabling technologies have ensured that many of these activities along a value chain can be managed as part of the coordinated activities.

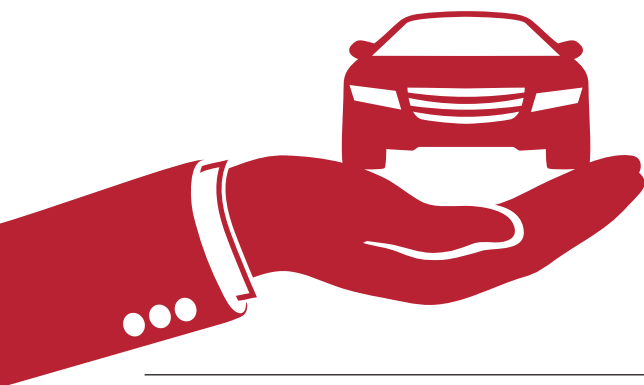
Looking forward, the eastern region can contribute to the automotive ecosystem in a number of different ways.

## Next-generation engineering R&D centres

The eastern region has a large number of premier engineering and technical institutions. These colleges churn out thousands of technical graduates. This is a strength that can be leveraged to set up R&D centres. India has over 1,000 global in-house centres (GICs) all across the country. With more than two decades of experience in India, these GICs are set to script next stage of their journey. Most of the GICs have been set up in metropolitan states and are hence fast losing out on their low-cost promise due to wage inflation and the escalating cost of infrastructure. Only a limited number of engineering/tech centres operate on a hub-spoke model and have multi-city operations. This opens up opportunities for the eastern region as a viable alternative for satellite centres to support expansion activities.

## Incubation centres

The Central government intends to establish seven research parks across the country to boost the start-up ecosystem as part of the Start-up India initiative. One of the premier institutes in the eastern region has been nominated to host one research park in the eastern zone. This might be an opportunity for the states in this region to promote allied/feeder research parks to augment the effort and to contribute to fresh thinking/ideas. Smart cities provide a conducive environment for such incubation centres by providing good physical and digital infrastructure at affordable commercial rates. Many of the smart city locations from the eastern region are comparable to the best in the country. Therefore, such smart cities can assume a leading role in hosting incubation centres going forward.



## Test facilities

The automotive industry is subject to rigorous testing and certification at a part, subsystem, system and vehicle level. Recently, there has been a lot of regulatory attention towards pedestrian safety, vehicular emission and noise pollution. The government's drive for electric mobility is a step in that direction. As the automotive sector in India progressively matures, a number of mechanical and electrical parts would come to market and these products would need to pass stringent boundary conditions. The National Automotive Testing and R&D Infrastructure Project (NATRIP) is an initiative that combines the government and auto companies to create state-of-the-art testing and validation facilities in the country. Currently, there is no NATRIP centre in the eastern region.

Currently, manufacturers usually build and operate their own test and proving facilities. With a predicted volume growth, many OEMs in the future would need to build their own facilities or expand into a satellite centre in response to the escalating cost in established locations. Given the abundance of physical and human capital availability, some of the states in the eastern region can present credible business cases for setting up testing facilities for many OEMs.

## Hubs for digital CoEs

The digital initiatives of many MNC firms in India have yielded success for their technical support teams. Hence, the world is increasingly leveraging Indian talent and infrastructure to deliver a greater customer experience. Even within the larger digital umbrella, a number of different tasks can be performed by leading tier I cities in the eastern region. In order to present themselves as a viable destination, these cities need to present business cases to support the digital initiatives of the MNCs by supplying manpower with an in-depth understanding of mobility or application frameworks, development, and quality assurance. Also, these centres should ensure that there is a self-sustaining system to generate high-quality statisticians and data scientists.

## Manufacturing of plastic parts

Plastic has wide usage in all growth segments like automobiles, healthcare, packaging, agriculture as well as emerging segments like plastic composites, sports and 3D printing. Triggered by both import as well as export demands, the plastic sector in India is expected to deploy 1,80,000 machines in 2020 from the current 1,20,000 machines. Exports of plastic goods from India are expected to double from 7.9 billion USD currently to about 15 billion USD in five years.<sup>15</sup> Due to plastic's multi-industry applications, the eastern region has the opportunity to develop this competency. In order to enable this, the region must nurture the following capabilities: enhanced design, high-capacity processing machines, R&D facilitation and intelligent manufacturing.

15. GPCA Plasticon (April 2017) website: <http://www.gpcaplastics.com/> (last accessed on 4 February 2018)

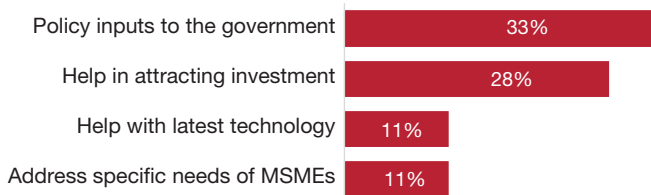
# Expectation from the government and industry associations

State governments and industry associations all have their roles to play in increasing the automotive footprint in this region. Government policies and ease of doing business are major factors in deciding investment destinations for investors. Business leaders are looking for a long-term stable investment-friendly policy from state governments.

Connectivity has been indicated by business leaders as the other major factor in deciding the location for plants. According to a few business leaders of the region, the connectivity of the existing industrial areas must improve. A new airport close to the location of automotive companies can improve the situation. The government has already started working towards this end.

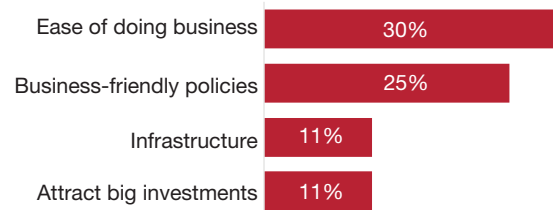
The leaders have also emphasised good infrastructure and facilities. According to them, infrastructure and facilities are one of the top areas for governments to work on. So, any new areas that are targeted for business investment should have good connectivity and all other facilities sufficient for not only running a plant but also for employees to live.

**Question: What is the top challenge area on which business associations need to focus more to develop into the state an automotive hub?**



Source: CII-PwC survey in eastern India (2018)

**Question: What is the top challenge area on which state governments need to focus more to develop the state into an automotive hub?**



Source: CII-PwC survey in eastern India (2018)

Once these are in place, it is important for the government to create the right perception and brand for their states. It is important to highlight the right strengths to create awareness. A few state governments have been reaching out to automotive companies to attract such investments already. Industry associations can play a big part in creating platforms for the government and the business community to come together and work towards new investments. The region's strengths can be showcased and experiences of existing businesses can be shared on such platforms.

Additionally, industry associations can also play a crucial role in providing policy inputs to state governments so that policymakers are aware of the concerns of the business community while creating policies.

Business leaders have also indicated that they expect industry associations to help in understanding the emerging technology trends, and thus help in technology enablement of manufacturing. They would like industry association to address the specific needs of MSMEs. As MSMEs constitute a large portion of the value chain for the automobile sector, focusing on their concerns is important.



*'In order to attract the right talent to run an industry successfully, the administration and investor have to ensure proper infrastructure and amenities. A right work-life balance and the overall ecosystem constitute one of the important factors. Young talent always looks for a good balance between work and life (on-site) and personal life (off-site), especially in remote and underdeveloped areas.'*

**- Aditya K Shrivastava**

Head of Manufacturing Operations/Sr. Vice President,  
Volvo-Eicher Commercial Vehicles Limited



# Conclusion

Overall, technology adoption among the companies in eastern India is increasing. Industry bodies are generating more awareness about new technology options by providing a common platform to industry leaders, academia, service providers and consultants.

At the same time, emerging technologies are going to change the manufacturing landscape in a significant way. There will be new opportunities for developing products and services as the fourth industrial revolution is going to bring sweeping changes in automotive manufacturing and automotive component manufacturing. Competition is expected from non-traditional players.

Government organisations are implementing the requirements of ease of doing business faster. This helps in improving state-level rankings. The eastern region has also set an example of a productive manufacturing environment in certain industrial clusters. Collective efforts are needed to make the region a strong manufacturing hub.



# About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8,500 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 265 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

As a developmental institution working towards India's overall growth with a special focus on India@75 in 2022, the CII theme for 2017-18, **India@75: Inclusive. Ahead.** **Responsible** emphasizes Industry's role in partnering Government to accelerate India's growth and development. The focus will be on key enablers such as job creation; skill development and training; affirmative action; women parity; new models of development; sustainability; corporate social responsibility, governance and transparency.

With 67 offices, including 9 Centres of Excellence, in India, and 11 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Iran, Singapore, South Africa, UK, and USA, as well as institutional partnerships with 355 counterpart organizations in 126 countries, CII serves as a reference point for Indian industry and the international business community.

## Confederation of Indian Industry

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