



Confederation of Indian Industry

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# *Success stories and the road ahead*

## Technology-enabled manufacturing



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# Foreword



Emerging technologies have brought unprecedented opportunities for the manufacturing industry. These technologies present new options for improving quality, reducing cost and increasing revenues. Globally, companies are adopting new technologies to make their manufacturing processes smarter and to keep pace with the changing demands in the markets. In such a global manufacturing landscape, future growth for a company depends on how it can leverage new technologies to create a competitive advantage for itself.

This changing technology landscape presents an excellent opportunity to eastern Indian manufacturing companies to differentiate themselves from global competition. India has a vision to become a prominent manufacturing hub in the future. India 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 grow fast to contribute significantly in this journey.

Eastern India has many manufacturing success stories for emulation by others. There are companies with the elite level of quality accreditation. The region also has companies that have implemented advanced technologies and are realising business

benefits. There is also an example of a foreign company that has chosen to set up operations in eastern India and cater to their customers all over the country.

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 environment. It is important that the manufacturing companies understand the present state of the region in all four areas and the forces of the future that can help them grow.

**T V Narendran**  
Chairman  
CII Eastern Region

# Introduction



Technology is changing the definition of competitiveness in the manufacturing industry. Manufacturing factories are becoming more intelligent, with smarter machines that produce smarter products. Enterprises are increasingly getting digitally integrated. According to PwC's 20th Annual Global CEO Survey, nearly 64% of CEOs worldwide believe that technology will reshape or significantly impact industrial manufacturing in the next five years.<sup>1</sup>

At the same time, a manufacturing company's ability to realise value through new technologies will determine how successful it is going to be in its space. Manufacturing companies need to develop new capabilities to build and sustain their competitive advantage with the help of technology. This advantage will come through better quality, higher productivity and more flexibility. The right mix of strategy, innovation, quality focus, workforce development and technology will help manufacturing companies gain this competitive advantage. All these elements need to work in tandem to make a future-ready company.

To understand the views of leaders from the eastern region, the Confederation of Indian industry (CII) and PwC conducted a survey through CII's digital platform. About 52 business executives from all five states of eastern India responded to our questionnaire and shared their perspective on several aspects related to quality, workforce, technology and productivity in the manufacturing industry. The respondents represent a wide spectrum of industries, including engineering, power, cement, steel and electronics. We received responses from 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 highlighted the successful journey of many organisations. We thank all the respondents for spending their valuable time in sharing their inputs.

**Arijit Chakraborti**  
Executive Director  
Technology Consulting  
PwC India

<sup>1</sup> PwC. (2017). 20th CEO Survey. Retrieved from <http://www.pwc.com/gx/en/ceo-agenda/ceosurvey/2017/gx/20th-anniversary.html> (last accessed on 17 February 2017)

# Technology-enabled manufacturing: The road ahead

## Growth story of eastern India from last year

Last year, CII and PwC together carried out an industry study and survey<sup>2</sup> to understand the growth prospects of the manufacturing industry in eastern India. The survey also tried to examine the role of emerging technologies in this growth story. We found that growth expectations were high among business leaders, who believed that technology could play a big role in their companies' growth.

In line with the emerging technology trends of 2016, last year's survey probed three technology areas: the Internet of things (IoT), additive manufacturing and robotics. According to the survey, IoT was strategically important for almost 81% of the respondents; additive manufacturing, for about 46%; and robotics adoption, for 44%. Further, the survey revealed that technology was always on the agenda for business strategy development for nearly 66% of the companies.

### Benefits expected from digital integration by 2020



(Source: PwC's 2016 Global Industry 4.0 Survey)

However, very few of the companies surveyed had adopted or had a plan for the adoption of these technologies. Although business leaders realised the strategic importance of these technologies, a few major barriers obstructed their adoption. The top four barriers identified by the respondents were high cost of initial investment, lack of proper infrastructure, lack of compelling business cases and lack of a skilled workforce.

## Rapidly changing technology landscape

The technology landscape is extremely dynamic. Accordingly, the CII-PwC survey has recalibrated its lens for viewing technology-enabled growth in eastern India. Our 2017 survey focused on business leaders' views on the growth potential of the manufacturing industry in eastern India in view of the

changing technology landscape and the changing definition of competitiveness. Some of the major trends to emerge recently are as follows: An unprecedented emphasis among companies globally on digitally integrating their operations; more digital technologies featuring on the list of technologies that matter to the manufacturing industry.

## Digital integration of enterprises

Companies globally have begun using technologies in new and innovative ways. Using technologies like cyber-physical systems, autonomous robots and wearables, they are digitally integrating the full enterprise—i.e. integrating data from machines, IT systems, the workforce, fleet, products etc., through the Internet. This integrated enterprise data is then being used to generate valuable insights and for more effective real-time tracking. Through such digitalisation, integration and insight generation, companies expect to gain significant benefits in terms of efficiency, low cost and additional revenue.<sup>3</sup>

## More intelligent manufacturing

The benefits of digitalisation and integration of value chains are not limited to visualisation of data and insights. These advances enable machines, robots and other devices that are connected to the Internet to communicate with each other. Such communication, together with intelligent analysis, enables a fleet of robots and machines to work in tandem without any manual intervention, thus opening up many new doors to automation. For example, a Chinese firm has created a factory fully operated by industrial robots, computer numerical control (CNC) machines and unmanned transport trucks. The central control system is used only for monitoring purposes and no manual intervention is required during the production process.<sup>4</sup> This example illustrates the level of automation that can be achieved in manufacturing plants.

<sup>2</sup> CII and PwC. (2016). Technology-enabled manufacturing: Growth prospects for eastern India.

Retrieved from <http://www.pwc.in/publications/2016/technology-enabled-manufacturing.html> (last accessed on 17 February 2017)

<sup>3</sup> PwC. (2016). Industry 4.0: Building the digital enterprise. Retrieved from <http://www.pwc.com/gx/en/industries/industry-4.0.html> (last accessed on 17 February 2017)

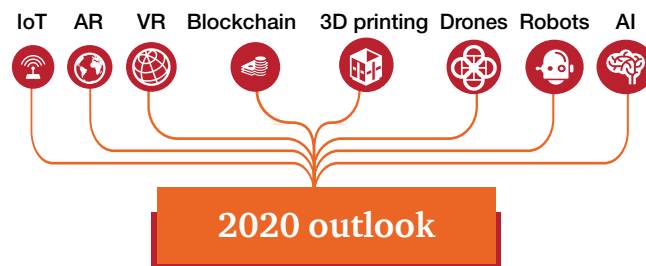
<sup>4</sup> PTI. (2015, July). China sets up first unmanned factory; all processes are operated by robots. Economic Times.

Retrieved from <http://economictimes.indiatimes.com/news/international/business/china-sets-up-first-unmanned-factory-all-processes-are-operated-by-robots/articleshow/48238331.cms> (last accessed on 17 February 2017)

## The 'Essential Eight' technologies

In its forecast for 2020, PwC identified eight technology areas that are referred to as the Essential Eight. These technologies will matter the most across industries in the near future: artificial intelligence (AI), augmented reality (AR), blockchain, drones, Internet of things (IoT), robots, virtual reality (VR) and 3D printing. Most of these technologies are bringing changes to manufacturing companies worldwide.

### The Essential Eight



**Internet of things (IoT):** A network of objects—devices, vehicles, etc.—embedded with sensors, software, network connectivity and compute capability, which can collect and exchange data over the Internet. IoT enables devices to be connected and remotely monitored or controlled. The term 'IoT' has come to represent any device that is now 'connected' and accessible via a network connection. Industrial IoT (IIoT) is a subset of IoT and refers to its use in manufacturing and industrial sectors.

**Augmented reality (AR):** Addition of information or visuals to the physical world, via a graphics and/or audio overlay, to improve the user experience for a task or a product. This 'augmentation' of the real world is achieved via supplemental devices that render and display said information. AR is distinct from VR, as the latter is designed and used to re-create reality within a confined experience.

**Virtual reality (VR):** Computer-generated simulation of a three-dimensional image or a complete environment, within a defined and contained space (unlike AR), that viewers can interact with in realistic ways. VR is intended to be an immersive experience and typically requires equipment, most commonly a helmet/headset.

**Blockchain:** Distributed electronic ledger that uses software algorithms to record and confirm transactions with reliability and anonymity. The record of events is shared between many parties and information once entered cannot be altered, as the downstream chain reinforces upstream transactions. This technology is going to create a new era of contract management, and will play a significant role in smarter collaboration among the businesses within an ecosystem.

**3D printing:** Additive manufacturing techniques used to create three-dimensional objects based on digital models by layering or 'printing' successive layers of materials. 3D printing relies on innovative 'inks', including plastic, metal and, more recently, glass and wood. This is going to make flexible manufacturing a reality in the coming years, and will redefine the manufacturing industry.

**Drones:** Air or water-based devices and vehicles—for example, unmanned aerial vehicles (UAV)—that fly or move without an on-board human pilot. Drones can operate autonomously (via on-board computers) on a predefined flight plan or be controlled remotely. (Note: This category is distinct from autonomous land-based vehicles.)

**Robots:** Electro-mechanical machines or virtual agents that automate, augment or assist human activities, autonomously or according to set instructions—often a computer program. (Note: Drones are also robots, but PwC classifies those as a separate technology). Twenty years ago, there were fewer than 7,00,000 industrial robots in action. Today, there are about 18,00,000 of these machines, and their number is estimated to be 26,00,000 by 2019.<sup>5</sup>

**Artificial intelligence (AI):** Software algorithms that are capable of performing tasks that normally require cognitive human capabilities, such as visual perception, speech recognition, decision-making, and language translation. AI is an 'umbrella' concept that is made up of numerous subfields. One such sub-field is machine learning, which focuses on the development of programs that can teach themselves to learn, understand, reason, plan and act (i.e. become more 'intelligent') when exposed to new data in the right quantities.

<sup>5</sup> IFR. (2016). Press release. Retrieved from <http://www.ifr.org/news/ifr-press-release/world-robotics-report-2016-832/> (last accessed on 17 February 2017)

## Being competitive in the age of change

Owing to the changing technology landscape, the manufacturing companies of eastern India will face strong competition. With the use of robots, flexible manufacturing and automation, the option of cost arbitrage from a cheaper workforce is gradually fading. Quality of product and innovation are becoming more important to gain a competitive advantage in the global market. Customers increasingly want products that are better, faster and cheaper—all at the same time. The new generation of technologies can enable manufacturers to fulfil these expectations.

However, the adoption of cutting-edge technologies in silos will not be very beneficial. The goal is to provide value to customers and stakeholders using these new technologies as enablers. To do this, companies will also need to focus on certain other essential attributes. They need to focus on quality to necessitate improvements. They also need a motivated workforce to innovate and drive improvement measures. Finally, they need a robust vision and roadmap. Therefore, a more holistic approach is needed to transform into a future-ready company—namely an approach where factors such as technology, workforce, quality practices and business goals work in tandem to deliver value.

*We are seeing companies in eastern India adopt newer technologies to reap business benefits—a majority of these industry 4.0 adoptions are aimed at quick wins. We would like to see effective collaboration between manufacturing companies and technology start-ups that lead to the development of unique solutions locally, thereby yielding a technology-led competitive advantage.*

**Arnab Basu**  
Joint Leader, Technology Consulting, PwC

*In the emerging and rural parts of India, people do expect high product quality but at a much lower price. This is only possible by innovation and not copying products from the developed world.*

**A B Lall**  
Plant Head (Jamshedpur Plant),  
Tata Motors Limited

This survey attempted to investigate where the manufacturing industry of eastern India stands in terms of quality, workforce, technology and productivity in order to present a holistic view of their competitiveness in the new landscape. In addition, the survey examined whether companies are following any vision and roadmap, and how the changing digital technology landscape is being leveraged to deliver value.



## Aspiring for long-term growth

Future-ready companies, together with a business-friendly environment, can ensure long-term growth for the manufacturing industry of eastern India. This CII-PwC survey has tried to gauge the level of confidence about revenue growth among business leaders in this region.

The International Monetary Fund (IMF) forecasted a GDP growth of 6.6% for India in the current fiscal year, despite the overall bleak position of the global economy.<sup>6</sup> While this is a positive signal for the business community, the government's increasing focus on the manufacturing industry lends further impetus to it. Smart cities, industrial corridors, the Make in India campaign, Digital India campaign and introduction of GST are expected to give a boost to business in the country. The focus on infrastructure projects is expected to generate demand for industrial manufacturing. All of these factors are adding to the optimism of business leaders.



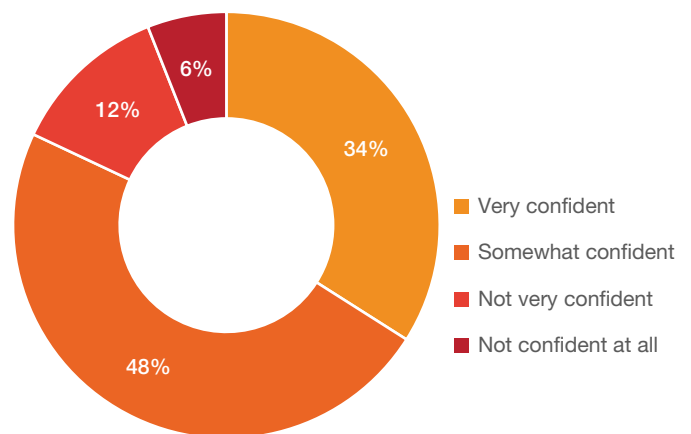
Additionally, state governments in the eastern region are making considerable efforts to attract investments. They are creating infrastructure and business-friendly policies and holding business summits to reach out to the business community. Moreover, they are focusing on ease of doing business to clear red tape and simplify the process of setting up business as much as possible.

Not surprisingly, the survey revealed that business leaders in eastern India were confident about business growth: About 80% of them expected that their company revenue

would grow in the next three years; within this group, 34% expressed a high level of confidence in growth.

However, the bigger challenge is preparing for long-term growth. The economic situation will keep changing, and only the companies that have developed strong capabilities to cater to their market will continue to grow.

### Question: How confident are you about revenue growth prospects of your company's operations in the next three years?



(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

Therefore, eastern Indian companies should not be complacent about short-term revenue growth prospects or be satisfied with the status quo. Companies worldwide are advancing fast and there is a constant danger of being surpassed by competitors from any corner of the world.

Government initiatives are expected to set the stage for companies in terms of good infrastructure, business-friendly policies and ease of doing business. Companies need to play their part by creating world-class products and services through the use of cutting-edge technologies wherever possible. This partnership can help the eastern region achieve long-term growth.

<sup>6</sup> Dhasmana, I. (2017, January). Note ban to cost India fastest growing crown, IMF cuts FY17 growth to 6.6%. Retrieved from [http://www.business-standard.com/article/economy-policy/note-ban-to-cost-india-fastest-growing-crown-imf-cuts-fy17-growth-to-6-6-117011601174\\_1.html](http://www.business-standard.com/article/economy-policy/note-ban-to-cost-india-fastest-growing-crown-imf-cuts-fy17-growth-to-6-6-117011601174_1.html) (last accessed on 17 February 2017)

# Being future ready

For a holistic view of future readiness, the survey considered four factors for eastern Indian companies—workforce, technology, quality and productivity. The survey also explored their roadmap for transformation to a future-ready company.

## Strong focus on quality

The first factor that the survey covered is focus on quality. A robust quality management set-up ensures that the company focuses on meeting and exceeding customers' expectations continuously. This focus extends from an aspiration to produce world-class products and to become globally competitive. One of the major attributes of a robust quality management practice is the focus on a culture of continuous improvements. Such a focus helps companies to explore options for betterment through technology enablement and process improvements. Hence, the presence of a good quality management system is a business imperative for future-ready companies. The CII-PwC survey found that eastern Indian companies usually focus on quality management practices and a good number of them are confident about their product quality. At the same time, business leaders understand that there are opportunities for improvement in both areas.

## Success story: Deming Prize winners

The eastern India manufacturing and mining sector has a few Deming Prize winners. This is a great inspiration for other companies who aspire to follow or are already following total quality management (TQM) practices for quality management. The Deming Prize is a highly prestigious globally recognised award which is conferred on companies that are a class apart in their quality management. The presence of such companies in eastern India will inspire other companies to learn from their practices.

## Success story: Technology-enabled quality improvement

A few companies in eastern India have set up their own research and development centres to improve on the adopted technology and use it to improve their product quality. Earlier, these companies primarily depended on foreign partners for technological advancements and subsequent re-adoption. With the activation of such indigenised R&D centres, they have been able to completely eliminate that dependency. These companies have jointly worked with academia, and sometimes with government ministries, to advance their research activities.

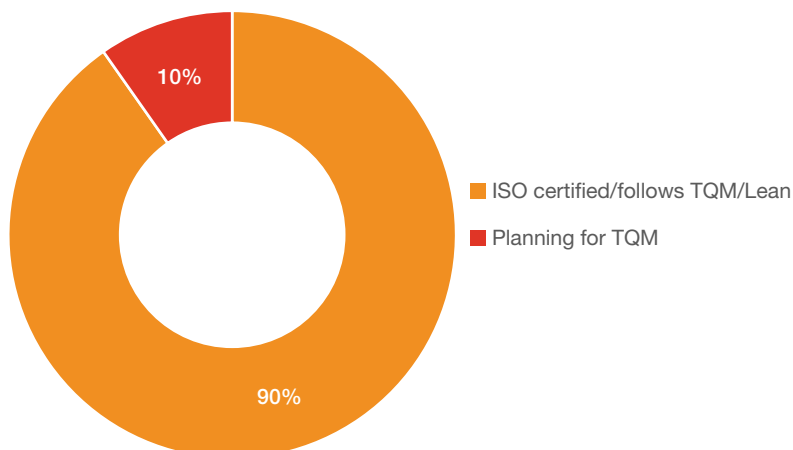
## Emphasis on quality management practices

The CII-PwC survey revealed that 90% of the companies followed some form of quality management practices—either TQM or Lean—or had International Organization of Standardization (ISO) certification. The remaining 10%, who did not follow any of these practices, stated that they were planning to implement TQM in their company.

Looking into each of the quality practices individually, the survey revealed that almost 27% of the companies were successfully running TQM, while 40% of the companies were planning to implement TQM. TQM is an approach that provides guidelines on management of quality at every stage of operation. It also suggests continuous monitoring of processes for improvement opportunities focusing on customer requirement.

The other practice that the survey examined is Lean. Lean mainly focuses on elimination of 'waste' from the process. It defines waste as usage of resources for anything other than creation of customer value. By following the Lean practice, companies focus on the creation of maximum value using minimum resources. The CII-PwC survey found that 25% of the companies were following Lean principles.

Quality management practices in eastern India



Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017

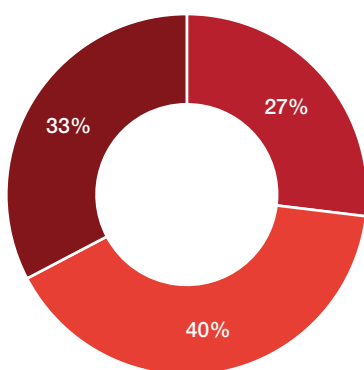


As far as accreditation is concerned, ISO offers internationally recognised certification for quality management. ISO 9001:2015 defines the standards for quality management that are relevant to many manufacturing companies. Going by the number of ISO certifications, the survey found that leading manufacturing countries such as China and Germany occupy the top positions. India is not far behind. As per the

ISO Survey 2015, India occupied the sixth position globally in terms of number of ISO 9001:2008 certifications.<sup>7</sup> The CII-PwC survey found that 40% of the eastern Indian companies surveyed possessed ISO certification for quality management.

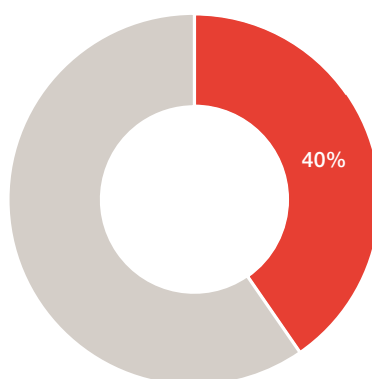
Almost 15% of the companies surveyed reported winning some national/international award in quality management practices.

**Companies following TQM**

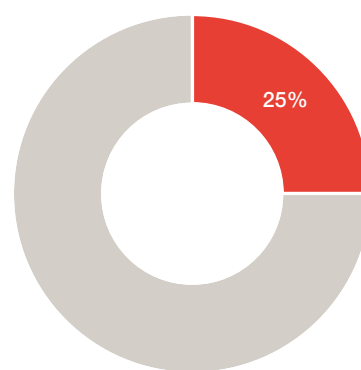


- Successfully running TQM practices
- Planning/implementing TQM practices
- No plan for TQM

**Companies having ISO certification for quality management**

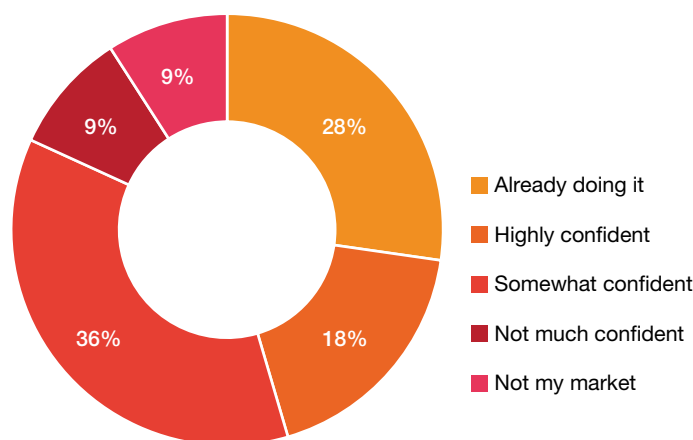


**Companies following the 'lean' practice**



Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017

**Question: How confident are you that the products produced by your company will be accepted in any other country's market without any quality issues?**



(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

**Confidence in product quality**

The CII-PwC survey found that business leaders in eastern India were highly confident about their product quality. A large number of them felt that their products could do well in global markets and withstand global competition. Many of these companies are already exporting products to other markets and some of them have been exporting selectively to test their product's acceptability.

<sup>7</sup> ISO. (n.d.) ISO Survey. Retrieved from <http://www.iso.org/iso/iso-survey> (last accessed on 17 February 2017)

## Leveraging digital technology to improve quality

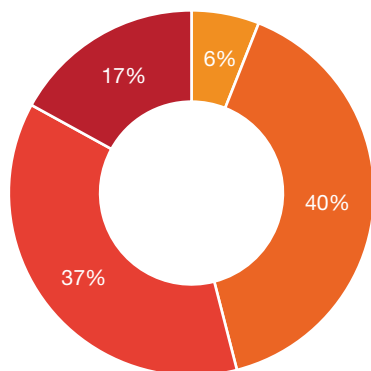
Companies in eastern India have started applying digital technologies to improve customer interactions and enhance product quality. However, there is more to achieve.

### Integration of customer-facing processes

One of the areas where digital technologies can add value in improving product quality is customer connect. Companies worldwide are integrating customer-facing operations such as sales, marketing and customer services to get a 360-degree view of their customers and assess the effectiveness of their sales activities. They want to understand each of their customers in totality so that they can deliver personalised value to them more effectively.

Companies can start with creating digital interfaces to showcase products, perform online transactions and gather data on opportunities. Subsequently, they can set up a customer relationship management (CRM) system and marketing automation tool to capture end-to-end data about customers, sales, orders, after-sales services and marketing campaigns to draw a complete picture of customer-facing operations. They can perform online customer surveys to capture customer inputs about products and services. Companies can leverage the captured data to understand many details about customers, such as product preferences, buying cycle, and budgetary constraints, and up-selling and cross-selling opportunities. This will allow them to understand internal performance parameters such as performance of sales teams and marketing campaigns. This is applicable to both business-to-business (B2B) and business-to-consumer (B2C) companies.

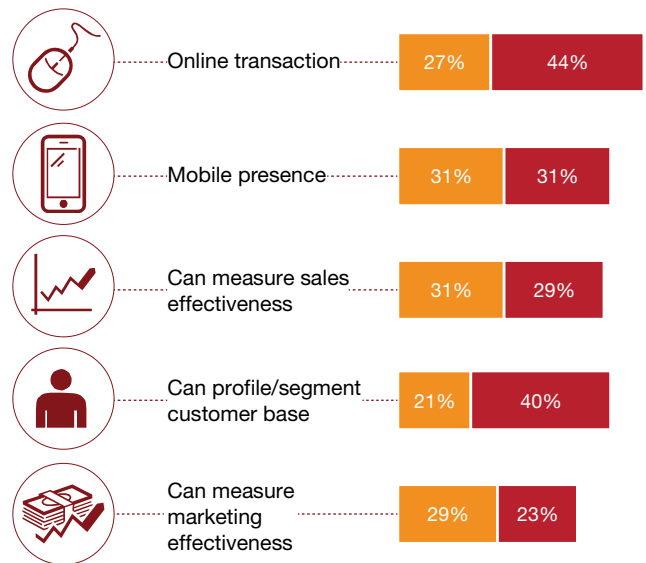
### Usage of multichannel customer interaction/profiling tool in eastern India



- Using today
- Planning in the next five years
- No plans
- NA to my business

(Source: CII-PwC eastern India manufacturing potential survey, 2017)

### Question: How much have you digitised customer-facing operations?



- Planning to start in the next five years
- Already using

(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

The survey found that a significant percentage of companies in eastern India had neither a presence on mobile platforms nor an online transaction interface for their customers. This is one area for companies to think and develop. Companies who have multichannel customer interaction and customer profiling tools such as CRM or marketing automation tools are able to measure sales effectiveness and marketing effectiveness and profile customers through automated processes. The survey found that 6% of the companies had such systems. The rest of the companies also measured these parameters, usually through manual analysis of data received from various sources. A majority of them used spreadsheet tools to perform such analysis.

## Analysis of product performance data

Analysis of product performance data is another way through which digitalisation helps to improve the quality of products. Today, products that are equipped with the latest digital technology can send back performance-related data to manufacturing companies. Companies can then map that data against the production parameters to understand the correlation between production environment and product performance. This helps companies to improve product quality. About 30% of the companies in eastern India are receiving such performance parameters from their products even after sales.

Companies need to design new products that can perform such data collection and data transmission at a regular frequency. They should also add this capability to their existing products in order to make them more successful. While some companies in eastern India have already started enhancing their products, others need to follow this lead and enhance their products and the portfolio.

## The technology adoption journey

Some of the highest quality products are getting manufactured in eastern India. However, the general perception is that the quality of products manufactured in this region lags behind that of similar products from industrially developed countries such as Germany, Japan or China. This perception needs to improve if the manufacturing industry in this region wants to thrive amidst global competition. In eastern India, large companies which are doing business in the global market have improved their quality because of international requirements. Micro, small and medium enterprises (MSMEs) that are working as suppliers to larger companies usually follow the quality norms mandated by large buyers. Companies focusing on local markets need to decide independently the extent to which they have to improve their quality based on their understanding of the market and competitive forces. Collectively, they can lift quality standards to a new level by taking proactive measures to improve quality. The market,

*If the government comes up with higher quality standards that all companies have to enforce, then everybody will have to incur the cost of quality. This will level the field of competition for all companies.*

**Adarsh Agarwal**  
Managing Director, JAMIPOL Limited

*Despite the multiple challenges, chiefly slow growth and stressed work order, MSMEs should consider going for TQM practices and setting up world-class manufacturing facilities within reasonable outlay. In the days to come, these will be a key differentiator.*

**S K Behera**  
Vice Chairman and Managing Director, RSB Transmissions (I) Limited

at the same time, needs to develop the requisite appreciation for high quality.

Taking full cognisance of the scenario, the Government of India has formed the Quality Council of India (QCI) to establish and operate a national accreditation structure and promote standards. QCI's aim is to improve the quality of products and services in 1.25 million MSMEs under the Make in India mission. QCI has launched the 'Zero Effect, Zero Defect' (ZED) initiative.<sup>8</sup> As part of this, MSMEs will have to compete to obtain gold, silver or bronze quality certifications in order to bag contracts from both private companies and the government. This initiative will incentivise MSMEs to comply with quality standards by initiating fair competition. In addition, it will improve the perception of our products in the global marketplace and create new markets for MSMEs.

Evidently, the overall quality standards are expected to improve over time, and companies in eastern India will need to develop the capabilities to manufacture products that are of world-class quality. Good quality management practices and the right enablement of technology will help them do so. Companies in eastern India have improvement opportunities in both these areas. They should explore the potential of digital technology in the customer interaction and quality management space. They can opt for CRM, partner relationship management (PRM), marketing automation tools, online transactions and mobile presence. Depending on the nature of business, they can find value in one or more of these areas. With regard to quality management practices, the survey found that a few large companies are way ahead of the others. The other companies should set the bar high and enhance their existing practices.

<sup>8</sup> Nigam, A. (2016, Aug). Quality standards soon for SMEs to bag private, govt contracts. Retrieved from <http://www.thehindubusinessline.com/economy/policy/quality-standards-soon-for-smes-to-bag-private-govt-contractsquality-standards-smes/article9003844.ece> (last accessed on 17 February 2017)

## Focus on improving productivity

The next factor that the CII-PwC survey covered was productivity. In order to compete globally in the long run, companies need to be profitable. Improved productivity leads to reduction of cost per unit, thereby impacting business profitability in a positive way. The survey found that eastern Indian companies, in general, are enjoying increasing productivity.

### Increase in productivity

Most of the companies surveyed in eastern India reported a positive productivity trend in the last three years. Almost half of the companies surveyed saw productivity improve at a compound annual growth rate (CAGR) of more than 5% per annum. Business leaders indicated low resource utilisation, low grade of technology and unplanned downtime as some of the major factors that impacted productivity in the past.

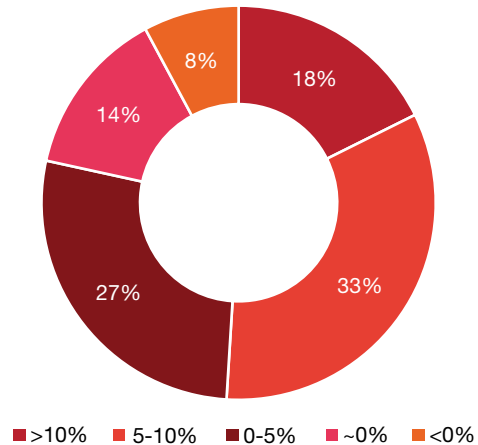
### Leveraging digital technologies to boost productivity

Companies have long been focusing on the Lean and 'just-in-time' methodologies to improve productivity. In addition, they have focused on using state-of-the-art production technology and a trained workforce. Another factor that will boost productivity is the digitalisation of the value chain with companies in eastern India starting to take this path. The CII-PwC survey focused on three major areas where digital technologies add value and increase productivity—rapid prototyping, predictive maintenance and real-time operation planning.

### More efficient prototyping

An efficient prototyping method such as rapid prototyping is one of the key factors that help reduce the time to go to market. Rapid prototyping using additive manufacturing or VR can save time, cost and effort, effectively increasing the flexibility and productivity for the company and meeting the need of the market. The CII-PwC survey found that only 2% of

CAGR of companies' productivity in the last three years



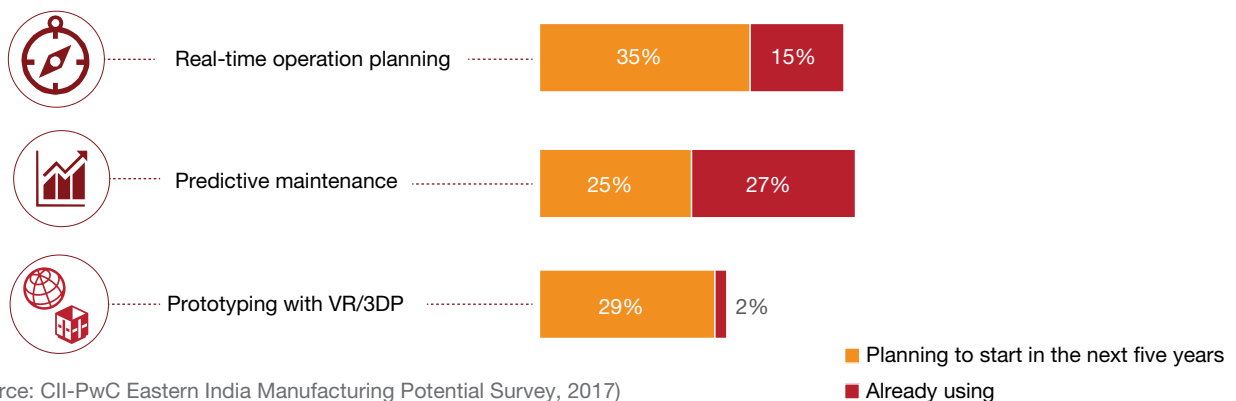
(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

companies used VR or additive manufacturing for prototyping. A large number of companies continue to use CAD/CAM and 3D modelling during the design and prototyping phase of product development.

### Predictive maintenance

IIoT can help companies predict maintenance requirements ahead of time. Such prediction reduces unplanned downtime and time taken to repair. This in turn reduces lost revenue and improves productivity. With predictive ability in place, companies can also consider reducing the strength of onsite maintenance teams, resulting in cost reduction. Maintenance staff are generally deployed to respond quickly to unplanned failures. However, in a digitally integrated value chain, machines can send a maintenance requirement notification ahead of time and directly to the original equipment manufacturer (OEM) through the web. Thus, OEMs can ensure services with nearly zero unplanned downtime without any intervention from onsite maintenance staff. According to our survey, 27% of the companies in eastern India are using predictive maintenance in some way.

## Question: How much have you digitised and integrated real-time operation planning, predictive maintenance and prototyping with VR/3D printing processes?



(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

### *Real-time operation planning*

Digitalisation and integration helps to connect machines, people and products through the Internet and provides an integrated view on whether any resource can be better utilised in the production line. This helps managers identify whether everything is running as per plan. If not, they can take corrective action immediately. More importantly, it helps them understand if the production plan itself has to change for better efficiency. After understanding the production plan, managers can optimise it to ensure significant cost savings. Nearly 15% of the eastern Indian companies surveyed were found to have digital capabilities in place to track resource utilisation and modify operation planning in real time.

### *The future of productivity improvement*

Companies in eastern India have a lot of scope to improve their digital technologies. To influence and enhance productivity, a significant percentage of leaders are planning for more technology advancement in this area in the next five years. We expect to see the improvement in productivity extend into the near future. Companies should keep analysing their productivity trends, identify areas where they face challenges and resolve those challenges by applying appropriate technologies. A continuous set of activities that will evaluate new technologies with respect to their effectiveness is expected, followed by the adoption of the most suitable technology to improve productivity.



## Technology: The enabler of transformation

Technology is at the heart of future-ready companies and has already brought disruption in every space, be it customer behaviour, labour arbitrage, optimisation of production processes or product quality. Therefore, adoption of cutting-edge technology today is a basic requirement, not a luxury. However, business goals should drive a company's technology roadmap and not the other way round. While our survey of eastern Indian companies found encouraging success stories of giant or large enterprises, in general, the adoption of digital technology and data analysis infrastructure is low.

*We use advanced technologies like face recognition techniques to report attendance of the workforce. Thus, the process is now more foolproof and automated.*

*Adarsh Agarwal*  
Managing Director,  
JAMIPOL Limited

### Success story: Early adopters

A few companies adopted advanced technologies even before some of their global competitors did. This early adoption of relevant technologies gave those companies a competitive advantage.

### Growing usage of emerging technologies

The CII-PwC survey found that the percentage of companies using emerging technologies like robots, additive manufacturing and IIoT has been marginally increasing over time. At the same time, awareness about each of these technologies is growing. This helps executives understand and express, with clarity, the technology they are using today and, more importantly, the technologies they are not using.

### Success story: Use of advanced technologies

Many companies, especially giant and large companies, with a prominent presence in eastern India are setting an example by adopting advanced digital technologies—for example, usage of drone-based surveillance systems in mines, VR showrooms to enhance customer experience and save showroom space, and face recognition techniques to report attendance of workforce.

The survey found that the adoption of IIoT, including smart sensors, was the highest among the Essential Eight technologies. Many leaders plan to implement IIoT in their business in the next five years. Business leaders also showed a high level of interest in additive manufacturing and location-detection technologies.



### Success story: Improvement of the adopted technology

In a few cases, companies in eastern India brought technology for their product line from a foreign partner, improved upon it and offered this new technology back to the foreign partner, who then implemented the new version of technology.

## Holistic digital integration

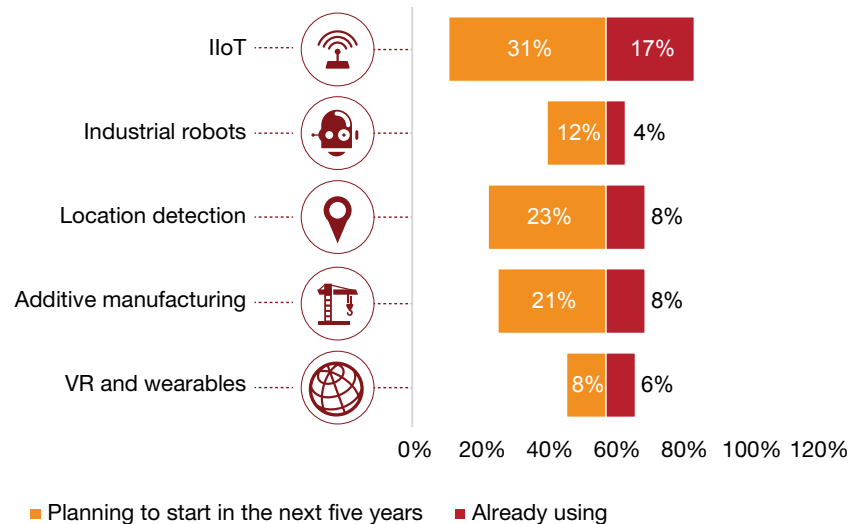
With regard to the digital capabilities of companies in eastern India, the CII-PwC survey revealed that companies tend to use digital technologies to address problems in specific areas and have yet to start the digital integration or interlinking of value chains. Further, 15% of the respondents indicated that they perform real-time operations planning—the one area where different functions of operation need to be digitally integrated and aligned with the value chain.

Some of the areas where companies are going digital are product tracking, supply chain integration, predictive maintenance and energy management.

## Development of data analysis capabilities

In order to take full advantage of digitalisation and integration, it is critical to develop data analysis capabilities. When cyber-physical systems are connected through the Internet, a high volume and variety of data is generated. A wealth of meaningful insights and tangible benefits can be derived by storing this data and performing appropriate analysis. Companies in eastern India can generate these insights by building their own capability for data analysis, for which they will need to build infrastructure and systems and train people. Alternatively, companies can think of buying analytics as a service. This will help in developing an ecosystem of technology start-ups that collaborate with manufacturing companies and deliver data analysis services.

## Emerging digital technologies used in eastern India



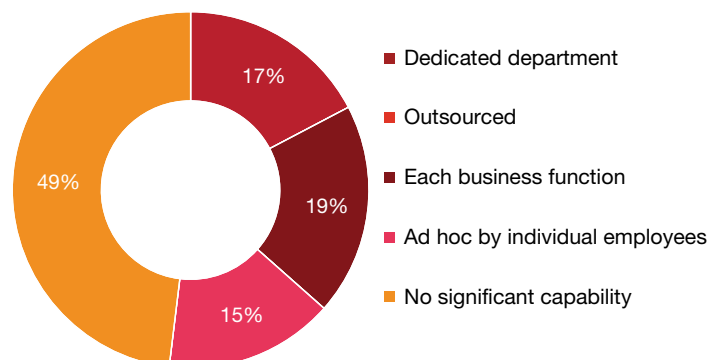
(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

As per the survey, about 17% of the executives stated that their organisations had a dedicated department to perform data analysis. Another 34% said that they handled data analysis either at an individual level or within business functions. In many such companies, data is aggregated manually from various sources to build up spreadsheet-based reports for leadership. Having systems to regularly gather data, process data and generate insights will help these organisations improve their capabilities significantly.

The CII-PwC survey found that 19% of the companies surveyed were using data warehousing or reporting software, and about 2% of them were using advanced analytics algorithms and big data.

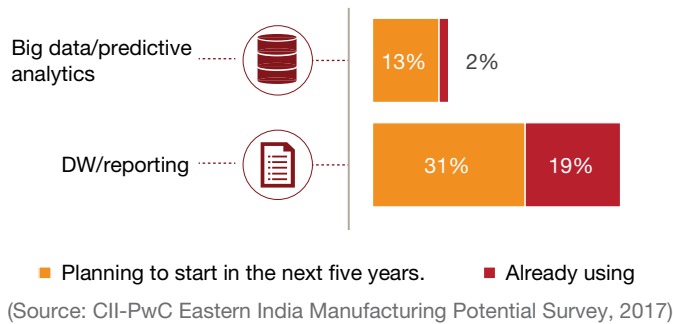
## Data analytics capability of companies in eastern India

Question: How are data analysis capabilities organised in your company?



(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

## Question: Do you use these data analysis technologies in your company?



integrated software systems. Such capabilities help them in controlling inventories of their distributors and points of sale. These technologies can help ensure that inventories in the distribution channel never run out, track products that are sold faster and calibrate production lines to produce more of the same items. This also helps in achieving the FIFO concept.

The survey revealed that nearly 40% of the companies had connected supply chain and product-tracking systems. About 8% of the respondents stated that their organisations used location-detection systems. Barcode scanning and manual entries were most commonly used to track the movement of products.

## Optimise energy usage

Digital technologies also help companies reduce their energy usage considerably. Energy consumption accounts for one of the most significant operating costs in manufacturing. Connected machines and devices send energy consumption information through sensors. Visual representation of captured data can provide management with a holistic picture of energy usage and help them to identify energy-draining areas. Companies can accordingly take corrective or preventive actions. Additionally, the use of analytics helps predict energy requirements for new product lines or new production plans.

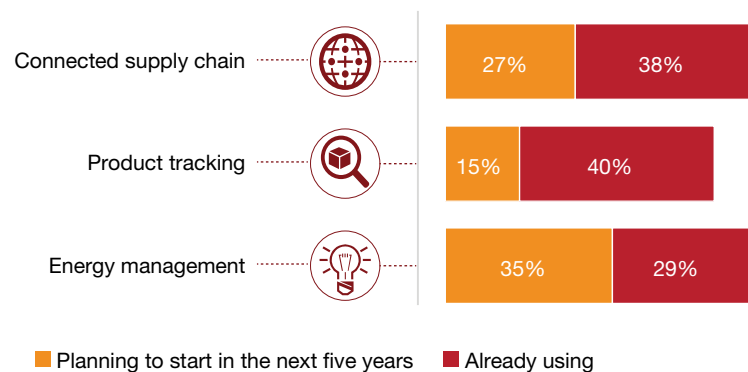
## Use of digital technology to resolve problems

In addition to improving quality, customer connect and productivity, digital technology is being used to better track and manage a company's operations.

## Connect supply chain

Today, companies can exert unprecedented control on the supply chain by tracking fleets of vehicles, products and the workforce by using location-detection technologies and

## Question: How much have you digitised and integrated supply chain, product tracking and energy management processes?





## The journey of digitalisation

Some companies have set examples in the usage of digital technologies. However, many respondents stated that the high cost of initial investment was one of the reasons their companies had not yet undertaken a digital transformation. In particular, MSMEs find the cost of technology investments to be too high for their scale of operations and market. As the cost of technology is expected to reduce further in the next few years, there is a chance that more companies will adopt digital technologies. Moreover, MSMEs can follow large companies and get a 'second mover' benefit by learning from their case studies. Such an approach will reduce the risk of new technology adoption for them.

One of the most important steps for companies is to analyse which digital technologies make sense for their business, depending on scale, type and price. Businesses need to do a cost-benefit analysis and check how best digital technologies can be leveraged. Last year's CII-PwC survey<sup>9</sup> found that many companies in this region (49%) did not find any suitable business cases to apply digital technologies. With successful use cases becoming available in the industry, the adoption rate of digital technology in eastern India is expected to improve.

Finally, companies need to improve their data analysis capabilities, either by developing capabilities internally or by purchasing them as a service.



<sup>9</sup> CII and PwC. (2016). Technology-enabled manufacturing: Growth prospects for eastern India. Retrieved from <http://www.pwc.in/publications/2016/technology-enabled-manufacturing.html> (last accessed on 17 February 2017)

<sup>10</sup> Nanda, P K. (2016, 26 May). Change law for allowing women to work night shifts, states told. Livemint. Retrieved from <http://www.livemint.com/Politics/SZEpN8UBTtYOE5QubQKkkM/Change-law-for-allowing-women-to-work-night-shifts-states-t.html> (last accessed on 17 February 2017)

## ***Nurture workforce: The driver of transformation***

In the age of Industry 4.0, it is essential that the workforce has a mindset to adapt to changes, innovate, take leadership and connect to the core values of the company. Such a mindset will help them acknowledge the benefits of digital transformation and drive relevant changes. Companies have a big role to play in the development of this mindset.

### ***Success story: Great relationship with the leadership***

A few companies have been running their operations with a big workforce without any counter-productive issues between the workers and management. The management of such companies communicates company-related decisions and rationale to the workforce effectively. They also design employment benefits to cover employees' family members in certain cases. This makes the workforce feel that the company cares for them.

Companies also need to take a proactive approach towards the skill development of their workforce in order to enable them to keep pace with the changing technological landscape. They can achieve this by organising relevant training and skill development programmes for the workforce. The CII-PwC survey found that companies in eastern India are increasingly making workforce development a priority.

*As a foreign company investing in eastern India, I found that the availability of a skilled workforce is not a problem.*

**Lalit Tejwani**  
Managing Director, Rongxin Power Electronic India Pvt. Ltd.

### ***Success story: A more gender diverse workforce***

A few companies are trying to bring more women to the factory floor and have taken some pioneering steps to make this move successful. In an increasingly automated factory, a diverse team of workers has been found to be more successful in achieving new goals.

Recently, the Government of India asked state governments to amend their Factories Act to allow women to work in night shifts.<sup>10</sup> Once all the states amend their acts, this move is expected to encourage more manufacturing companies to hire women and bring more diversity in the organisation.

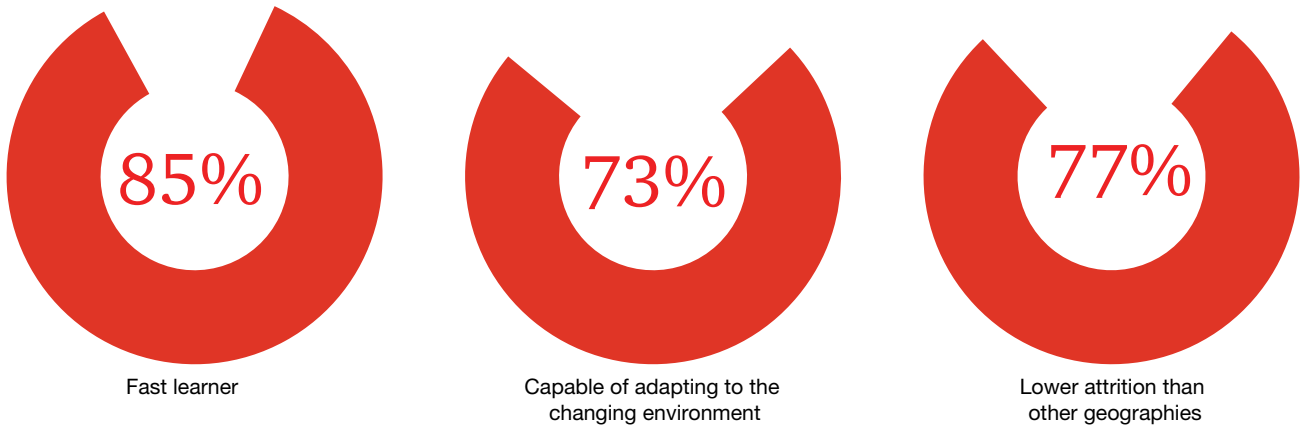
### ***Skilled workforce***

Most leaders felt that the skill level of the existing workforce was good and that they could adapt to changes. Moreover, the attrition rate in this part of India is lower than that in others. These are positive factors that will help companies in times of change. However, many of the leaders felt that, in this age of tough global competition, the workforce needed to clearly understand their role and contribution with respect to value chains as this would make them more focused and disciplined.

### ***Success story: Investment decisions influenced by workforce availability***

A few foreign companies that have set up operations in eastern India have identified the availability of inexpensive labour with a comparable level of skills as an influencing decision factor for their investments. These companies believe that they have gained significant cost advantages and have also highlighted a lower rate of attrition in eastern India.

**Question: Do you agree that the workforce in your state has these attributes?  
(percentage of participants who agreed)**

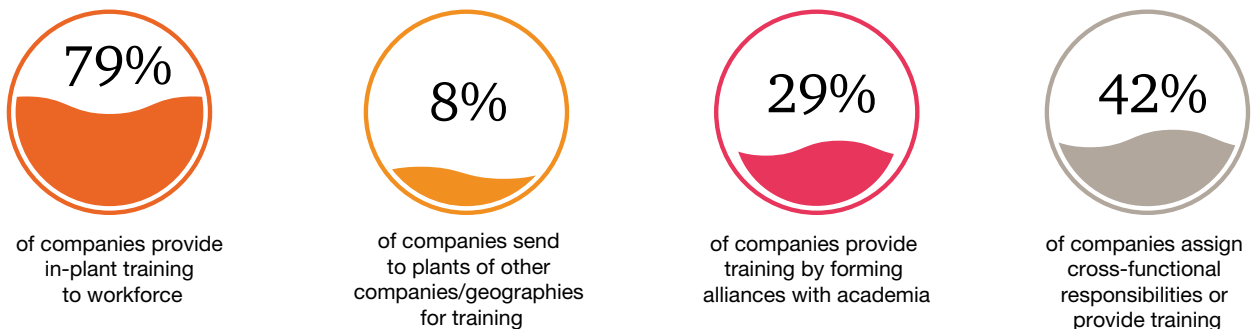


(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

**Greater focus on workplace development**

The CII-PwC survey found that companies were actively focusing on workforce development. While in the last two years no company had workforce development on top of its agenda, in the next two years, 8% of the companies surveyed will maximise their budgets towards it. One of the most important parts of workforce development is training. A majority of the companies in eastern India train their workforce through in-plant training. Some companies depute

their employees to other geographies or other companies. Such depositions often bring a broader perspective to the workforce. Many companies tie up with academic institutions and external agencies like HRD consultancy to upgrade the skills of their workforce. Companies also adopt other ways to get their workforce trained—for instance, through in-house research assignments and external expert training. The survey indicated that 42% of the respondents regularly assigned cross-functional responsibilities or provided cross-functional training to employees.



(Source : CII-PwC Eastern India Manufacturing Potential Survey, 2017)

## Gaps between educational programmes and industry needs

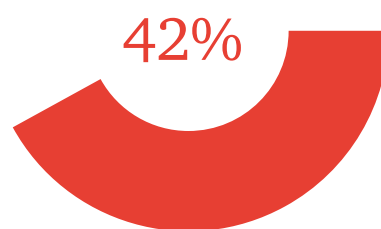
In the last CII-PwC survey,<sup>11</sup> business leaders highlighted the gap between skills provided by academic institutions and those expected by the manufacturing industry. In particular, there is a lack of focused hands-on experience. This gap is felt when people join an industry for the first time. In this year's survey, business leaders echoed the same view. A significant percentage of business leaders believed that the workforce that joined the manufacturing industry from academic institutions or from skill development institutions required additional training to take on the responsibilities of the job adequately.

## Towards a digital-savvy workforce

Many companies in eastern India rightly prioritise workforce development and should continue to do so. The other companies should follow the same path. These companies also need to increase workforce diversity wherever possible, following the examples of large companies. Bringing more diversity into the workforce often brings new and innovative ideas into organisations and can therefore play a big role in the transformation process. Diversity also makes an organisation more robust and resilient by removing biases. As a result of diversity, organisations solve different types of challenges, conflicts and opinions and identify ideas and solutions that are much more inclusive.

Companies increasingly need to stress on cross-functional responsibility assignment and cross-functional training to help the workforce develop a broader perspective. As companies get more digitalised and integrated, it will be more important for the workforce to understand the bigger picture rather than working in silos. More cross-functional leaders will be needed to drive changes. Cross-functional responsibility assignment is an effective way to mentor the workforce towards that end. Eastern Indian companies need to increase this practice from the current level (42%).

Percentage of leaders who think that the workforce that joins the industry does not come with training/ education suitable to take on job responsibilities



Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017

Further, innovation will play a big role in the future. Every company has a different set of challenges with regard to innovation and therefore the solutions might also be different. The more a company is able to find out appropriate solutions for its own challenges, the more appropriately it can use enablers like technology. Such solutions often need innovation from inside the organisation. Fostering a culture of innovation through appropriate rewards and recognitions thus becomes vital.

Finally, companies need to train their workforce in a timely manner so that they can smoothly fit into a digitally transformed organisation. Technology upgradation may change the roles of the workforce. This transition needs to be handled in a planned way, and companies in eastern India should start thinking about such training and transition. Imparting a world-class work culture will be equally necessary.



<sup>11</sup> CII and PwC. (2016). Technology-enabled manufacturing: Growth prospects for eastern India. Retrieved from <http://www.pwc.in/publications/2016/technology-enabled-manufacturing.html> (last accessed on 17 February 2017)

## Role of academia and government in skill development

As the technology landscape changes, along with companies, academic institutions need to play a role in skill development. Academic institutions can create an interface for students to connect with industry professionals. They can also encourage students to work in the industry sector on different real-life challenges pertaining to current technologies and practices. Such initiatives will be helpful for both the companies and students. Students will also get more hands-on, real-life experience on industry projects.

The other activity that academic institutions should undertake is upgrading the curriculum and workshops and updating laboratories with state-of-the-art equipment and simulated working models. Some premier institutions have 3D printers and other advanced equipment for laboratory research and education. This needs to be emulated in multiple institutes. The new generation of the workforce coming out of these academic institutions and Industrial Training Institutes (ITI) should be equipped with the knowledge and skills required in the new age of manufacturing.

The government needs to play its part in skill development as well. State governments and the Government of India do realise the need for further skill development and are

committed to take the required steps. The Government of India has introduced the 'Pradhan Mantri Kaushal Vikas Yojana' scheme which aims to enhance the employable skills of a large number of wage earners in the next few years. The Indian Institute of Skills Development (IISD) has been established for the same purpose.

State governments are providing subsidised training, special coaching programmes and career talks to jobseekers. Additionally, the West Bengal government launched a job portal called 'Employment Bank' in 2012 with the intention of bringing together jobseekers, employers, placement agencies, training providers, etc.,<sup>12</sup> on the same platform. 'Yuvasree', another scheme introduced by the West Bengal government in 2013, focuses on enhancing the employability of the first one lakh enrolled jobseekers.

Social education will help the eastern Indian workforces understand the positive effects of the industry on society and comprehend their role in the ecosystem of the industry. Companies can play an important role in imparting this education to their employees, and government and industry bodies can create a platform to facilitate such education.



<sup>12</sup> Employment Bank: Government of West Bengal Initiative. Retrieved from <https://employmentbankwb.gov.in/> (last accessed on 17 February 2017)

## Follow a roadmap and transform step by step

Even with a quality focus and the best workforce in place, companies are likely to fail in technology adoption if they do not have a long-term technology roadmap. Without such a roadmap, leaders from different business functions spend their budgets on technology implementation projects that address only the challenges they are facing. The lack of a holistic view leads to the development of different systems and applications which often use disparate technology, and rules out any scope for integration.

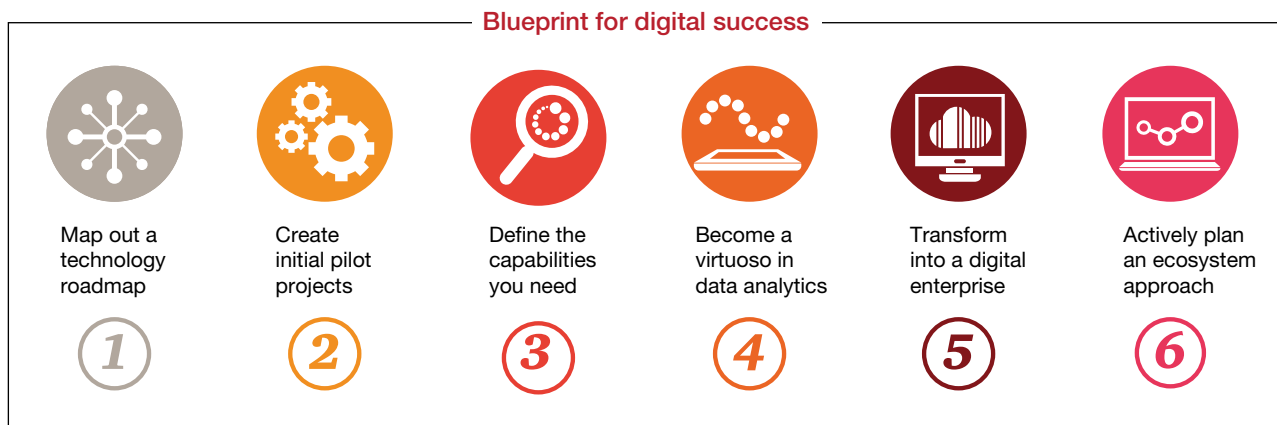
A company should first determine its business goals and use them to formulate a long-term technology roadmap. Even if these technologies are implemented in a phased manner, a roadmap will ensure that they are not unrelated or disparate. The CII-PwC survey 2016 found that only 11% of companies in eastern India had a long-term technology roadmap.<sup>13</sup> This figure is expected to improve in the future.

Digitalisation and integration should take place gradually and not at one go. Some of the common challenges companies face while adopting digital technologies are reluctance from stakeholders and lack of demonstrable success stories. PwC recommends that companies start with pilot projects focusing on one value chain. These projects should be cross-functional and should completely cover the value chain.

One example of such an initiative is the installation of sensors and actuators in some of the critical manufacturing equipment and, subsequently, the use of data analytics to explore predictive maintenance solutions. Another such initiative would involve the installation of track-and-trace devices on shipments to and from a selected supplier, which would lead to horizontal integration.

The purpose of such a project is to test whether the whole ecosystem comprising the workforce, technology and processes will work successfully in the changed system. Such pilot projects help companies get a buy-in and funding from stakeholders by showcasing actual successful implementation. These projects also help them understand, with minimum impact, the areas of improvement that the company needs to work on.

Such pilot projects can be undertaken in collaboration with start-ups or academia. The survey found examples of pilot cases where companies in eastern India are working with reputed academic institutions to facilitate a digital transformation.



<sup>13</sup> CII and PwC. (2016). Technology-enabled manufacturing: Growth prospects for eastern India. Retrieved from <http://www.pwc.in/publications/2016/technology-enabled-manufacturing.html> (last accessed on 17 February 2017)

# Addressing the challenges of the business environment

The CII-PwC survey tried to understand how governments are fostering growth in the manufacturing industry. A significant number of business leaders have highlighted initiatives taken to encourage entrepreneurship in the manufacturing sector. About 44% of the respondents stated that governments were successfully encouraging entrepreneurship, about 39% stated that governments were proactively reaching out to business communities for investments in their respective states, and around 29% of the respondents stated that government policies and actions had become business friendly.

The survey also tried to understand business leaders' views on areas for improvement. Around 49% of the respondents stated that governments should do more to make business activities easier, about 46% said that business policies and actions needed to be friendlier, and 44% highlighted the need for basic utilities and infrastructure.

Although business leaders admitted that a lot was being done to implement business-friendly policies, they believed that there was scope for improvement in this area. To address policy-related challenges, certain state governments connect with business leaders regularly in order to understand and address policy issues faced by them. This is a step in the right direction.



*Today, development is very high on the agenda of the government. States are competing with each other for ease of doing business. This is a big change from the past.*

**A B Lall**

Plant Head (Jamshedpur Plant),  
Tata Motors Limited



## Focus areas for the governments in eastern Indian states

49%



Implement initiatives related to ease of doing business

46%



Business-friendly policies/exemptions/subsidies

44%



Basic utilities and infrastructure

## Things that the governments in eastern Indian states are doing well

44%



Encourage entrepreneurship

39%



Reach out to the business community for investment

29%



Business-friendly policies/exemptions/subsidies

(Source: CII-PwC Eastern India Manufacturing Potential Survey, 2017)

<sup>14</sup> Department of Industrial Policy and Promotion. (n.d.) Business Reforms Action Plan. Retrieved from <http://eodb.dipp.gov.in/> (last accessed on 17 Feb 2017)

# Opportunities for MSMEs in the digital age

## New revenue streams

Digital technologies are sure to create many opportunities for MSMEs in the manufacturing sector, allowing them to set up new revenue streams around these new technologies. They can become suppliers of sensors and comprehensive IoT solutions in eastern India as the industry and consumer market start adopting IoT. PwC estimates that the IoT market in eastern India will reach 750–900 million USD by 2020.

<sup>15</sup> MSMEs can tap this market. Besides, MSMEs can build expertise around additive manufacturing technology and provide 3D prototyping as a service to large companies.

## Technology adoption: Tackling major challenges

Besides generating new revenue streams, MSMEs can take advantage of new technologies in producing quality products at cheaper costs. However, new technology adoption is often not on the radar of MSMEs. High initial investments in technologies pose a big challenge to them. MSMEs can bring down this capital investment by using technology on a shared basis. The Government of India's Cluster Development Programme (CDP) aims at the holistic and integrated

*MSMEs in eastern India can learn from the success stories and challenges of technology adoption from other parts of India, thus increasing their chances of success.*

**Anil Vaswani**  
Managing Director, Wesman Engineering Company Pvt Ltd

development of MSMEs in clusters through soft interventions, hard interventions and infrastructure upgradation.<sup>16</sup> Under this programme, MSMEs belonging to a cluster can share investments in new technologies and use technology as a common facility like a shared testing centre.

The study revealed that capital equipment manufacturing companies need to focus more on the requirements of MSMEs in this region. These companies can bring affordable technology solutions to MSMEs and help them upgrade and adopt new technologies in a short span of time. The study also found instances of large companies developing products for MSMEs to helping them to upgrade their technology. The

region should also provide robust environment for technology start-up companies that can study local needs and develop products and services for MSMEs.

To improve their IT infrastructure, MSMEs should focus on cloud computing technologies. This change in focus will allow companies to change IT-related capital expenditure into operational expenses. With cloud technology, companies can

*In eastern India, we need a hub of capital equipment manufacturers specially focusing on MSMEs. Such a hub will help upgrade the technology of the existing MSMEs fast and will bring more MSMEs into this part of the country.'*

**Ashish Agarwal**  
Executive Director, Ori-Plast Limited

save on the high cost of IT infrastructure and maintenance, as they need to pay only for their IT usage while infrastructure is provided and maintained by a service provider. The CII-PwC survey found that 80% of MSMEs were already using the cloud to meet their IT requirements.

## Leveraging the technology start-up environment

In eastern India, many manufacturing companies rely on foreign partners for advanced technologies for their operations or products. The same applies to emerging digital technologies. This creates an opportunity to build a technology start-up ecosystem that will be able to cater to manufacturing companies locally.

These start-ups can develop technology based on the needs of local manufacturing companies. The manufacturing companies, on the other hand, can develop requirements for their future products and work closely with one or multiple such technology companies to develop solutions. If implemented successfully, these solutions will lead to a win-win situation for both the manufacturing and technology companies. There are examples of many such cases in developed countries today. Attempts can be made to create a similar ecosystem in eastern India.

<sup>15</sup> Confederation of Indian Industry. (2015). Eastern India: A potential IoT hub. Retrieved from <http://cii.in/PublicationDetail.aspx?enc=8cO7pNQOyI164iS1AVMid6vkH0kx06LlunZDa1y94bmpAMAVYPsFqb51dl9x7lgc9WHH9WlJmAD/WA/urY9SNze4rjX5jfhz0dJahGX131ItaF13AZ8c5fhHWRSHJK5g8dsGNWq7KQuXtmdDM00TyOqh081K03eMmSSBly5fpEU27iao/FqStNMVt/ySSeH> (last accessed on 17 February 2017)

<sup>16</sup> MSE-CDP. (n.d.). Ministry of Micro, Small & Medium Enterprises. Retrieved from <http://www.dcmsme.gov.in/MSE-CDPProg.htm> (last accessed on 17 February 2017)



## **Investment in technology for MSMEs by the government**

The Government of India is upgrading and expanding the existing network of MSME Technology Centres through the Technology Centre Systems Programme (TCSP) at an estimated cost of 2,200 crore INR, with funding from the World Bank. Under this initiative, 15 locations across the country have been approved for establishing new technology centres. The government also plans to develop about 500 incubation centres and technology development centres across the country with the help of large industries and industry associations. The purpose of such centres is to provide support and training and eliminate difficulties faced when starting a new MSME.<sup>17</sup>

In Union Budget 2017, the Government of India gave income tax benefits to MSMEs by reducing the tax rate from 30% to 25%.<sup>18</sup> This step is expected to enable MSMEs to invest more money in the adoption of advanced technologies.



*Often government agencies provide funding assistance to MSMEs to develop products as per agency requirements. MSMEs should leverage such facilities for developing new products by adopting advanced technologies and enhancing capability.*

**S K Behera**  
Vice Chairman and Managing Director, RSB Transmissions (I) Limited



<sup>17</sup> Ministry of Micro, Small & Medium Enterprises. (n.d.) Technology Centre Systems Programme (TCSP). Retrieved from <http://www.dcmsme.gov.in/tcsp/TCSP%20-%20Concept%20Note.pdf> (last accessed on 17 February 2017)

<sup>18</sup> Moneycontrol.com. (2017, 3 Feb). Union Budget 2017-18 review: Systematix. Retrieved from [http://www.moneycontrol.com/news/brokerage-recothers/union-budget-2017-2018-review-systematix\\_8416541.html](http://www.moneycontrol.com/news/brokerage-recothers/union-budget-2017-2018-review-systematix_8416541.html) (last accessed on 17 February 2017)

# Conclusion

Digital technologies have brought about a paradigm change in the manufacturing industry. The manufacturing industry in eastern India has started its journey towards this changed paradigm. Some companies in this region, especially the large ones, have achieved great heights in quality practices. They have leveraged emerging technologies to gain benefits and have also taken some great initiatives on the workforce development front.

These success stories need to be emulated across all manufacturing companies. It is important that more companies adopt world-class technology and quality practices in order to stay competitive in the global market and create a sustainable growth platform for the future. A collaborative environment between manufacturing companies and technology start-ups will help create a competitive advantage for the manufacturing companies and accelerate growth.

Things are moving in a positive direction. The government has rightly begun to focus on manufacturing, technology adoption and MSMEs. At the same time, the cost of technology is falling, making it more affordable. Industry bodies are generating more awareness about new technology options by providing a common platform to industry leaders, academia, service providers and consultants. As a result of all of these efforts, more companies from eastern India are expected to focus on an immediate technology acquisition plan with a view to becoming future ready.

## Acknowledgements

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**Adarsh Agarwal**, Convenor, Economic Affairs Panel, CII Jharkhand & Managing Director, JAMIPOL Limited

**Ashish Agarwal**, Chairman, Family Business Subcommittee, CII Eastern Region & Executive Director, Ori-Plast Limited

**Anil Vaswani**, Chairman, CII West Bengal State Council & Managing Director, Wesman Engineering Company Pvt Limited

**Lalit Tejwani**, Member, CII Eastern Region & Managing Director, Rongxin Power Electronics India Pvt Limited

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# 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 8000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 240 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.

The CII theme for 2016-17, Building National Competitiveness, emphasizes Industry's role in partnering Government to accelerate competitiveness across sectors, with sustained global competitiveness as the goal. The focus is on six key enablers: Human Development; Corporate Integrity and Good Citizenship; Ease of Doing Business; Innovation and Technical Capability; Sustainability; and Integration with the World.

With 66 offices, including 9 Centres of Excellence, in India, and 9 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Singapore, UK, and USA, as well as institutional partnerships with 320 counterpart organizations in 106 countries, CII serves as a reference point for Indian industry and the international business community.

## **Confederation of Indian Industry**

The Mantosh Sondhi Centre

23, Institutional Area, Lodi Road, New Delhi - 110 003 (India)

T: 91 11 45771000 / 24629994-7 \* F: 91 11 24626149

E: [info@cii.in](mailto:info@cii.in) \* W: [www.cii.in](http://www.cii.in)

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## Contacts:

### **Arnab Basu**

Joint Leader, Technology Consulting,  
PwC India  
Email: [arnab.basu@in.pwc.com](mailto:arnab.basu@in.pwc.com)

### **Dipankar Chakrabarti**

Executive Director, Advisory, PwC India  
Email: [dipankar.chakrabarti@in.pwc.com](mailto:dipankar.chakrabarti@in.pwc.com)

### **Arijit Chakrabarti**

Executive Director, Technology  
Consulting, PwC India  
Email: [arjit.chakrabarti@in.pwc.com](mailto:arjit.chakrabarti@in.pwc.com)

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