REINVENT YOUR BUSINESS WITH INDUSTRY X.0

The opportunity for Indian manufacturers to recast their digital value chain and lead in the new.
The world is becoming digitally connected to the point of no return. Globally, technology costs are plummeting at an unprecedented pace.

The price of industrial robots, for example, has declined from US$550,000 in 2007 to US$20,000 in 2014. The cost of sensors has fallen from US$30,000 in 2009 to US$80 in 2014, and of 3D printing from US$40,000 in 2007 to US$100 in 2014.1

Lower prices have led to faster adoption, and an explosion of data and connectedness. Each day, around five million new devices are being linked with each other, the Internet or both.

Today, there are around 6.4 billion data-communicating devices in the world, and by 2020 this number is forecast to explode to around 20 billion.

The volume of big data in India alone is expected to grow eight-fold, reaching an estimated value of US$16 billion by 2025.2 This giant leap in data and connectedness is transforming business models and enabling new customer experiences across the world, including in India. Our digital universe is truly in a healthy expansion mode.

At the core of this seismic upheaval sit physical products reinvented as connected, intelligent devices that act, think, and are closely and constantly interacting with their users and ecosystems. Clearly, physical objects designed and produced by leveraging digital technologies will play a significant role in this seminal trip toward the planet’s digitization. In the journey to such a future, companies must seize every opportunity to leverage digital technologies to disrupt business-as-usual processes and build new business models that deliver great customer experiences and drive growth. This means using digital across functions, business units and geographies to create seamless, data-driven organizations.

The industrial enterprise world, comprising two-thirds of the world’s GDP, will be changed beyond recognition by digital technology, disrupting decades-old business habits, conventions and operating models. The ways in which labor works, machine-based processes are organized and information is shared will be turned on their heads. Strategic corporate thinking will be forced...
to incorporate completely new, data-driven business models. No wonder the US, Germany, China and Japan—all strongholds of successful industrial enterprises—have, with varying focus, put industrial digital transformation high on the agenda.

India, too, has a unique opportunity to compete with these manufacturing giants of the world. With a growing middle-class population, a large youthful talent base and a government which is keen to incentivize the digital economy, the opportunity is ripe for Indian manufacturers. What matters now is to make the most of their digital reinvention journeys. This research not only addresses the ‘why’ behind digital reinvention, but also showcases the ‘how’ in detail, with steps that industrial businesses need to take to gain the exponential financial promise of digital.

At Accenture, we are keen to support Indian businesses make this journey successfully. There is no one standard way to make it happen, and the journey must be tailored to each enterprise individually. But, Indian businesses must start now.

Anindya Basu  
Senior Managing Director  
Country Head  
Accenture in India

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Senior Managing Director  
Global Lead for Products  
Industrial and Industry X.0
Industrial companies across India understand the power of digital. They see the potential of digital technologies to bring about much-needed revenue growth. And, many are making big investments in a wide variety of cutting-edge technologies.

But nearly all companies continue to maintain that they are not getting the most out of their investments. Why? A disproportionate number of Indian companies are too singularly focused on growth, with many neglecting an important goal in the digital era: Transformation of their current operations.

According to an Accenture survey, less than a third of executives in India want to use digital for transforming their current operations by driving greater operational efficiencies. That’s a small number, especially compared with the three quarters (76%) who want to leverage digital for new, experience-driven revenue growth.

To better understand this worrisome trend, we spoke to industry experts and senior business executives. Our conversations revealed an interesting insight: Indian companies display a high intent to leverage digital to acquire new customers and enter new markets. However, the intent to digitize product design, manufacturing systems, operations and the supply chain—all very critical to deliver the right experiences at the customer-facing front-end—is on the lower side.

Indian businesses must understand that unless they transform their core operations to free up capital, they will be unable to make sustained investments in new digitally enabled products and business models that create new revenue streams.

Indeed, according to our global survey as well, almost two in three executives (64%) admitted that a failure to employ digital technologies to both transforming the core and growing the new will mean a struggle for their very survival.

If Indian manufacturers can leverage digital technologies to redesign their core products, elevate manufacturing productivity levels and build efficient supply chains, they will significantly boost the industrial sector’s contribution to the
country’s gross value added. That could potentially restore a much-needed balance between manufacturing and services in India’s economic growth profile—especially, at a time when India’s aspirational workforce is still choosing IT over manufacturing.

The good news is, Indian companies can seize the digital opportunity now, achieve transformation in their current core business operations as well as target new growth opportunities. The approach to achieve this goal is what we are calling, Industry X.0. It’s an action plan for becoming more adept at embracing technological change and profiting from it. Industry X.0 businesses leverage combinations of advanced digital technologies to deliver exceptional operational efficiencies and continuously create new, hyper-personalized experiences. In this research report, we identify six strategic imperatives for Indian businesses to embrace Industry X.0.

**AT THE CORE OF INDUSTRY X.0 ARE HIGHLY INTELLIGENT, CONNECTED SYSTEMS THAT CREATE A FULLY DIGITAL VALUE CHAIN.**

**What is the biggest gain from being an Industry X.0 business?**

Industry X.0 businesses become adept at unlocking valuable technological combinations to significantly reduce their cost per employee and grow their market capitalization. As seen from our research, the size of the prize associated with this gain is very huge. At a global level, for example, we estimate that companies in the industrial equipment sector could cut down the total cost per employee by almost 20 percent if they combine autonomous robots, artificial intelligence, blockchain, Big Data analytics and 3D printing.

As part of our research, we also estimated how similar technology combinations could boost market value for manufacturers across industries. Accenture is committed to be a trusted partner with Indian companies in their journey to becoming Industry X.0 businesses. This report is good place to start.
Over the last couple of decades, Indian manufacturers across many industrial sectors have struggled to achieve globally competitive scale and productivity. Not only has manufacturing’s contribution to the gross domestic product (GDP) been lackluster, productivity levels remain much lower than other emerging economies.
The industrial sector has grown at a 6 percent compound annual growth rate (CAGR) for the past five years to more than US$700 billion in 2016. And yet the value added per person employed is one of the lowest in the world, at only US$6,000. (See Figure 1)

**FIGURE 1: LOW EFFICIENCY LEVELS HAVE PLAGUED INDIA’S INDUSTRIAL SECTOR (2016)**

Source: World Bank Statistics and Accenture Analysis
The reason? The manufacturing industry in India has placed too much emphasis on low-cost labor and not enough on technology-related capital. While the Indian workforce has become a global leader in IT skills, the domestic manufacturing sector is stuck on the sidelines, reaping limited benefit. India’s young talent pool continues to choose jobs in IT over manufacturing.

But all hope is not lost. In this digital era, Indian manufacturers can redefine their future. Digital technologies, unlike traditional enterprise resource planning (ERP)-focused IT technologies, hold the potential to drive both dramatic efficiency improvements and exponential revenue growth, and attract digital talent back into the manufacturing sector. (See Figure 2)

**FIGURE 2: IT VS. DIGITAL – UNDERSTANDING THE DIFFERENCE**

<table>
<thead>
<tr>
<th></th>
<th>IT</th>
<th>INDUSTRIAL IT</th>
<th>DIGITAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcomes</strong></td>
<td>Automation</td>
<td>Process excellence</td>
<td>Products, process and service innovation</td>
</tr>
<tr>
<td><strong>Impact areas</strong></td>
<td>Specific organizational functions</td>
<td>Enhanced process visibility</td>
<td>Efficiency improvement, business model, workforce, value chain and ecosystem</td>
</tr>
<tr>
<td><strong>Value for customers</strong></td>
<td>Standardization</td>
<td>Segmented customization</td>
<td>Hyper-personalization</td>
</tr>
<tr>
<td><strong>Technology stack</strong></td>
<td>IT bundle (PCs, servers and dedicated hardware, software applications and ERP solutions, Web 1.0/ E-commerce)</td>
<td>MES, SCADA</td>
<td>Combinatorial application of multiple new technologies (IIOT, Cloud, Applied Intelligence, Robotics, 3D Printing, etc.)</td>
</tr>
</tbody>
</table>
The good news is, many Indian businesses are keen to begin their digital journey. We surveyed a small group of 30 executives in India representing companies with sales turnovers exceeding a billion dollars each. Nearly all—93 percent—said they wanted to leverage digital for business growth. (See Appendix for ‘About the Research’)

Another positive sign: Stakeholders across the manufacturing ecosystem are now beginning to align their goals. The Indian government, for example, has set a target to expand the country’s digital economy to reach US$1 trillion in the next few years.5 These policy measures have enhanced India’s profile as a lucrative investment destination. In fact, India was the No. 1 country for greenfield foreign direct investment (FDI) in 2016—ahead of China and the US—having received investments of more than US$62 billion.6 FDI in the manufacturing sector alone rose to a five-year high of just more than US$20 billion in FY2017.7 Moreover, manufacturing startups today are driving innovation and widening the frontiers of the industry by opening new avenues for growth. Indian startups are going beyond app-based businesses and creating innovative products using sensor-based technologies, robotics and artificial intelligence, and Big Data analytics.

Much of this positive investment sentiment also stems from the rapidly growing domestic market. India’s private consumption expenditure has been growing at a compounded rate of 14 percent for the past five years, reaching US$1.5 trillion in FY2017. To add to that, India is also home to one of the fastest growing e-commerce markets, with online retail sales expected to reach US$64 billion by 2021.8

While multiple technology domains such as artificial intelligence, quantum computing, blockchain and machine learning are reaching maturity in quick succession, the convergence of maturity curves for these technologies presents a rare opportunity.
Companies can now implement multiple technologies at once and realize massive benefits through their strategic combinations (See Figure 3B).

Finally, with a 23-million strong digital native population driving the growth of India’s digital economy, the time is now for Indian manufacturers to fast-track their plans to become digital businesses.\(^9\)

**FIGURE 3: A PERFECT SETTING FOR LEADING WITH DIGITAL**

### 3A: FDI IN MANUFACTURING GROWING AT 15 PERCENT CAGR

![Graph showing FDI in manufacturing growing at 15 percent CAGR from 2012-13 to 2016-17.](image)

**3B: PEAKING TECHNOLOGY CURVES**

- **Mainframe**
- **Client-server & PCs**
- **Web 1.0 ecommerce**
- **Web 2.0, cloud, mobile**
- **Big data, analytics, visualization**
- **IoT & smart machines**
- **Artificial intelligence**
- **Quantum computing**

**COMBINATIONAL EFFECT OF TECHNOLOGY**

- **Public Cloud Mainstream**
- **Manufacturing FDI**
- **Mexico**
- **India**
- **China**
- **Brazil**
- **Germany**
- **UK**
- **US Deep Sectors**
- **Paris**
- **Tokyo**
- **1980**
- **1990**
- **2000**
- **2010**
- **2020**
- **2030**

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**3A: FDI IN MANUFACTURING GROWING AT 15 PERCENT CAGR**

<table>
<thead>
<tr>
<th>Year</th>
<th>Manufacturing FDI (US$ million)</th>
</tr>
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<tbody>
<tr>
<td>2012-13</td>
<td>8</td>
</tr>
<tr>
<td>2013-14</td>
<td>10</td>
</tr>
<tr>
<td>2014-15</td>
<td>12</td>
</tr>
<tr>
<td>2015-16</td>
<td>14</td>
</tr>
<tr>
<td>2016-17</td>
<td>16</td>
</tr>
</tbody>
</table>

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3C: INDIA IS HOME TO THE 3RD LARGEST DIGITAL NATIVE POPULATION

DIGITAL NATIVES, MILLION (2013)

- China
- United States
- India
- Brazil
- Japan

Source: DIPP Quarterly Factsheet on FDI, September 2017; Central Statistical Office of India and Accenture Analysis; “The State of India’s Online Retail Market In 2017”, Forrester, June 14, 2017; “India now has highest number of Facebook users, beats US”, Mint, July 14, 2017; International Telecommunications Union
BUT A LOPSIDED VIEW TO ACHIEVING DIGITAL OUTCOMES COULD JEOPARDIZE SUCCESS.

As our survey reveals, most Indian business leaders have a strong desire to leverage digital technologies. But, to what extent?

Less than a third of the executives said they wanted to use digital for driving greater operational efficiencies. Yet more than three quarters (76 percent) want to use digital for new, experience-driven revenue growth. Indeed, quite a lopsided view. (See Figure 4)

**FIGURE 4: ONLY A FEW COMPANIES ARE KEEN TO DRIVE EFFICIENCY WITH DIGITAL**

<table>
<thead>
<tr>
<th>FIRMS THAT WANT TO DRIVE OPERATIONAL EFFICIENCY WITH DIGITAL</th>
<th>FIRMS THAT WANT TO DRIVE NEW GROWTH WITH DIGITAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>31%</td>
<td>76%</td>
</tr>
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</table>

Source: Accenture Industry X.0 Survey 2017
To better understand this trend, we spoke to more than a dozen industry experts and senior business executives. Our conversations revealed an interesting insight: Most Indian companies are very keen to leverage digital technologies to woo and acquire new customers, and enter new markets.

But, in their excitement to tap prospects of new growth, they are overlooking the opportunities to transform their core product design, manufacturing and supply chain operations by harnessing the power of digital. This unbalanced view of growth in the digital era is a worrisome trend in the making.

**Why? Because taking a piecemeal approach to investing in digital will lead to sub-optimal realization of potential value, as opposed to taking an integrated, holistic approach to adoption of digital.**

Our research shows that as businesses commence their digital journey, they get better at systematically deploying combinations of multiple digital technologies. Further, when applied in a certain combination, these technologies help multiply financial gains beyond what each technology would deliver on its own. But how companies mix digital technologies will vary based on their industry and position in the industrial value chain.

Through a rigorous economic-modelling exercise, we determined the impact these combinations would have on both cost savings per employee and on market capitalization across different industries at a global level. For example, at a global level, companies in the industrial equipment sector could cut down the total cost per employee by almost 20 percent if they combine autonomous robots, artificial intelligence, blockchain, Big Data analytics and 3D printing.

As part of our research, we also estimated how similar technology combinations could boost market value for companies across industries. (See Figure 5)
Digital technologies, when applied in a certain combination, help multiply financial gains beyond what each technology would deliver on its own. Thus, resulting in creating exponential business value.
FIGURE 5: SYSTEMATICALLY COMBINING TECHNOLOGIES CAN LEAD TO GREATER SAVINGS AND A HIGHER MARKET VALUE

INCREMENTAL SAVINGS IN COST PER EMPLOYEE

<table>
<thead>
<tr>
<th>Technology</th>
<th>Automotive</th>
<th>Industrial Equipment</th>
<th>Natural Resources</th>
<th>Aerospace &amp; Defense</th>
<th>Medical Technology</th>
<th>Electronics &amp; High Tech</th>
<th>Life Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Printing</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Autonomous Robots</td>
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<tr>
<td>AI</td>
<td></td>
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<tr>
<td>Blockchain</td>
<td></td>
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</tr>
<tr>
<td>Digital Twin</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Big Data</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Machine Learning</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Mobile Computing</td>
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<td></td>
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<tr>
<td>Autonomous Vehicles</td>
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<tr>
<td>AR/VR</td>
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</tbody>
</table>
### ADDITIONAL GAINS IN MARKET CAPITALIZATION

<table>
<thead>
<tr>
<th>Technology</th>
<th>Market Capitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Computing</td>
<td>Natural Resources 26.3%</td>
</tr>
<tr>
<td>3D Printing</td>
<td>Aerospace &amp; Defense 16.8%</td>
</tr>
<tr>
<td>Autonomous Robots</td>
<td>Chemicals 25.6%</td>
</tr>
<tr>
<td>AI</td>
<td>Medical Technology 14.7%</td>
</tr>
<tr>
<td>AR/VR</td>
<td>Oil &amp; Gas 43.9%</td>
</tr>
<tr>
<td>Autonomous Vehicles</td>
<td>Industrial Equipment 24.9%</td>
</tr>
<tr>
<td>Big Data</td>
<td>Life Sciences 12%</td>
</tr>
<tr>
<td>Blockchain</td>
<td>Automotive 9%</td>
</tr>
<tr>
<td>Digital Twin</td>
<td>Consumer Goods &amp; Services 34.5%</td>
</tr>
<tr>
<td>Machine Learning</td>
<td>Electronics &amp; High Tech 48.1%</td>
</tr>
<tr>
<td></td>
<td>Utilities 38.8%</td>
</tr>
</tbody>
</table>
INDUSTRY X.0
DIGITAL REINVENTION OF YOUR INDUSTRY

INDIAN MANUFACTURERS MUST RETHINK THEIR DIGITAL APPROACH TO TRANSFORM BUSINESS OPERATIONS AND GROW NEW REVENUE STREAMS.

How can Indian businesses drive growth, experiences and efficiencies at the same time, and thrive in the digital era?

At Accenture, we recommend a novel approach to reinventing business with digital, an approach we call Industry X.0. Industry X.0 businesses embrace constant technological change—and profit from it. They move beyond experimenting with IT bundles or SMAC (social, mobile, analytics, cloud) stacks, combining digital technologies to drive both top-line and bottom-line growth.

Industry X.0 businesses incorporate Industry 4.0’s core operational efficiencies, but also leverage combinations of advanced digital technologies to continuously create new, hyper-personalized experiences in both a business-to-consumer and business-to-business context. (See Figure 6)

FIGURE 6: THE JOURNEY TO INDUSTRY X.0

INDUSTRY 1.0
Mechanical production powered by water and steam

INDUSTRY 2.0
Mass production based on the division of labor and powered by electrical energy

INDUSTRY 3.0
Electronics and IT for automation of production and front/middle/back office

INDUSTRY 4.0
Cyber physical production systems

INDUSTRY X.0
Industry 4.0 efficiencies + smart, connected, living and learning experiences
COMPANIES MUST REIMAGINE AND REBUILD THEIR BUSINESSES AS SMART, CONNECTED, LIVING AND LEARNING ENTITIES TO DIGITALLY REINVENT THEIR INDUSTRY.
There are lessons from global industrial companies that Indian businesses could look at emulating.

**SCHNEIDER ELECTRIC’S PREDICTIVE-MAINTENANCE SERVICE**

Consider the case of Schneider Electric, an MNC industrial products and solution provider, headquartered in France. Schneider Electric has combined digital and IoT technology with B2C thinking around the customer experience to create a Digital Factory where it can build, test and deploy new applications with ease. Through this Digital Factory, Schneider Electric has launched a new predictive-maintenance service. Analyzing huge volumes of data on production, consumption and electronic batch processing through a proprietary algorithm, the company can predict equipment failures and take appropriate action well in advance. Based on this intelligence, Schneider Electric’s equipment can adapt to its environment at speed, reducing overall downtime and improving asset utilization for its clients.10

**MICHELIN’S EFFIFUEL FOR SAVING FUEL COSTS**

Similarly, Michelin, the French tire manufacturer, has built an ecosystem of experts to deliver its new EFFIFUEL™ service. The service uses high tech and high touch to reduce fuel costs in truck fleets.11 Sensors inside vehicles collect data on fuel consumption, tire pressure, temperature, speed and location. This data is then transmitted to a cloud service of a Michelin solutions partner, and that’s where the human touch begins. Michelin’s solutions fuel experts analyze the data and make recommendations to the fleet manager and Michelin’s solutions instructors train drivers on how to use less diesel fuel when driving.12 Result: Truck fleet managers can save 2.5 liters of fuel for every 100 kilometers driven. Michelin has become more than a tire manufacturer—with the launch of the Michelin solutions business, it’s also a fuel savings partner.13 (See Figure 7)
Michelin is helping truck fleet managers reduce fuel consumption and costs, and allowing them to pay for tires on a kilometers-driven basis.

**FIGURE 7: MICHELIN’S MOVE TO TIRE-AS-A-SERVICE**

Source: Driving unconventional growth through the Industrial Internet of Things, Accenture (2014).

Large Indian companies participating in our survey seem to have started walking the Industry X.0 path. (See Figure 8)

**FIGURE 8: TOP TECHNOLOGY CHOICES OF INDIAN MANUFACTURERS**

**TOP 5 TECHNOLOGIES FOR DRIVING COST EFFICIENCIES**

1. **AUTOMATION ROBOTS** 62%
2. **AUTOMATION VEHICLES** 62%
3. **MACHINE LEARNING** 59%
4. **3D PRINTING** 59%
5. **ARTIFICIAL INTELLIGENCE** 55%

**TOP 5 TECHNOLOGIES FOR DRIVING NEW GROWTH**

1. **MOBILE COMPUTING** 66%
2. **MACHINE LEARNING** 55%
3. **ARTIFICIAL INTELLIGENCE** 52%
4. **BLOCK CHAIN** 48%
5. **DIGITAL TWIN** 45%

**SO, HOW DO INDIAN COMPANIES EMBARK ON AND ACCELERATE THEIR INDUSTRY X.0 JOURNEY?**
THE INDUSTRY X.0 JOURNEY

SIX STRATEGIC IMPERATIVES TO LEAD IN THE NEW WITH DIGITAL

Our research reveals six strategic imperatives Industry X.0-driven businesses must address to digitally reinvent their industries. Some Indian businesses are already experimenting along these lines in their quest to become Industry X.0-ready.

1. TRANSFORM THE CORE
Organizations must lay a groundwork for digitized engineering and production systems to drive new levels of efficiency.

2. FOCUS ON EXPERIENCES AND OUTCOMES
Delivering hyper-personalized customer experience and outcomes is critical to building and maintaining market leadership.

3. INNOVATE BUSINESS MODELS
Companies must look to reinvent business models with the goal of creating new sources of value and new revenue streams.

4. BUILD A DIGITAL-READY WORKFORCE
Sourcing, training and retaining talent possessing digital-ready skills is key to maintaining competitive advantage.

5. BUILD NEW ECOSYSTEMS
Nurturing the right partnerships in a newly architected ecosystem can help drive innovation and new capabilities.

6. PIVOT WISELY
Companies must manage the wise pivot by continually balancing investment and resource allocation between the core and the new.
1. **TRANSFORM THE CORE:** Industry X.0 companies build core product design, engineering and production systems around digital technologies that drive new levels of efficiency. They also ensure that physical machines and software systems are integrated to unlock previously unseen cost efficiencies, thus driving up investment capacity.

Mother Dairy, for instance, has equipped its supply chain with various digital technologies. In addition to being an early adopter of technologies such as virtualization and cloud computing, the company deployed mobile applications for order collection and invested heavily in IoT for tracking the location of its milk trucks and monitoring storage temperatures at its warehouses. Further, the company deployed a host of new software programs to remotely operate shop floor machinery, to record and retrieve production and process data, and to generate performance dashboards for production control systems. Through detailed, real-time reporting, these software programs have helped Mother Dairy improve visibility of its operational-process parameters, and enhance product traceability by several folds. Additionally, Mother Dairy reduced milk recirculation times by almost 50 percent.

2. **FOCUS ON EXPERIENCES AND OUTCOMES:** Industry X.0 companies invest cost savings in driving hyper-personalized experiences for customers. First, they design and deploy products, services and platforms that constantly adapt to meet changing customer needs. They then use Big Data as the foundation for real-time insight generation and decision support. And finally, they enhance customer experience throughout the product lifecycle, through smart, digital touchpoints between the customer and the company.

A leading Indian carmaker is looking to completely transform the sales experience by harnessing digital and connectivity. It already has a mobile application that allows customers to avail a variety of post-sales services such as—booking service appointments, paying service bills, tracking service status, availing 24-hour on-road assistance etc. To add to that, it will also be launching its first set of revamped technology-enabled showrooms by March 2018. These showrooms will feature interactive touchscreens for customers to browse through product catalogs. They will also have designated areas that will allow customers to digitally choose the customization options for their cars and add accessories according to their needs.
3. **INNOVATE BUSINESS MODELS:** Industry X.0 companies use a combination of digital technologies to create new business models to drive differentiated customer value propositions well beyond the point-of-sale interaction. Connected and intelligent products are designed from scratch, allowing companies to monetize product-user interactions via software-based services and pay-per-use revenue models.

Mahindra Tractors, a subsidiary of the Mahindra Group, launched Trinngo, a farm equipment-sharing platform that offers tractors and other equipment on a pay-per-use basis. The service lets farmers reserve tractors from a fleet that includes both company-owned tractors and those owned by other farmers. Launched in June 2016, the service is already serving 50,000 farmers and clocking more than 40,000 total hours of use. The company plans to extend its services to more than one million farmers.¹⁶

4. **BUILD A DIGITAL-READY WORKFORCE:** Industry X.0 companies recruit, train, and retain talent with skills for the digital enterprise and encourage collaboration between people and machines. They are redesigning roles to encourage active collaboration within workforces with varying levels of digital awareness and appreciation. They will eventually need to plan for the co-existence of humans and autonomous robots and machines, while equipping workers with software-engineering and machine-learning skills.

Tata Steel, the iron and steel major, has made substantial progress in refocusing its internal culture to build a digital-ready workforce for the future. The company has fostered one-to-one relationships between millennial workers (employees aged under 30) and the more experienced leadership team through a reverse-mentoring program, where younger employees spend part of their time bringing senior leaders up to speed on the latest digital trends and technologies. This serves both to motivate millennial employees through exposure to senior leaders, and provides an avenue for experienced employees to keep pace with rapidly evolving digital trends.¹⁷

5. **BUILD NEW ECOSYSTEMS:** An Industry X.0 company builds an ecosystem of suppliers, distributors, startups and customers, which allows it to scale new digital business models rapidly. Such businesses obtain and develop ideas for new products or services from a wide variety of sources, both internal and external to the firm. All this while nurturing innovation clusters that design and prototype early-stage technology use cases.
Take, for example, Bangalore International Airport (BIAL) which handles more than 24 million passengers today, and is building a new terminal to handle more than 45 million passengers. BIAL has turned to a wider ecosystem to accelerate digital adoption and related innovation. While BIAL leverages internal ideas generation via the Ideascale platform, they also tap into external service providers, customers, distributors and niche startups for ideation and execution. BIAL’s innovation center has opened avenues for new ideas to flow in, which are evaluated, prioritized, piloted and scaled up on systematic basis. This is helping BIAL find multiple pathways for a given problem, identify unconventional ideas to improve customer experience, and experiment with new technologies which could be relevant now or in the future.

6. PIVOT WISELY: Industry X.0 companies are moving into the future, but as they do so, they carefully balance investment and resource allocation between the core business and new businesses to synchronize innovation and growth. Companies pivoting wisely create shared performance metrics that not only monitor traditional performance outcomes but also track levers that can disrupt such outcomes. They systematically and continuously inject digital technologies into mainstream operations through the buy-in of a leadership team that is passionate about, and can envision the use of, digital in strategic and tactical initiatives.

Several large enterprises in India are carving out venture funds, running digital accelerators, and acquiring niche startups to help incubate and invest in early-stage business ideas which will help them identify strategic bets for the future. The range of companies cuts across sectors—from industrial product companies to consumer durables to drug manufacturers, who are all looking to leverage the start-up ecosystem to identify and nurture strategic bets which may transform their industry or product offerings. While this is still in initial stages, we clearly see this as emergent play, where enterprises look to co-create new experiences for their customers and develop new, differentiated product-service offerings that can be scaled up into viable businesses.

THE EMERGING INDUSTRY X.0 PARADIGM WILL UNLEASH NEW ENERGY INTO THE WORLD OF INDUSTRIAL PRODUCTS AND SERVICES. TO BE A VIABLE PLAYER IN THE DIGITALLY CONTESTABLE FUTURE AND CONTINUE TO MAINTAIN A PROFITABLE GROWTH TRAJECTORY, INDIAN COMPANIES WILL NEED TO PLAN AND CALIBRATE THEIR INDUSTRY X.0 JOURNEY. COMPANIES THAT EMBARK ON THIS JOURNEY IN A HOLISTIC MANNER TODAY WILL EMERGE AS THE DIGITAL LEADERS OF TOMORROW.
APPENDIX: ABOUT THE RESEARCH

In 2017, Accenture surveyed 29 senior executives from leading Indian companies across 12 manufacturing and production industries. These 29 executives were part of a larger survey of more than 900 senior executives from large industrial companies across 21 different nations, including India. The global survey sought to understand:

- Digital technologies being deployed by companies to drive new-to-market efficiencies and hyper-personalized experiences.
- Challenges being faced by businesses while deploying digital technologies.
- Investments being made by companies in digital technologies and capabilities to deliver new efficiencies and new growth.

The companies surveyed were classified into relevant industries based on industry definitions followed by Accenture. Consistent cross industry datasets of key financial variables (e.g. capital investment, wage bill, sales turnover, profits, market capitalization etc.) were constructed for the period 2010-2016 based on inputs gathered from a survey of 931 senior executives from large companies (most having sales turnover of US$ 1 billion and above) across 12 manufacturing and production industries (sample distribution discussed in Figure-1) as well as information sourced from reputed financial database (S&P Capital IQ).

Hyper-personalized experiences and operational efficiencies were designated as “performance dimensions” to understand the combinatorial impact of technologies on the company’s top-line and bottom line, respectively. Principal component analysis was utilized to determine the optimal combinations of technology to drive hyper-personalized experiences and operational efficiencies.

The result of the above analysis was then used to create Technology Indices to understand the impact of various technology combinations on the two performance dimensions.

We then identified statistically significant financial indicators of top-line and bottom-line performance. We arrived at cost-per-employee and market
capitalization as the two statistically significant financial performance indicators to capture the impact of technology combinations (technology indices from a modelling perspective) on bottom-line and the top-line.

Thereafter, we sought to understand the relationship of the technology indexes with market capitalization and cost-per-employee of companies across 12 industries. The following industry sample sizes (numbers mentioned in parentheses) were used to measure the impact of technology combinations on market capitalization while driving hyper-personalized experiences:

- Electronics & Hi-Tech (47), Aerospace & Defense (55), Automotive (45), Consumer Goods & Services (50), Industrial Equipment (84), Life Sciences (78), Transportation (40), Medical Technology (43), Utilities (62), Natural Resources (58), Chemicals (67) and Oil & Gas (47)

Industry sample sizes (numbers mentioned in parentheses) used to measure the impact of technology combinations on cost-per-employee while driving operational efficiencies were as follows:

- Electronics & Hi-Tech (46), Aerospace & Defense (53), Automotive (38), Consumer goods (43), Industrial Equipment (78), Life Sciences (75), Transportation (44), Medical Technology (43), Utilities (66), Natural Resources (57), Chemicals (64) and Oil & Gas (49)

The Saunders & Brynjolfsson's (2016) research was adopted to build an econometric model. This model provides an estimate of the potential improvement in top- and bottom-line performance (captured through increase in market capitalization and reduction in cost-per-employee) resulting from improvement in the technology combination index responsible for driving operational efficiencies and hyper-personalized experiences.

\[ FPi = \beta_1 \times K_i + \beta_2 \times F_i + \beta_3 \times IT_i + \beta_4 \times E_i + \beta_5 \times Tech_i + \epsilon_i \]

**WHERE**

FP= Financial performance indicator
(Market Capitalization or Cost-per-employee)
K = physical non-IT Capital
(property, plant and equipment (PP&E))
F = rest of non-IT Capital represented on balance sheet
IT = IT Spending
E = Number of Employees
Tech = variables based on the firm’s technology combination index
All variables are in logarithmic form. $\beta 5$ represents the impact in financial performance of enhancing technology combination by one unit. This way, the model provides an estimate of the potential improvement in top-and bottom-line performance (captured through increase in market capitalization and reduction in cost-per-employee) resulting from improvement in the technology combination index responsible for driving operational efficiencies and hyper-personalized experiences.

To estimate the potential value release through systematic selection of technologies, respondents were categorized by decreasing order of the technology index scores, separately for market capitalization and cost-per-employee respectively. The top 10 percent were selected from the list and their average value release (both market capitalization and cost-per-employee) was compared with the average value release of the remainder 90 percent of companies. The financial impact of reinventing the business from average to being one capable of driving experiences with the highest impact was derived by calculating the average change in the index score of the 90 percent of companies in context of the average index of top 10 percent, and then multiplying the same with average market capitalization of companies in the 90 percent bracket and the technology index regression coefficient. The same approach was also adopted toward calculating maximal associated with cost-per-employee.
REFERENCES


