

Opportunities for India in the Digital Economy

Strategic Internet of Everything-based opportunities abound in the public and private sectors.

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It's time for a Digital India. - Narendra Modi

The digital economy is the new productivity platform that some experts regard as the third industrial revolution. Sometimes referred to as the Internet Economy or Internet of Everything (IoE), this digital revolution is expected to generate a wealth of new market growth opportunities and jobs, and become the biggest business opportunity of mankind in the next 30 to 40 years.

[Goldman Sachs predicts that India, which comprises 15 percent of the world population with a growth rate of 7 to 8 percent, could be the second largest economy by 2030.](#) There is no doubt that the leadership of the country sees the digital economy as a major growth enabler. When Prime Minister Narendra Modi strategically listed “Digital India” among the top priorities for the new BJP-led central government, he delivered a resounding nod to the many opportunities that exist in the digital economy.

According to research conducted by Cisco Consulting Services, the global IoE value at stake (VAS) is estimated to be US\$19 trillion from 2013 through 2022 in private and public sectors combined. VAS is defined as the combination of net new revenues, cost savings, and the value that flows to organizations and industries that take advantage of new IoE connection-based capabilities. These findings are based on a predictive analytics model focusing on use cases that can be operationalized in the short to medium term.

For the global private sector, the estimated VAS is US\$14.4 trillion from 2013 through 2022. For the global public sector, the estimated VAS is US\$4.6 trillion. This VAS is derived from increased efficiency and related cost savings, improved citizen experiences, and greater revenue opportunities. Approximately 60 percent of the global VAS will be created net new, while the remaining 40 percent will be up for grabs, to be claimed by the businesses and organizations that exploit IoE.

Recently the Department of Electronics & Information Technology of India (DeitY) published the draft Internet of Things (IoT) policy, which shows that the country expects to create an [IoT industry in India of US\\$15 billion by 2020](#). The DeitY estimates that India will have a share of 5 to 6 percent of the global IoT industry with a focus on agriculture, health, water quality, natural disasters, transportation, security, automobile, supply chain management, smart cities, automated metering and monitoring of utilities, waste management, and oil and gas.

Considering all IoE pillars - which encompass people, data, and process in addition to things - Cisco Consulting Services estimates that the opportunities for India will be higher. There was nearly US\$35 billion VAS for the private sector in 2013. Indian companies realized about \$18 billion of the VAS, which is only 53 percent. Major enablers for India will be the growth of broadband penetration, machine-to-machine connections, and mobility.

The broadband penetration, which today is 9 percent, is growing fast. The average broadband speed will grow 250 percent from 2012 to 2017. In 2017 the total amount data equivalent to all movies ever produced will cross India's IP network every 2 hours. The IP traffic by 2017 will grow 6 times, which is a compound annual growth rate of 44 percent

There will be 1.1 billion mobile devices in 2018, up from 878 million in 2013. The mobile broadband penetration of 49 percent will grow. The average mobile speed will triple from 2013 to 2018, a compound annual growth rate of 20 percent. The mobile traffic will grow 24-fold from 2013 to 2018, a compound annual growth rate of 88 percent.

Machine-to-machine connections account for 53 percent of VAS for Indian firms.

Cisco Consulting Services estimates that the overall IoE VAS for India in the next ten years will be US\$116.2 billion in the public sector (see Table 1) and US\$394.8 billion in the private sector (see Table 2).

IoE Public-Sector Opportunities

As shown in Table 1, the biggest IoE opportunities in the public sector are in travel avoidance, connected learning, smart grid, and gas monitoring. Also high on the list is the “payments” opportunity with VAS of US\$16.47 billion. The Unique Identification Authority of India (UIDAI) Aadhaar project is one of the first attempts to tap IoE capabilities and improve service delivery and cut costs. It is designed to demonstrate the power of Big Data and enable the Indian government to confirm identities of recipients of benefits and services. It allows banks and customers to link ID numbers to accounts, facilitating transactions via biometric identification. It improves delivery of government and other service benefits to India's neediest residents.

Table 1. Public Sector in India: IoE Value at Stake Breakdown 2015 - 2025

Opportunity	Estimated Value (US\$B)	Opportunity	Estimated Value (US\$B)
Travel Avoidance	\$18.21	Payments	\$16.47
Connected Learning	\$13.07	Smart Xmission Grid	\$11.40
Gas Monitoring	\$11.30	Cyber Security	\$9.82
Mobile Collaboration	\$8.80	Bring Your Own Device (BYOD)	\$3.92
Water Management	\$3.69	Particular Monitoring	\$3.45
Chronic Disease Management	\$3.36	Video Surveillance	\$2.98
Telework	\$1.71	Public Transport	\$1.30
Disaster Response	\$1.27	Counterfeit Drugs	\$1.00
Smart Street Lighting	\$1.00	Smart Buildings	\$0.90
Road Pricing	\$0.82	Waste Management	\$0.76
Virtual Desktop	\$0.17	Smart Parking	\$0.16
Drug Compliance	\$0.15	Local Metro	\$0.14
Fleet Management	\$0.08	Correctional Visits	\$0.07
Bridge Maintenance	\$0.06	Inpatient Monitoring	\$0.05
Smart Tollbooths	\$0.02	Wildfire Suppression	\$0.00
Total: US\$116.2 billion			

Connected learning also represents a huge opportunity in India's public sector with an estimated VAS of US\$13.07 billion. An example in this space is [Amrita University, which is tapping IoE capabilities to extend educational reach and reduce costs](#). Amrita supports qualified and expert teachers in training and empowering other teachers throughout India. It delivers classroom content to the most highly skilled teachers to reach the vast student population across the country. It provides a platform that government officials can use to conduct collaborative meetings, trainings, and seminars.

Several other IoE opportunities exist for public-sector organizations that use IoE to help manage assets, optimize performance, and create new business models. An estimated 70 percent of the value will come from agency-specific implementations, while 30 percent will derive from cross-agency use cases.

The primary benefits of IoE opportunities in the public sector include:

- Increased revenue
- Reduced costs
- Higher employee productivity
- Improved safety and security
- Improved environment
- Enhanced citizen experience
- Better health and well being

Public-sector strategy opportunities are concentrated in two major groups: people/citizens with US\$23.5 billion and cities with US\$92.7 billion. More than two-thirds of public-sector VAS (69 percent) will be powered by citizen-centric connections (person-to-person, machine-to-person, or person-to-machine). Cities will generate almost two-thirds (63 percent) of VAS in the public sector.

IoE Private-Sector Opportunities

As shown in Table 2, the overall VAS in India's private sector is estimated to be US\$394.8 billion. Major opportunities exist for improving asset utilization, employee productivity, supply chain, and customer experience, as well as reducing time to capability through innovation. The private-sector value opportunities are concentrated in two areas: cross-industry use cases with US\$94.9 billion and vertical-industry use cases with US\$299.9 billion.

Table 2. Private Sector in India: IoE Value at Stake Breakdown 2015 - 2025

Opportunity	Estimated Value (US\$B)	Opportunity	Estimated Value (US\$B)
Smart Factories	\$75.2	Connected Marketing/Advertisement	\$62.2
Physical/Logical Security	\$34.6	Time to Market	\$32.9
Supply Chain Efficiency	\$26.9	Future of Work 24.	\$24.1
Business Process Outsourcing	\$23.7	Connected Gaming/Entertainment	\$19.4
Connected Commercial Vehicles	\$18.8	Innovative Payments	\$18.8
Smart Farming	\$16.4	Smart Buildings	\$11.2
Wealth Management	\$11.0	Travel Avoidance	\$10.0
Virtual Attendants	\$5.2	Next-Gen Vending Machines and Digital Malls	\$1.5
Digital Signage	\$1.2	Next-Gen Retail Bank Branches	\$0.5
Total: US\$394.8 billion			

For the next ten years, large factories will be the primary benefactors with US\$75.2 billion VAS. One of the local companies tapping into the smart factories opportunity is Entrib. Its product called ShopWorx makes the shop floor smart for manufacturers. Large organizations, government departments, and the bigger cities in India can benefit directly from new technologies that transform supply chain management and logistics in the private sector.

India-based global enterprises such as Tata Motors, Infosys, and others, can take advantage of IoE for significant global competitiveness and productivity. These companies can build on the potential of mobile technology to develop smart working practices and education and training for their employees. A good example is the retailer Mark and Spenser that uses mobile technology to improve financial literacy among their workers in India, resulting in a 33 percent increase in workers with bank accounts. This action yields significant cost savings and increased productivity. Mid-size, locally focused enterprises and small businesses that employ the majority of India's people are not yet the primary focus for IoE opportunities.

Digital Economy: a Strategy for India's Growth and Job Creation

India recognizes the importance of national policy leadership in digitalization. Prime Minister Modi's call for a Digital India and e-governance is a glaring example of national leadership. With one-third of the world's population online, the need to coordinate government policies and commercial strategies for rolling out and using Information and Communication Technologies (ICTs) has never been greater.

This importance calls for investment in digitalization in the public and private sectors. Digitalization has emerged as a vital economic driver of accelerated growth and job creation. The commitment by India's government to spend Rs1.13T (US\$19 billion) in the next three to five years is a strategic call. According to Cisco estimates, an increase of 10 percent in a country's digitalization score fuels a 0.75 percent growth in its per-capita GDP. A 10-point increase in the digitalization score leads to a 1 percent drop in the unemployment rate. The launch of the Digital India Program of the Government, which aims at "transforming India into a digitally empowered society and knowledge economy," may provide the impetus for the country's development of IoE. India's leadership recognizes the opportunities that lie in improving the efficiency of governance to help address poverty and inequality. Bad governance can lead to corruption practices.

The digital economy opens new investment opportunities for Indian government and business leaders. Research conducted by Cisco and the authors of this article shows that India-specific applications can make a significant difference in the country, with varying levels of maturity or progress. In addition, consortiums may have a significant positive impact, such as the one created in Bangalore where veterans from Tech Mahindra, GE, Vodafone, Cisco, Philips, and Tesco are forming an [India Internet of Things](#) panel to build open source IoT solutions for solving problems in healthcare, education, and agriculture, among others. However, in most cases, an ecosystem of businesses and technology can seize serious IoE opportunities. Chief among these opportunities are the following (in no particular order):

- **Water-scarcity monitoring.** In the public sector, water management has a VAS of US\$3.69 billion. It is hard not to see the social and health implications of this opportunity. For this fundamentally important and difficult-to-solve-problem for the people of India, IoE technologies offer solutions focused on water conservation (water catchment areas, ground water recharge and monitoring, safe drinking water, sewage treatment), and smart/green homes (safety, water/energy conservation, and grid-connected power). According to research published in Businessweek (January 2015), India's overall non-revenue water is about 40 percent. Non-revenue water includes water lost to leaks, poor metering, fire department, and theft. This problem can be mitigated using Big Data analytics solutions, as a company called [TaKaDu is doing in Israel](#). The company helps address water scarcity using its Big Data-based software "to slice and dice and analyze the raw data measured by smart sensors in the water network." These sensors monitor the flow rates, pressure, and water quality, and identify bugs in the meters, valves, and other system equipment. From this data, the software can analyze where water is escaping.

- **Arable land and food security.** India has the second largest amount of arable land and the largest gross irrigated crop area. Hence, India is among the top three global producers of many crops including wheat, rice, pulses, cotton, peanuts, fruits, and vegetables. It is the largest producer of milk and has one of the biggest and fastest-growing poultry industries. India is expected to remain self-sufficient in the production of food staples until at least 2025. The smart farming VAS opportunity is estimated to be US\$16.4 billion. Still there is the problem of malnutrition and poverty. The main reason for malnutrition in India is not so much the lack of food as a woefully inefficient supply chain. Inefficiencies in the downstream segments of the food supply chain are rampant, and threaten to undermine self-sufficiency and perpetuate malnutrition. For example, according to the [Wall Street Journal Asia, inefficiency in the tomato business results in as much as 20 percent of tomatoes rotting in transit](#), while the price for consumers is marked up by as much as 60 percent.

The supply chain efficiency VAS is estimated to be US\$26.9 billion. Agriculture applications that improve the supply chain process and logistics, improve yield, increase acreage, and avoid food wastage are highly desirable. Some of these problems could be mitigated by logistical methods developed by Cisco for cloud-based supply chain solutions that interconnect the public cloud with private clouds (in this case, the capabilities of the farmers). Farmers could take advantage of a cloud-based solution using their smart phones, which are practically available to everyone. Other applications could involve pest control, crop insurance, fertilizer optimization, and livestock monitoring.

- **Smart city solutions.** Smart cities are becoming one of the biggest IoE opportunities in India. Prime Minister Modi has recognized the vast opportunities for smart city solutions, calling for a plan to develop 100 smart cities in the country. Cisco already is working with a few local governments. Public- and private-sector opportunities include smart buildings with VAS of US\$11.2 billion, physical and logical security with US\$34.6 billion, connected commercial vehicles with US\$18.8 billion, among others. They may include traffic management solutions, which have been implemented by Cisco working with local partners and authorities in Tashkent (Uzbekistan), or urban security systems that Cisco is developing with partners to control parking, reduce or prevent crime, and enhance citizen security. Video surveillance alone has an estimated VAS of US\$2.98 billion.

Opportunities in development include air quality monitoring, emergency route discovery, pollution monitoring, road quality checks, efficient municipal control and management of lights and traffic, road damage prevention, integrated/flexible city transport, government asset tracking, and many more. Smart car solutions, such as CarlQ developed in India, can make a difference, thanks to a device that records traditional data from a car (for example, mileage and speed) along with driving patterns. IoE solutions around safety and security, urban security, and citizen-to-government interaction are not only impactful for people, but also could generate new revenue streams for the local and central government.

- **ICT-based health technologies or e-health.** Critical investment areas for India are healthcare (remote health, elderly care), health information exchange, and telehealth. Evidence strongly suggests that implementing ICT can result in higher quality and safer, more patient-responsive healthcare. Mobile collaboration technologies (VAS of US\$8.8 billion) and BYOD (VAS of US\$3.92 billion) can be delivered using basic or sophisticated Cisco technologies. Combined with Cisco IT infrastructure technologies, these opportunities may enable e-health solutions and remote healthcare systems built in neighborhoods, rural areas, locally in stores, or where people gather, shop, or socialize. If so, doctors, nurses, and other qualified personnel can deliver health services remotely. For example, a telepresence system can connect residents of flood-stricken areas in India with medical services. UNIQ, a mobile electrocardiography diagnostics tool created by LifePlot, is already doing this. Greater adoption of health ICTs will factor prominently in efficiency and cost reduction gains, improved healthcare delivery, decreased medical errors, and improved patient safety and chronic disease management (VAS of US\$3.36 billion).

IoE Opportunities Abound in Digital India

Government leaders are increasingly aware that the world is becoming digital. Many are trying to capitalize on this unique situation instead of react to it. Prime Minister Modi's vision for a Digital India is a strategic call to embrace the opportunity India has to be a leader in the third industrial revolution.

The projected opportunity numbers for India may seem low when compared to other countries, or compared to its gross domestic product (GDP). However, for businesses, organizations, and governments that fully embrace IoE, the benefits can be materially greater. Globally, the value at stake grew to US\$2.3 trillion in 2014, but 47 percent of that value was left on the table. Moreover, 40 percent of the global value at stake will be garnered by new winners and new vendors in the next ten years.

India is one of the powerhouses in digital innovation and recognized as a fast-growing economy with significant influence. India might be able to garner advantage from its membership in the new associations of developing and newly industrialized countries.

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