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The Future of Internet in India



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Foreword

"We are still in the very beginnings of the Internet. Let's use it wisely."

- Jimmy Wales, Founder, Wikipedia

On August 15, 2016, India celebrated 21 years of having commercial access to the Internet. From the interminable wait for that all-too-familiar hissing and beeping dial-up sound to the lightning speeds we have all become accustomed to today, the Internet is now an integral part of our lives. The Internet today fulfils roles ranging from postman to personal banker, doctor to instructor, entertainer to evangelist, and beyond.

Let us not forget that India's IT-BPM sector was enabled by the digital foundation of the Internet. In the flat world that it created, the Indian IT-BPM sector flourished like no other. It is estimated to have aggregated revenues of \$143 billion in FY2016, with exports touching \$108 billion, making it a global powerhouse with incomparable impact on the economy.

The next phase of evolution in the Internet-driven ecosystem has been led by young companies which began leveraging the ubiquity of the mobile Internet to provide more meaningful services to Indian users across platforms such as e-commerce, payments and mobile apps. The driving force behind the success and exponentially growing reach of Internet-driven products and services has been convenience. The Internet has, quite simply, made it easier to do a lot of things that were once long-drawn-out, error-prone, frustrating and fraught with human friction at every step of the way.

And the proof is in the numbers. As of 2015, India had ~330 million internet users, which is expected to witness a 20% CAGR in the next 5 years. What's more, India became the third country globally to have over five Internet companies valued at over \$1 billion. And Indian players are globalising like never before, with even smaller B2B and B2C companies getting online customers from around the world, and setting up offices overseas.

By 2020, the Indian e-commerce industry is expected to reach \$34 billion, with 200 million individuals transacting online, which is more than a quarter of the 730 million Indians who will have access to the Internet by then. This growth in Internet usage and entrepreneurship will be driven by India's youth demographic, which is one of the largest in the world.

Conversely, the Internet is also helping Indian players localise like never before. It is expected that 75% of growth in the number of Internet users will come from rural areas, with the vast majority of these consuming content in local languages. Companies that leverage this extensive opportunity are the ones that will emerge as the heroes of the Internet economy.

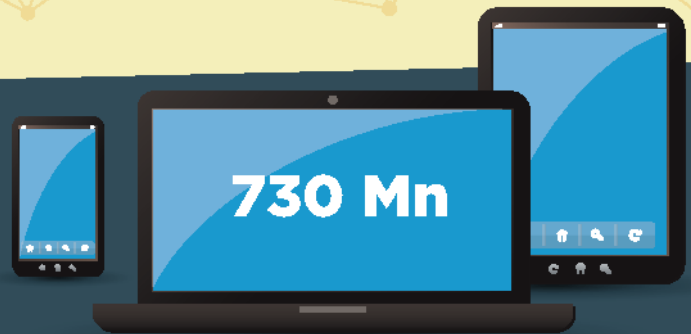
India is truly set to add its own flavour to the Internet and make it an engine for socio-economic growth. We invite you to review this report on "The Future of Internet in India", which provides a panoramic sweep of its history, its evolution, the sectors it has most impacted, the risks such growth entails, and what the future will look like.

R Chandrashekhar
President, NASSCOM

Sidharth Malik
MD & Vice President, Akamai India

Internet in India by 2020

730 Mn Internet users



75% of new Internet user growth to come from rural areas

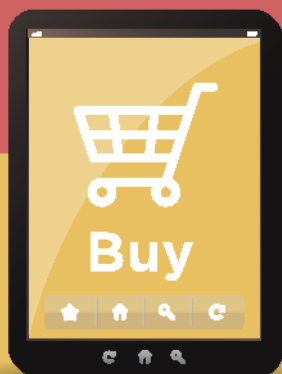
75% of new Internet users to consume content in local language



Mobile video content to grow at an **83% CAGR** in next 5 years



Number of online shoppers to become **175 Mn**, a **3.5X** growth over 2015



70% of e-commerce transactions via mobile phones

50% of travel transactions to be online



The history of Internet in India

For the millennial generation, and even the septuagenarian, it's hard to imagine or think back to a time when the world had no Internet. August 1995 marked the debut of the Internet in India. And, to say that the Internet has changed the way we live in just two decades would be an understatement.

Launched by the Videsh Sanchar Nigam Limited (VSNL), which was then a public sector enterprise and now part of Tata Communications, it focused on catering to overseas communication. People in six Indian cities could access the Internet through dial-up services, which promised a speed range of 9.6 kbps to 128 kbps on premium leased lines at costs ranging from INR 5,000 to INR 20,00,000 per annum. In six months, VSNL was able to acquire more than 10,000 customers, many of whom were prominent business leaders.

A year later, in 1996, India's first cyber café opened in Mumbai. Over the next few years, the Internet became synonymous with cyber cafés. People had to wait their turn before being allotted an available computer. The slow Internet speed and computers with less RAM did not matter as the Internet was mostly used to browse, send an e-card, or enjoy a chat session. Using the Internet at home was considered a luxury, and therefore uncommon. Dial-up connections were the only option available at an average speed of 10 kbps.

The late 1990s saw the Internet expanding its reach and computing becoming a part of people's lives. Internet adoption spread across business segments and heralded the dotcom boom. Just as people and businesses in India and the world were getting to understand the Internet better and leveraging its potential, an Indian entrepreneur took the world by storm with his webmail company Hotmail. Within two years of its launch, Sabeer Bhatia's Hotmail had millions of registered users. In 1997, Microsoft acquired Hotmail.com for \$400 million, its largest acquisition at that time!

A key landmark in the growth of Internet in India is the opening up of the sector by the Government to allow private Internet Service Providers (ISPs) to set up Internet infrastructure. This was in November 1998. A decade ago, the industry had already witnessed the launch of NASSCOM to promote the IT industry in the country. In the years to come, NASSCOM led many initiatives that spurred the growth of India's software and services exports, and enabled the IT sector to make a significant impact to the country's GDP.

From Yahoo (recently acquired by Verizon) and MSN launching their Indian sites in 2000, to Wikipedia adding Indian regional languages, and BSNL introducing the first broadband option in 2004 – there are many key milestones in the Internet's journey in India in its early years.

Changing India – one connection at a time

The Internet has changed the way we live, learn, shop, work, and even the way we connect. People no longer have to wait in long queues at telephone booths, more popularly known as PCOs, to talk to family and friends stationed overseas for a steep amount once a week. But, that was the reality two decades ago. With the introduction of mobile phones and Reliance overhauling the playing field, mobile telephony became affordable to the common man. Even today, India has some of the lowest calling rates in the world. With the proliferation of Wi-Fi and low-cost data plans, Skype, WhatsApp and

other VOIP options are the preferred modes of calling, especially for long-distance calls. Today, Internet video calling is not only virtually free, but it also ensures that people are connected to family and friends all the time. Distances of hundreds and thousands of kilometres seem to have phenomenally reduced. Everything, from e-commerce services and products, advertising, online content, devices, connectivity, as well as private infrastructure and the government, as a whole make up India's Internet economy.

Today, we can buy anything online, from clothing to groceries, even motorcycles and cars. Online businesses are generating crores of rupees in revenue annually. Consumers are rapidly and intuitively adapting to new modes of online sales: for instance, in 2014 the sale of Chinese smartphone manufacturer's Xiaomi phones through exclusive flash sales on India's home grown e-commerce platform – Flipkart – did not last more than 5 seconds. That is a powerful example of how the Internet has changed consumer behaviour in the country – it is also testament to how speeds have accelerated (averaging 3.5 Mbps in Q1 2016).¹ India is also home to the world's second-largest user base² for social media giants like Facebook³ and LinkedIn. And, it took less than a decade for companies like Facebook to tap the large user base, since its debut in 2006, followed by Twitter in 2007.

In addition, the Internet has changed the way we bank today. A visit to the bank to deposit the monthly salary, or waiting for at least four days for an outstation cheque to be cleared, or even having to pay to get outstation cheque cleared, are all a thing of the past!

The meteoric rise of the mobile Internet

And, that's not all. In the last two-three years, mobile devices are ushering in yet another revolution by bringing the Internet to India's hinterland, where infrastructure woes crippled access to the Internet so far. By opening doors to the world through a four-inch screen, India's rural masses now have access to the Internet and the benefits it has to offer, which was limited to the urban populace until the first decade of the 21st century. This is because for any solution to be accessible to the rural masses, it has to fulfil three key criteria – affordability, scale, and convenience. And, the mobile Internet is a perfect fit. From agriculture to education, business to healthcare, mobile Internet is changing lives in rural areas for the better.

India added 88 million Internet users from 2008 to 2012, and at the end of that period, the total number stood at 137 million, ~60% of the users connected to the Internet through mobile.⁴ By 2014, India became the third-largest online market with significant growth in the number of mobile internet users. And the latest report from the Internet and Mobile Association of India (IAMAI), titled 'Mobile Internet in India 2016', predicts that the country is estimated to have 371 million mobile Internet users by June 2016. While 71% of this number will belong to urban areas, rural India is said to hold the potential to further fuel the growth of mobile Internet in the years to come. In fact, in

1 [Akamai's State of the Internet Report Q1 2016](#) (last retrieved 24 July 2016)

2 [What's it with Indians and social networks?](#) Mint, 26 May 2015 (last retrieved 24 July 2016)

3 [India effect: Facebook top social media platform, WhatsApp No. 1 messenger](#) PTI, 6 October 2015 (last retrieved 24 July 2016)

4 [5th top smartphone user, India gaining on China, US](#) – The Hindu Business Line, 4 December 2012, quoting a report by Kleiner Perkins Caulfield and Byers' analyst Mary Meeker (last retrieved 24 July 2016)

2015, the number of mobile Internet users from rural areas had already doubled from what it was in 2014.⁵

The same report cites another interesting growth driver for mobile Internet: content in Indian languages. In June 2015, the number of consumers of online content in regional languages was pegged at 127 million, a 47% increase from the previous year. While Wikipedia added a few Indian languages in 2002 and 2003, Google News launched in Hindi in 2007, followed by Tamil, Malayalam, and Telugu the next year. These moves weren't big growth drivers until mobile Internet gained traction in rural areas.

The Internet economy

Untapped potential, infrastructural woes, government policies – there are many factors that need to be addressed to truly leverage the potential of the Internet. In spite of this, India's Internet economy contributes to India's economic growth. In 2013, it accounted for 3.2% of the country's GDP, and that is likely to increase to more than 5% (~\$200 billion) by 2020, according to a report by [the Boston Consulting Group \(BCG\) and IAMAI](#).⁶

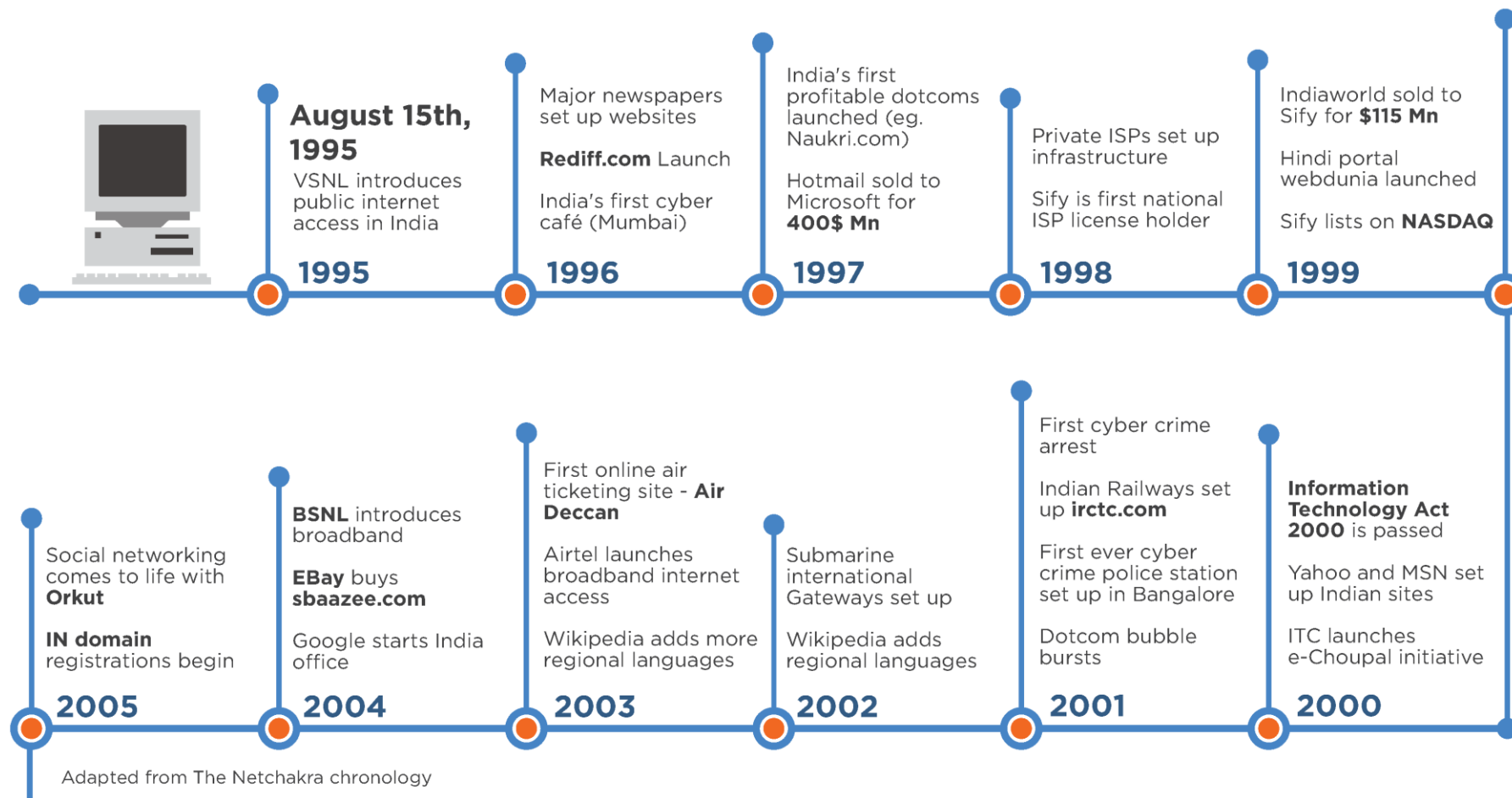
This will primarily be driven by an increase in Internet-enabled businesses and enterprises, as well as financial inclusion and extensive use of Internet-based services in daily life. Certainly, there are risks to this growth, primarily in terms of data security, which is covered in the [Risks section](#) of this report.

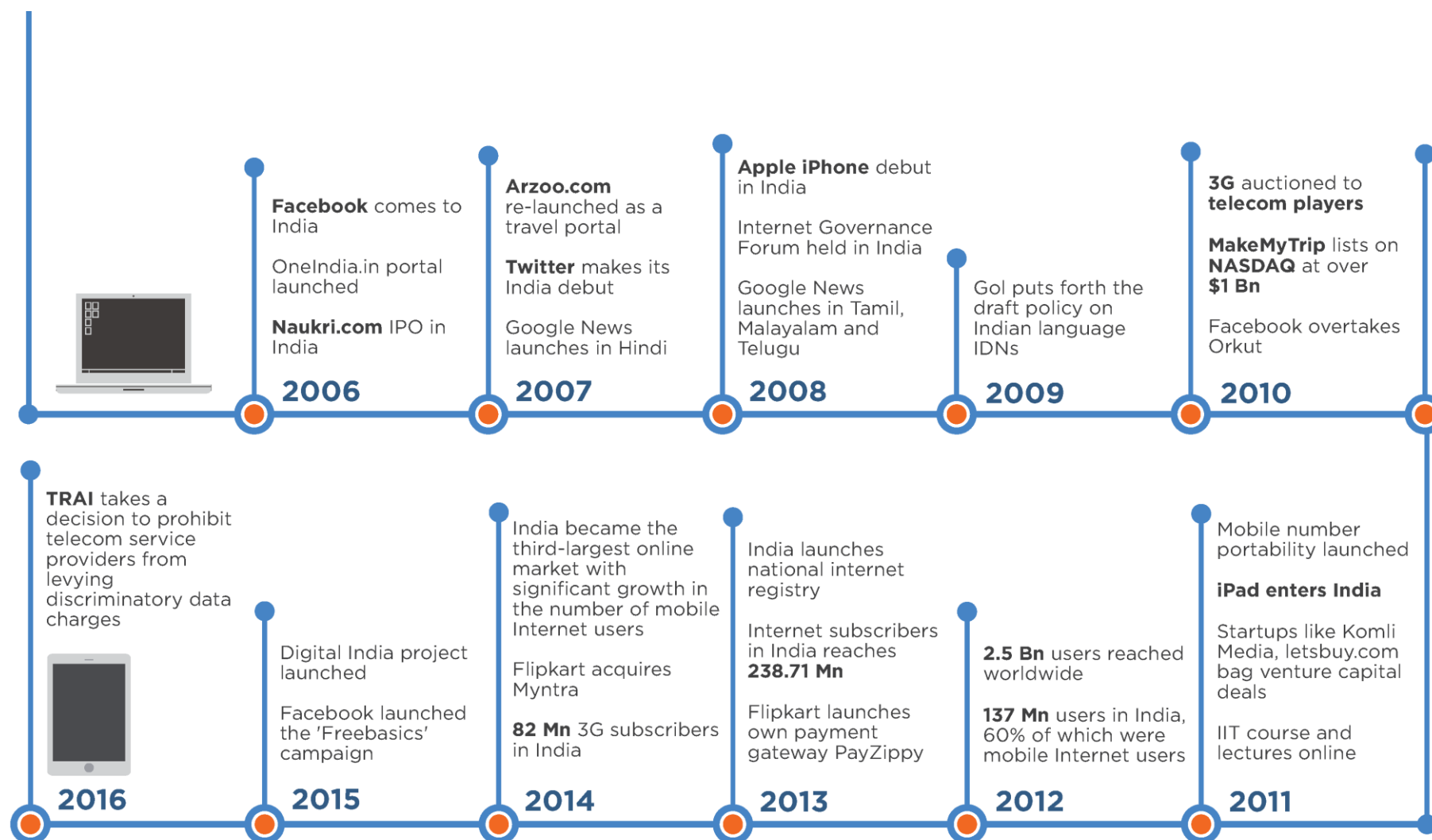
Nevertheless, the greatest disruptor of our age is all set to change the way we work, interact with friends, family and co-workers, and live life in general. The Internet is bringing newer experiences such as VR, AR, gaming, Smart TVs, leading towards the Internet of things (IoT) in our very homes. As IoT continues to transition from being a futuristic technology to one that is beginning to impact almost every aspect of everyday life, the Internet is only bound to change the country in many, many ways. And, with the Government's focus on Digital India and smart cities, there's no doubt that the Internet is going to bring about a change needed for the greater good of the country.

⁵ IAMAI report on Mobile Internet in India 2015

⁶ [India@Digital Bharat, IAMAI & BCG - 2015](#)

History of Internet in India





Adapted from The Netchakra chronology



Sectors in focus

E-COMMERCE

TRAVEL & HOSPITALITY

PUBLIC SECTOR

MEDIA & OTT

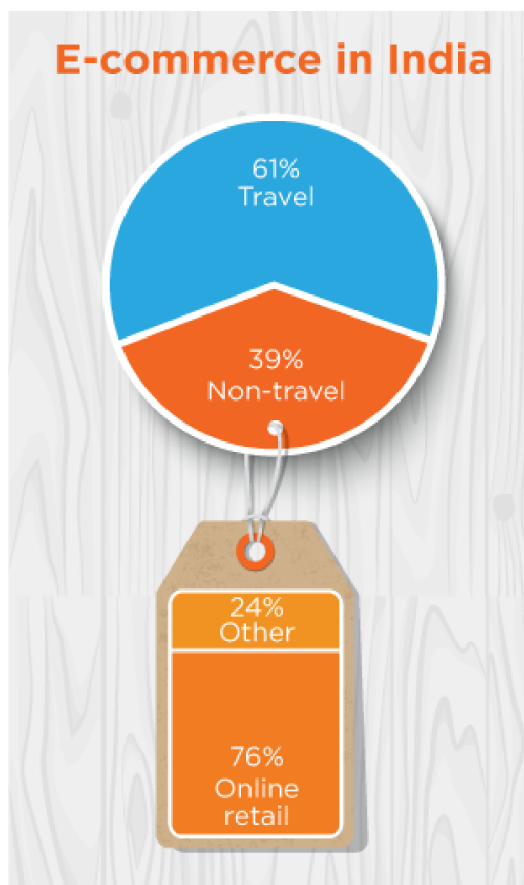
FINANCIAL TECHNOLOGY



E-commerce – Growth from underserved markets

Five years ago, buying anything online (except perhaps air, rail, and bus tickets) was a novelty. Then came players like Flipkart (2007) and Snapdeal (2010) and bit by bit, you could buy everything online. If you had an Internet connection, you could order things that weren't available in your neighbourhood, or your city. The media covered these companies extensively, partly because they were pioneers in their field and partly because they were mopping up millions of dollars in funding from large global investors like Tiger Global Management and Nexus Venture Partners. A few years down the line, Flipkart raised a mammoth \$3.15 billion from a clutch of investors, while Snapdeal raised \$1.74 billion from SoftBank, Alibaba and others.

According to IAMAI's Digital Commerce Report for 2015, travel still accounts for the biggest chunk (61%) of the total e-commerce market in India (see section on [Travel and Hospitality on page 15](#)). Yet, given the large sums of money at their disposal, Flipkart and Snapdeal and the many others that followed sold the Internet story to every household. These companies, joined by global giant Amazon who entered India in 2012, spoke about the benefits of online shopping to millions of Indians through methods that ensured maximum visibility. Ironically enough, the majority of communication to the masses in the initial days was offline – full page 'cover' ads in newspapers and outdoor hoardings. Online, consumers flocked to these sites on the promise of massively discounted pricing – which they could pay for on delivery.



Source: IAMAI, YourStory Research

Online retail to drive growth

According to NASSCOM, the overall e-commerce market in India was estimated to be worth \$17 billion at the end of FY 2016, with travel accounting for 61% of all online sales. Non-travel-related transactions account for the remaining 39%, of which e-tailing accounts for 76%.⁷ Further, e-tailing has grown 93% y/y, with the top three e-tailing giants (Flipkart, Snapdeal and Amazon) accounting for over 80% of the segment in 2015. By 2020, e-commerce is likely to double to \$34 billion, mainly driven by the growth in the online retail space, as per the same NASSCOM report. The digital economy in India has grown on the back of several inter-related trends; both on the supply side and the demand side.

India: The next big frontier

India is the next big frontier of e-commerce. With a population of more than 1.2 billion, India has the potential to be the largest open Internet market in the world, with a median age of 27 years.⁸ This demographic dividend, coupled

⁷ IAMAI – Digital Commerce Report 2014

⁸ [CIA - The World Factbook](#) (last retrieved 24 July 2016)



DRIVERS OF E-COMMERCE

Demand Side



Convenience



Product range



Discounted price



Nuclear families and urbanisation



Growing number of women customers



Lack of brick and mortar retailers beyond large cities

Supply Side



Growth in Internet penetration



Growth in use of smartphone



VC funding



Robust logistics infrastructure



Varied payment options



Growing demand from semi-urban and rural areas



with increasing urbanisation, nuclear families and a growing middle class with more disposable income, is leading to a digital revolution that is spurring growth in online retail.

Among all the drivers listed in the diagram above, we focus on the two that relate primarily to the focus of this report: **increasing Internet and smartphone penetration** (on the supply side) and the **untapped potential in Tier 3 cities and beyond** (see infographic on page 10).

Increasing Internet and smartphone penetration to make e-commerce accessible

As of December 2015, India had around 330 million fixed and mobile Internet subscriptions. This is expected to witness a ~20% CAGR in the next 5 years, taking the numbers to ~730 million by 2020. As per the IAMAI report, in 2015, 80% of them were mobile internet users.¹⁰ India already has the second-largest market for smartphones after China; it surpassed the US at the end of 2015, and now has >230 million smartphone users. The tipping point came when device manufacturers dropped the price of a smartphone to less than \$150, and then to less than \$100, mostly on the Android platform.

The scope for growth remains huge, given that there are over 1 billion mobile phone connections in India already but Internet penetration remains at under 35%.⁹ For the semi-urban and rural population, the mobile phone is economical and easy to carry compared to other devices.

By 2020, India will have an estimated 702 million smartphones in use and mobile phones will emerge as the preferred device for online shopping, accounting for 70% of total online shopping.¹⁰

Semi-urban and rural areas to drive the next phase of growth

Less than 10% of India's 1.2 billion population lives in Tier 1 cities, and Internet penetration is soon likely to reach saturation in these cities. Outside the metros and large cities, however, the growing presence of television is driving both awareness and aspiration, in Tier 3 cities and beyond. Major offline retailers have very little or no presence beyond Tier 1 and Tier 2 cities due to the high setup and maintenance costs involved. Consumers in regions unserved by these retailers are now discovering what the market has to offer through mobile Internet access.

Rural mobile users grew at a 5-year CAGR of 128% over 2012-2016, albeit from a lower base compared to urban mobile users (56% CAGR over 5 years).¹¹ At present, the majority of online shoppers belong to the top 8 metros and large cities, accounting for 76% of online shoppers (as of December 2015).¹² Online retailers, therefore, have significant potential to tap into from the 4,000+ smaller cities and towns in the rest of the country.

Rapid growth spurring the supporting ecosystem

The strong demographic dividends and their demand drivers are seeing ecosystem enablers such as telcos and logistics providers drive growth. Bharti Airtel launched its 4G service in

9 [Internet Live Stats](#) (last retrieved 28 July 2016)

10 [The emergence of 'Made in India' smartphone devices](#) ET Telecom (last retrieved 28 July 2016)

11 [Internet Users In India: 354M, 60% Access From Mobile](#)– Daze Info, quoting an IAMAI-KPMG study for 2014 (last retrieved 14 July 2016)

12 IAMAI report on Digital Commerce - 2015

about 300 cities in 2015, and Reliance Jio Infocomm is set to launch the high-speed data service in the fourth quarter.

With the RBI allowing 100% FDI in online marketplaces and the introduction of level playing rules in the e-commerce sector, competition will only intensify in this space. Alibaba and Rakuten have already evinced interest in entering the Indian e-commerce market this year.

Overall, the future of e-commerce in India will be characterised by growth in online retail, including growth in emerging categories such as food/groceries, furniture, and jewellery. (See infographic on page 14.)

Indian E-Commerce in 2020

1. Online shopping will account for two-thirds of the total e-commerce market, edging out travel.¹³ The fashion and lifestyle segment will emerge as the largest e-tailing category with a 35% contribution to e-commerce GMV by 2020.¹⁴ (Myntra/Flipkart's recent acquisition of rival Jabong in a \$70 million, all-cash deal¹⁵ could well be the beginning of a consolidation in the sector that has already begun sharpening focus on the high growth area of lifestyle goods.)
2. Other categories, like online food retail and furniture are still miniscule, but are witnessing increased traction with innovation in these areas. By 2020, online retail is also expected to account for 3% of the total retail in India,¹⁶ with the number of online shoppers likely to more than triple to 175 million from 50 million in 2015.¹⁷
3. The number of women shoppers is likely to rise by 5x and this category is slated to spend more on lifestyle and fashion products.¹⁸
4. Deeper engagement and virtual reality will change the way people shop. Customers need to be offered targeted value added services (VAS) like extended warranty and buy-back in case of high-value items such as consumer durables, electronics and jewellery. Virtual reality is still in its infancy, but will give customers a better idea about how jewellery, clothing, colour cosmetics or any accessory will look like when they wear it.
5. Faster speeds on mobile will see e-commerce players spend more on securing their online properties and assets. This, in turn, will further increase consumer confidence and enable wider adoption for purchase of large-ticket items such as electronics, precious jewellery, and vehicles.
6. Easier payment options: While cash-on-delivery may remain the preferred mode of payment for newer users, keep in mind that the use of mobile banking and e-wallets is surging. The number of mobile banking logins has already exceeded the number of NetBanking logins. Further, India has 135 million mobile wallet users at present, clocking transactions worth \$3.2 billion in 2015. This is expected to grow to \$11.5 billion by 2022.¹⁹ Let's also not forget the recently launched United Payments Interface (UPI) which allows users to carry out transactions on the basis of a 'virtual address', and simplifies

¹³ [India's e-commerce industry likely to touch \\$38 billion mark in 2016 – ASSOCHAM](#)

¹⁴ [Fashion & lifestyle to overtake electronics in e-com: Study](#) – The Financial Express, quoting a Google-AT Kearney report (last retrieved 01 August 2016)

¹⁵ [Myntra acquires Jabong in a deal valued at \\$70 million](#) YourStory.com (last retrieved 01 August 2016)

¹⁶ [eCommerce in India – Accelerating Growth, PwC 2015](#) PwC (last retrieved 01 August 2016)

¹⁷ [Online sales to hold up even without discounts: Google-A.T. Kearney report](#), Mint (last retrieved 01 August 2016)

¹⁸ [Online sales to hold up even without discounts: Google-A.T. Kearney report](#), Mint (last retrieved 01 August 2016)

¹⁹ [How wallet companies like Paytm, MobiKwik, Oxigen Wallet are trying to prevent fraudulent mobile transactions](#) The Economic Times (last retrieved 24 July 2016)

the payments process by doing away with two-step authentication or IFSC codes. (More on this in our section on [Financial Technology on page 32.](#))

7. Convenience & discounts: While non-urban consumers will try out e-commerce for novelty, access to variety and discounts, urban consumers are likely to continue with online shopping even without the massive discounts that characterised the first wave of e-commerce. This is, to an extent, driven by the time and money that urban consumers spend on commuting long distances and dealing with the inconveniences caused by chaotic traffic. For this group of consumers, online retail, which provides doorstep delivery, is a real convenience that they're willing to exchange for lower or no discounts.

WHY?

Increasingly affordable smartphones, devices and data plans and rising monthly spends on data plans



WHO?

A larger, younger consumer base coming online + the number of women shoppers growing 5x



WHERE?

New consumer base spread across tier 2/3 cities and semi-urban India, where traditional retailers do not have a (significant) presence



WHAT?

Fashion and lifestyle segment will dominate shopping carts, edging out the current heavyweight: consumer electronics



HOW?

Cash-on-delivery will continue to dominate, but growing awareness will drive e-wallets, m-banking, and online and card payments



WHEN?

Sales will continue to peak during discounts but traffic challenges for urban consumers, and product range for non-urban consumers will fuel steady sales all-year



Travel & Hospitality: Driven by the ease of booking online

Travel and hospitality is one sector that embraced the Internet more than a decade ago. The online ticketing and room booking facilities are used by over 50 million Indians on a regular basis. Over the last decade, MakeMyTrip and Cleartrip have been trendsetters in this space. (Rival Yatra listed on the NASDAQ after its recent reverse merger with Terrapin 3 Acquisition Corporation.) Both companies first used the Internet to create an inventory of tickets and allowed travellers to book online without having to go to travel agents. They soon added hotel bookings, holiday packages, and other services like train and bus bookings to increase revenues.

The growth of verified, peer-reviewed hospitality options has, in turn, boosted travel in India – the Ministry of Tourism estimated that Indians planned 1,290 million domestic trips in 2015, not counting the 18 million foreign trips. What's more, traveling on a shoestring budget is not the problem it used to be earlier – you no longer need a friend or relative in a place you want to visit. Traditional hospitality has been disrupted by the likes of professional and verifiable homestay options, aggregators of standardised accommodation such as OYO Rooms, Treebo and Stayzilla (which focuses on smaller towns). Startups in the travel and hospitality sector have raised close to \$300 million in just three years, the entry of global players like AirBnB notwithstanding.²⁰

Up, up and away: 50% of travel transactions to be online by 2020

As per the India Brand Equity Foundation (IBEF), the total addressable travel market in India is estimated to reach \$40 billion by 2020, and online travel is estimated to account for 40-50% of all travel related transactions by 2020, up from 12% in 2015. The growth is being driven by demand from across India as a larger, younger population comes online. According to KPMG, several industry drivers are playing a pivotal role in shaping the Indian tourism sector: government initiatives, diverse product offerings, the growing economy, increasing disposable income levels and marketing initiatives, along with key trends such as increasing number of women and senior citizen travellers, multiple short trips and weekend holidays, and introduction of innovative tourism concepts and customised tour packages. (See infographic below.)

According to IBEF, the tourism and hospitality sector is among the top 15 sectors in India to attract the highest foreign direct investment (FDI). During April 2000-September 2015, the hotel and tourism sector attracted around \$8.48 billion in FDI, according to data from Department of Industrial Policy and Promotion (DIPP).

It's not just the online travel agents, even IRCTC (covered in the [Public Sector section on page 21](#)) and travel providers are benefiting from this trend. With the rise in the number of global tourists and realising India's potential, many large companies have invested in the tourism and hospitality sector. Some of the recent investments in this sector are as follows:

1. Fairfax-owned Thomas Cook has acquired Swiss tour operator Kuoni Group's business in India and Hong Kong for about INR 535 crore (\$80.3 million) in order to scale up its inbound tour business.²¹

²⁰ [The State of Early-Stage Travel Startups: Where Investments Went in 2015 LinkedIn Pulse](#) (last retrieved 24 July 2016)

²¹ [Thomas Cook buys Kuoni India for Rs 535 crore Business Standard](#) (last retrieved 24 July 2016)



TRAVEL & HOSPITALITY



Demand Side



Convenience of making bookings online for travel & accommodation



Discounted pricing making travel more affordable



More women travelling alone



Increase in social travel, including pilgrimages, visiting friends, etc.



Increase in aspirational travel, driven by a desire to visit places people read about/see online



Urbanisation and hectic lifestyles prompting an increase in the number of short breaks taken per month



Supply Side



Growth in Internet penetration & increase in smartphone usage



Growth in good quality, verifiable budget accommodation



Better connectivity by road, rail, bus, all of which can be booked online



Increasing purchasing power of a growing middle class



Competitive pricing for travel & hospitality as number of airlines increase after the Open Skies policy



Government campaigns such as Incredible India and similar ones by state governments to boost tourism



Easier payment options for online bookings, including e-wallets and growing use of online payments

2. ITC is planning to invest about INR 9,000 crore (\$1.35 billion) in the next three to four years to expand its hotel portfolio to 150 hotels. ITC will launch five other hotels – in Mahabalipuram, Kolkata, Ahmedabad, Hyderabad and Colombo – by 2018.²²
3. Japanese conglomerate Softbank led an INR 630-crore (\$94.5 million) funding round in Gurgaon-based OYO Rooms.²³

Given that the online travel & hospitality segment is a part of e-commerce, many of the factors driving the growth in this area are the ones driving online retail too: increasing Internet penetration²⁴ and usage of smartphones, assisted by falling prices of devices and affordable broadband data plans. Nevertheless, while online retail will be primarily driven by growing demand in smaller towns and beyond, growth in travel and hospitality will come from across urban and rural India alike.

Indians everywhere are traveling more

Indians love to travel and the improved connectivity – thanks to bookings made easy through online portals for rail, road and air – is seeing them getting more footloose. A [National Sample Survey Organization report](#)²⁵ in June 2016 confirmed that people were traveling a lot more now than they did at the time of the previous survey (2008-09). It also found that there is very little difference in the number of trips taken by people in urban areas versus the number of trips taken by people in rural areas. When it came to trips taken in the previous year, 40% were for health and medical reasons, followed by leisure (35%). The Government's decision to offer e-visas to citizens of 186 countries is also expected to boost foreign tourist arrivals, and therefore domestic travel within India. An increasing number of user-generated content online (views on social media, reviews on websites) is driving aspirational travel, tipping the scales in favour of trips that were once only contemplated, never undertaken.

Airline and railway ticketing becoming commoditised

A little over a decade after travel bookings moved online, online travel agents (OTAs) such as MakeMyTrip, Cleartrip, Yatra and Goibibo have taken the app route to drive customer loyalty (boosted by discounts, cashback offers and other sweeteners), yet first-time users are very often driven by the best deals unless the customer experience is sub-par. Indeed, travel is also the largest segment in Indian e-commerce (see the [section on e-commerce](#)) and there is clearly more money to be made here in the next few years. As stated earlier in this report, the online travel market accounted for 61% of the total e-commerce market (~\$10.3 billion) as of FY 2016

The dominant online travel player, IRCTC, sold 193 million tickets in 2015-16, accounting for 59% of all railway tickets booked that year, and expects turnover to grow 15-20% by 2020.²⁶ While it has entered into partnerships with private players like OYO Rooms, the Dabur group, Pizza Hut, to provide hotel and catering services, it is yet to scale up operations (or awareness) of the other facilities it offers (airline bookings, taxis and tour packages); when it does and is able to provide a superior customer experience, it could well disrupt the playing field for other OTAs. **Read more about IRCTC in the section on [Public Sector](#).**

22 [ITC planning to invest Rs 9,000 crore to expand its hotel portfolio](#) Economic Times (last retrieved 24 July 2016)

23 [OYO Rooms raises Rs 630 crore from Softbank, existing investors](#) Business Standard (last retrieved 24 July 2016)

24 [Internet Live Stats](#) (last retrieved 24 July 2016)

25 [How India Travels](#) – Mint (last retrieved 24 July 2016)

26 [IRCTC – Excellence on track – June 2016](#) (last retrieved 24 July 2016)



Online hotel bookings: OTAs vs Aggregators

Online Travel Agents

Inherent first-mover advantage

Full spectrum of offerings

Captive consumer base of experienced travellers

Hotel aggregators

Fast catching up with offering of standardised, seamless experiences

Focused on affordable accommodation and expanding into niches like homestay

Targets a growing consumer base that is ready to experiment, take risks



Budget hotel bookings are the next growth frontier in online travel

According to a report by rating agency ICRA, online hotel bookings are likely to double by the end of 2016 from the current level of 20%. By all accounts, as much as 40-45% of all travel related transactions in India will happen online by 2020. Online travel agents are actively driving this, given the huge opportunity and the higher margin of 12.5% that hotel bookings offer (against the 5.7% average in air ticketing, down from 8-9% five years back). Leading online travel player MakeMyTrip, for instance, has stated²⁷ that 45% of its revenue comes from hotel and hotel packages, and 55% from air ticketing. Its target, however, is to get as much as 75% of revenue from hotels and packages in the next 2-3 years.

The next few years are likely to see the competition between online travel agents and hotel aggregators intensify to capture a larger share of the addressable hotel booking market of [\\$20 billion](#). Nearly 72% of all advance bookings made are done online, according to global research agency Millward Brown.²⁸

It is difficult to predict at this point who will win this round, given that OTAs have just beefed up their war chest: MakeMyTrip has raised \$180 million, Goibibo raised \$250 million and much of that is set to be used to aggressively capture the online hotel bookings space. OYO, of course, has SoftBank behind it.

The Indian Online Travel & Hospitality Industry in 2020

Online travel bookings currently account for 61% of the total e-commerce market in India. While the share of travel bookings within e-commerce is likely to fall owing to the boom in

²⁷ [MakeMyTrip aims to dominate half of online hotel booking space](#) Business Standard (last retrieved 24 July 2016)

²⁸ [Only 25% hotels booked online](#) The Economic Times quoting a study by Millward Brown (last retrieved 24 July 2016)

online retail, the e-commerce market in itself is set to grow to \$34 billion. Domestic air and rail ticketing accounted for the majority of online travel transactions in 2015, with 50% penetration. However, this is likely to change with hotels and holiday package bookings witnessing a higher growth, which currently has a low penetration of 25%.²⁹

Travel across India, for social visits, leisure, shopping, holidays and more is all set to increase and more people will be booking online, taking advantage of competitive pricing offered by OTAs and aggregators, assured by online peer reviews and the additional exposure to travel destinations through online mediums.

Tourism is set to grow. The total contribution from the travel and tourism sector to India's GDP is expected to increase from \$136.3 billion in 2015 to \$275.2 billion in 2025.³⁰ Barring socio-political instability or serious deterioration in macro factors, the World Tourism Organisation estimates that foreign tourist arrivals in India will touch 15.3 million by 2025 from the current 7.1 million, in part driven by the liberalised visa-on-arrival policies and medical tourism.

Senior citizens are all set to travel more. Traditional holiday package providers are seizing the opportunity and offering tailored trips for senior citizens; the exposure to these packages and bookings are often done online, by their children.

Growing urbanisation and emigration has also seen more seniors traveling than ever before to meet their children or relatives. A Frost & Sullivan and Amadeus report pointed out that there will be 7.3 million outbound senior travellers from India by 2030.³¹

As women become financially independent, the market for women travellers is likely to emerge as a high-value market given their discerning nature. In rural India too, women will travel alone more, although this may be for social, medical and other reasons such as shopping, rather than leisure. And the growing acceptance of smartphones means much of the booking – whether for road, rail or air – will be done online.

29 [Only 25% hotels booked online](#) The Economic Times quoting a study by Millward Brown (last retrieved 24 July 2016)

30 [Careers in tourism and travel industry, Indian Institute of Tourism & Travel Management](#) (last retrieved 24 July 2016)

31 [Senior citizens drive up travel business](#) – The Times of India quoting a Frost & Sullivan and Amadeus study (last retrieved 24 July 2016)



WHO

More seniors will travel to meet family. More women and singles will travel for leisure and experiential trips



WHEN

All through the year, as urbanisation increases and a growing number of middle-class people take a greater number of shorter breaks



WHY

Rising disposable income, which in turn will lead to more aspirational and experiential travel. Increasing business related travel



TRAVEL & HOSPITALITY IN 2020



HOW

Online, through mobile apps, aggregator sites and directly with service providers



WHERE

Across India, urban and rural, newer holiday destinations will emerge as accommodation options improve and travel to remote locations becomes more convenient



WHAT

Flight, rail and bus tickets, hotel rooms, holiday packages, and more

Public Sector – Technology for bettering a billion lives

Traditionally, the public sector – Government services and Government-run companies – lagged behind when it came to exploring and adopting technology. All that has changed and today, technology is the primary driver of delivering citizen services, with its widespread adoption by many state governments as well as the Union Government.

Impactful initiatives such as UIDAI (Aadhaar), the Indian Railways website, IRCTC.co.in, and MyGov.in have been in the spotlight for a while now. A recent entrant in this space is the United Payments Interface (UPI) from the Reserve Bank of India, and waiting in the wings is the proposed Bharat Bill Payment System (BBPS), which promises to make digital bill payment a possibility for those without access to NetBanking. The list is longer if you include the digitisation of land records, and tax filings and refunds. The common denominator driving this change is disruptive technology. Not only are these innovations driving convenience, they are also driving greater transparency and creating widespread impact by the sheer number of people they affect. Here's a quick look at the key public sector initiatives which have, or are in the process of, changing the way the Government brings about change.

UIDAI/Aadhaar

At the heart of this digital transformation is Aadhaar – the world's largest biometric identification system from the Unique Identification Authority of India (UIDAI). In less than six years since its inception, as of April 2016, over 1 billion cards were issued, covering 93% of the adult population. The UIDAI authenticates over 4 million transactions each day.³² Its simplicity lies in the fact that it verifies, biometrically, that you are who you claim to be. And the publicly available APIs, layered on top of Aadhaar, make it the key to accessing 10 important public services, including the direct cash transfer of subsidies for LPG and kerosene, applying for rural job guarantee schemes as well as accessing monthly pensions, digital life certificates for pensioners, and employees' provident fund. Aadhaar has also simplified the process of opening a bank account. Beyond that, the UPI, also layered on top of Aadhaar, promises to do away with the two-factor authentication for service providers. The end result is a less-cash system that is more transparent, faster, more efficient, and above all, convenient. Its adoption is aimed at bringing more people into the formal financial system than ever before simply by making it convenient for them to be within the system rather than outside it. The UIDAI aims to issue an Aadhaar identity to each adult Indian by March 2017.³³

IRCTC

India's rail network is the largest in the world, and IRCTC's online ticket booking facility has truly transformed what was once a lengthy, frustrating process involving a lot of planning and waiting in queues at railway stations. Once it enabled an online booking option, the process of booking a train ticket became easier and more transparent. In 2014, it introduced a cleaner interface, streamlined the process, and is India's biggest e-commerce site, accounting for 59% of all railway tickets booked. Ironically, its biggest challenge today is an

32 [PMO turns to UIDAI to ensure Aadhaar for all citizens by March 2017](#) The Economic Times (last retrieved 01 August 2016)

33 [PMO turns to UIDAI to ensure Aadhaar for all citizens by March 2017](#) The Economic Times (last retrieved 01 August 2016)

excess of traffic (15-18 million users a month) despite expanding its vast base of servers.³⁴ In May 2016, media reports³⁵ claimed that the personal data of 10 million customers had allegedly been stolen from IRCTC servers, but the IRCTC issued a statement denying this. However, the incident highlighted the vulnerabilities in the infrastructure supporting digital platforms in the public sector, especially one as large as the IRCTC.

Digital India

The Digital India initiative aims to bring to citizens transparent services. The idea is to transform India into a digitally-empowered society and deliver government services to citizens electronically. To do so, it aims to provide high-speed Internet in all villages of the country, and across all national highways, which would enable the rural population to access government services transparently and quickly.³⁶

This would make it easier for India's population to apply for and get various certificates (birth, death, school-leaving, scholarships, etc.) online. The e-kranti service aims at delivering services such as telemedicine and mobile healthcare, education, relevant services for farmers (e.g. real-time price inputs, loans), in addition to justice, security, and financial inclusion through digital payments. Beyond that, it aims to bring all records pertaining to land, tax, insurance, citizens, pensions, and posts onto a single platform.

And to ensure that citizens can in fact access these proposed services, there is the National Digital Literacy Mission, which plans to train aanganwadi and Asha workers, among others, to make citizens digitally-literate. As of July 2016, 9.8 million people had enrolled for digital training.³⁷

MyGov.In

In 2014, the Government of India set up MyGov.in, a 'citizen engagement platform', aimed at getting citizens to actively participate in governance and development by evaluating government projects and plans, and contributing their ideas. For now, it links to over 6,500 government websites, from the Union level to the district level and beyond, and has become a repository of data on the work and performance of every government department.

The site's participatory nature is reflected in the fact that ahead of the 2016 Union Budget presentation, it received over 70,000 suggestions on improving processes, transparency, and reducing corruption through closing loopholes. Many of these ideas found their way into the Union and Railway budgets.³⁸

34 [FAOTLY](#) (last retrieved 24 July 2016)

35 [IRCTC denies hacking, data leak in e-ticketing system](#) – The Hindu (last retrieved 24 July 2016)

36 [India takes digital leap, Lightreading.com](#) (last retrieved 24 July 2016)

37 [National Digital Literacy Mission](#) (last retrieved 24 July 2016)

38 [Open data initiatives in India and Ukraine](#) - World Bank (last retrieved 24 July 2016)



Key enablers of Internet usage in the public sector



Availability of high-speed broadband across urban, semi-urban and rural India



Affordability of access and use of Internet-based applications through mobile devices



Increased digital literacy across the country through public/private partnerships



Availability of relevant content and tools in local languages



Favourable business environment for Internet-based businesses



Broader base for Internet-based applications in non-commercial areas

Passport Seva Kendra

Less than a decade ago, getting a passport issued was usually a long-drawn and complex process. Long queues, unscrupulous 'agents' and confusion over documentation were common, as also the uncertainty over appointments and outcomes. In 2008, the Government took the public-private-partnership route and awarded the Passport Automation Project to Tata Consultancy Services (TCS) to reduce the time for passport issuance after police verification to just three days. The digital integration of police districts has reduced the number of days needed to complete verification from 49 in 2013 to 34 in 2015.³⁹

³⁹ [Liberalization of Police Verification procedure for passport issuance and launches Mobile App to cut delays in submission of Police Verification Report, Ministry of External Affairs](#) (last retrieved 24 July 2016)

The e-appointment facility has, to a large extent, discouraged the public from approaching agents. People are able to schedule their appointments at the passport office and there is little wastage of time. The entire process inside the passport office now takes just a couple of hours from the time the applicant enters the office.

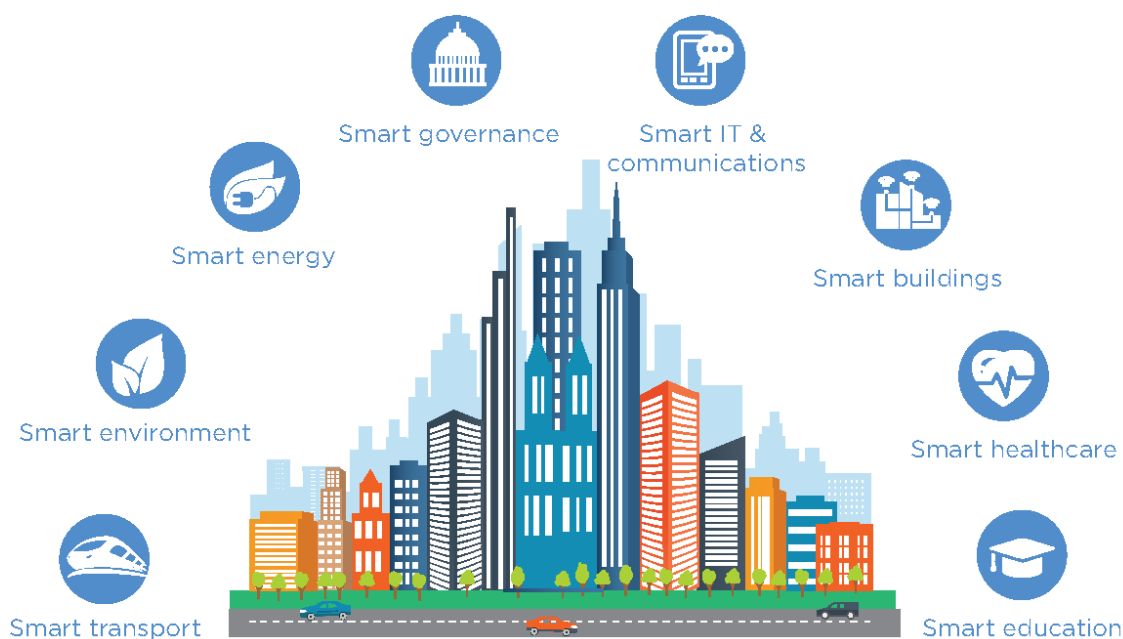
Public-Private Partnerships

Studies across the world have found that there is significant co-relation between broadband connectivity and economic growth. On an average, it was seen that GDP saw an increase of 3.19% correlated to a 10% increase in broadband penetration.⁴⁰

The economic and social consequences of having an extensive and reliable broadband network include creation of jobs, increase in productivity, more innovation, and easier access to healthcare, education, banking and other essential facilities. However, the fact remains that for the Government to do this on its own is a major challenge. Collaboration between the Government, private telecom players and mobile companies in the form of a public-private partnership can play a crucial role to run initiatives such as these.

By setting up multi-tenant telecom towers, especially in rural areas, to ensure the crucial last-mile connectivity, making affordable broadband phones available to the masses, focusing on content plans for rural households, and other such measures, the public-private partnership model can bring to life the “digital villages” envisaged under the Digital India plan. In the urban space, the Delhi-Mumbai Industrial Corridor Development Corporation (DMICDC) – another public-private partnership – plans seven smart cities along its 1,500 km route across 6 states with a total investment of \$100 billion.

Smart Cities



40 [World Development Report Exploring the Relationship Between Broadband and Economic Growth – World Bank](#) (last retrieved 24 July 2016)

India is drawing on the development of smart cities at the global level. Prime Minister Narendra Modi's 'Digital India' envisages building 100 smart cities across the country.⁴¹ Broadly speaking, a smart city is an urban space that seeks to use technology and the Internet of Things (IoT) to seamlessly connect and integrate multiple components such as homes, buildings, transport networks, hospitals and classrooms, to drive up efficiency and productivity, make them more sustainable, bring down costs, and vastly improve the quality of life for the residents.

The 2014-15 Union Budget allocated INR 70.6 billion (\$1.2 billion) for development of smart cities, and work has been launched in 20 cities from the list.⁴² The smart city plan involves greater connectivity and ease of life using the Internet of Things.

Towards transparent public sector services

Accessing information and tools, especially in Indian languages, will be key to deciding the success of digital initiatives in the public sector. One area where going online has brought about significant change in attitudes and approach is the filing of income tax returns. The process became virtually seamless after the CBDT merged the PAN and Aadhaar databases and allowed assesseees to verify their filing through a one-time password over email or SMS. This effectively ended the need to make a paper filing. While the debate over large sections of the population evading taxes continues, this is certainly one way of ensuring that people don't avoid paying taxes because it was too cumbersome to do so.

Initiatives like MyGov, Bharat Bill Payment System (BBPS), UPI, and Aadhaar, among others, are showing results by taking tangible services and practical, useful information to the masses like never before. The public sector's role is to ensure that non-commercial areas that private operators may eschew are not left uncovered for lack of profit, be it in agriculture, nutrition, healthcare (preventive and otherwise), education, and citizen services. (See infographic on page 26). McKinsey⁴³ suggests that the adoption of key technologies across sectors spurred by the Digital India initiative could help boost India's GDP by \$550 billion to \$1 trillion by 2025.

41 [List of 98 cities selected under Smart Cities Mission](#) – PIB (last retrieved 24 July 2016)

42 [Profile of 20 smart cities](#) – Smartcities.gov.in (last retrieved 24 July 2016)

43 [Digital India plan could boost GDP up to \\$1 trillion by 2025: McKinsey The Economic Times](#) (last retrieved 28 July 2016)



WHERE

Across India, including semi-urban and rural India



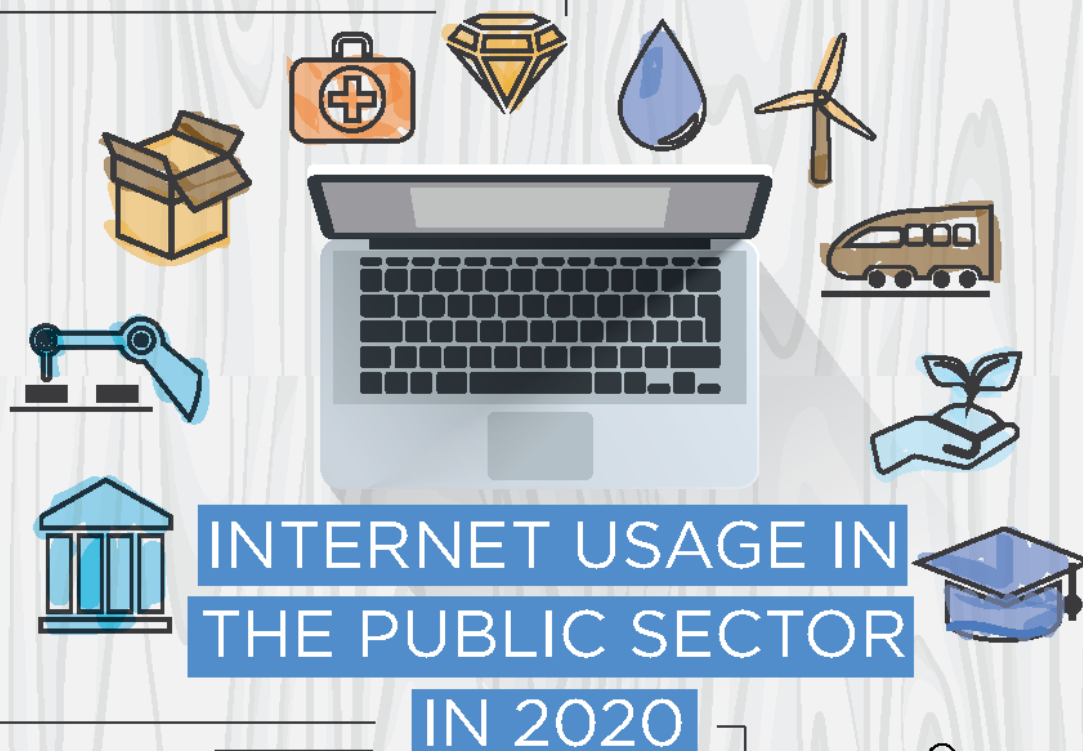
WHO

A larger base of users, >600 million*, 48% will access the internet through mobile devices^



WHAT

Accessing services, information, entertainment, shopping, communication/interaction



WHY

Internet-based public services will be more affordable, quicker to access, and ensure greater transparency



HOW

Through e-wallets, payment banks, online (mobile & net) banking, and credit/debit cards



WHEN

For registrations (businesses, births, deaths), transfer of funds/subsidies, buying/purchasing land, access to subsidies, healthcare, education etc.

* Statista.com,

^ Cisco Visual Networking Index, June 2016

Media & OTT – all moving online, one app at a time

Until a few years ago, TV and print media were considered indispensable to capturing the Indian consumer's mind and timeshare. The numbers spoke for themselves. Daily newspaper circulation stood at 100 million copies and growing, while TV penetration was at 900 million with over 690 satellite channels. But those dynamics have now begun to change. Digital advertising, though growing rapidly, simply did not have the reach of traditional media.

The availability of affordable smartphones and tablets, together with falling data prices, has changed all that. It has fuelled the second-screen (and in many cases, third-screen) phenomenon. With the rapid adoption of smartphones and 3G/4G networks, content consumption patterns and consumer engagement channels are rapidly evolving. Delivery of media and entertainment is set to become personalised like never before.

While India will no doubt continue to have a robust print market owing to still-growing levels of literacy and the affordability of print (a single newspaper could be read by more than a dozen people) in semi-urban and rural markets, online is where media is moving to on the back of several factors. (See infographic on page 28.)

Print vs. digital

Traditional media houses are well aware of the challenges posed by the rapid growth of digital advertising and to keep up with changing times, are investing in digital media to provide news on the move. Most national dailies now have a dual presence in traditional and digital media either through e-papers or through mobile apps. Many regional newspapers have also progressed to capture online readers in recent years, with Malayala Manorama being one of the early entrants. Living Media put its flagship India Today magazine online more than 15 years back and now has the online-only opinions site, DailyO. For standalone magazines, which do not enjoy economies of scale, digital distribution is expected to bring down the cost of operation significantly. Monetisation, however, remains a challenge as the subscription model hasn't worked and people are still largely unwilling to pay for digital content.

The television industry has also been evolving through advanced systems including digitisation and changing TV consumption practices. Set-top boxes, smart Blu-ray players, and Wi-Fi enabled TVs are redefining the way we consume content, and how advertisers reach out to viewers. DTH service providers like Tata Sky/Dish TV, with their "on-the-go" mobile apps, are providing a more personalised viewing experience.

As per a report on Indian media and entertainment by KPMG and FICCI,⁴⁴ the industry was valued at \$15 billion in 2014, with TV at \$7 billion and print media at \$3.9 billion. Advertising revenue for TV stood at \$2.3 billion and \$2.6 billion for print media. Digital ad revenue stood at \$1 billion. However, we are in a world where Internet advertising spend will eventually catch up with TV advertising.

OTT, the new kid on the block

The chief new medium of personal entertainment that has emerged is undoubtedly OTT, which stands for over-the-top, a term used to describe the delivery of entertainment – including TV programmes and movies – via the Internet, without having to subscribe to a cable or satellite TV provider. People already have a screen in their pockets, prices of data plans are falling, and

44 [#shootingforthestars FICCI-KPMG Indian Media and Entertainment Industry Report 2015](#) (last retrieved 24 July 2016)

Media & OTT

Demand Side



Growing demand for personalised entertainment, even in rural areas



Growing demand for original content



Convenience of viewing through smartphones and tablets



Growing middle class with rising disposable incomes



Increasing Internet penetration and smartphone usage



Increasing affordability of data plans



Growth of original, online-only content providers



Affordable/free original content (monetised via ads)



connectivity is getting better, which means OTT is set to become the medium of choice for entertainment for both existing and future users of smartphones.

It promises to merge the worlds of television and digital media once content providers figure out what their audiences want to watch and distributors figure out how best to deliver it to them (subscriptions, transactions, or free, but ad-supported, platforms).

With growing interest from traditional TV broadcasters, film producers are currently leveraging this opportunity to port existing TV content and movies to digital platforms and launch their own OTT platforms. According to a Media Partner Asia (MPA) report, [India had 12 million active OTT video subscribers in 2014](#).⁴⁵ And given the launch of more than half-a-dozen personal entertainment apps from large media houses since then, the number of subscribers has been steadily increasing. Media companies like Star, Sony Pictures Networks, Zee, Eros and Reliance Entertainment are already present in the OTT market. Similarly, platforms like YuppTV, Hotstar, Press Play TV, Viu, and Netflix are also in the race. Viacom 18 entered the OTT play earlier this year with the launch of its digital platform, Voot. In the wings are Arré, owned by former Network18 executives B. Saikumar and Ajay Chacko, and Balaji Telefilms' ALT. As a result, even though the video-on-demand (VOD) market in India is nascent it is already highly competitive.

In parallel, **social media is fast evolving into a personal online identity**. Earlier, it was used to connect with friends and update your status. Now online citizens – especially millennials – routinely use social media to tap into the pulse of the world around them.⁴⁶ Social media is deeply intertwined with VOIP-based OTT players like Skype, WhatsApp, Viber, and SnapChat, which are changing the revenue game in telecom. As on January 2015, as per TRAI, SMS traffic in India fell to 4,367 million in June 2014 from 5,346 million in June 2013, a decline of 18.3%, and is likely to show further decline y/y. WhatsApp topped the messaging application market with 52% of all users using OTT messaging services in India.⁴⁷

Messaging platforms are clearly evolving into destination-content portals and have a great deal of leverage in promoting and drawing viewers. In the US, NBCUniversal signed an agreement to create mobile, short-form versions of a number of its popular shows for SnapChat for its OTT audience.⁴⁸ In 2015, Thailand's instant messaging and chat app LINE launched LINE TV, a YouTube-style video service integrated into the app. Closer home, evolving service models like Gaana and Saavn, among others, allow users to download content that can be viewed offline without consuming the device resources.

Together, the combination of affordable devices, affordable access to online content, the availability of original content and millennials' preference for personalised media and entertainment is driving the growth in OTT.

Monetisation remains a challenge

While OTT may be the future of media and entertainment, it still faces the same challenges that traditional media faces – monetisation. Getting in the way of monetisation are a number of obstacles. **Piracy** remains a huge challenge, not just in India, but worldwide. Hollywood loses hundreds of millions of dollars due to piracy each year and India's massive entertainment industry suffers just as badly. Content providers are currently **unable to charge premium rates**

45 [How OTT Can Speed Up Digital India's Success – CXOtoday.com](#) (last retrieved 24 July 2016)

46 [#shootingforthestars FICCI-KPMG Indian Media and Entertainment Industry Report 2015](#) (last retrieved 24 July 2016)

47 <http://www.trai.gov.in/WriteReadData/ConsultationPaper/Document/OTT-CP-27032015.pdf>

48 [NBCUniversal is bringing mini TV shows to Snapchat](#) Tech Crunch (last retrieved 08 August 2016)

for content that they potentially can for personalised content because the market is fragmented and competition is intense. Data prices are falling, but they are still too pricey for many to spend on entertainment even though entertainment is what most people want. While the next wave of Internet users will come from rural areas, their adoption of digital media will heavily depend on affordable data plans and better connectivity. The income disparity needs to be bridged before we can expect the vast majority of India's citizens to pay for online entertainment. It is only once these aspects are addressed that the matter of how much they're willing to pay for original content will crop up. Subscriptions have so far never worked in India. Advertising, and native advertising to be precise, still remains the best – if not the most adequate – source of revenue for media companies.

The media's growth story for 2019-20 will be scripted by user experience

According to analysts, Indians consume around 750 MB of data per user every month. This indicates the huge business opportunities for VOD players. An MPA report adds that India's OTT video subscriber base is expected to grow to 105 million by 2020.⁴⁹ Such projections explain why OTT firms in India are betting on this market. As of now, bigger players are either betting on current revenue from traditional media (TV) or on an advertising-led model; however, it will be interesting to see how the revenue model shapes up: subscriptions, transactions, OTT and telco/ISP partnerships, or free but ad-supported platforms? Ultimately, the model that delivers a superior experience in terms of quality and delivery of original content will be the winner.

For now, the advantage firmly rests with the telecom providers and ISPs for the simple reason that they have both digital and brick-and-mortar touchpoints. A partnership between telcos/ISPs and OTT content providers would be a revenue opportunity for the former and drive customer loyalty in an industry that is fraught with customer churn.

And let's not write off traditional media just yet

In spite of digitisation, TV and print media are witnessing decent growth. The media and entertainment industry in India is expected to grow at a CAGR of close to 14% by 2020, as per the KPMG-FICCI report. Media revenue in TV is projected to grow at a 15.5% CAGR, reaching \$14 billion in 2019 while print media revenue is set to grow at a CAGR of 8% to reach \$5 billion by 2019. In spite of the linear growth, traditional media advertising revenue remains significant, riding on the back of growth in Tier 2 and Tier 3 cities, rising disposable income and literacy rates. Digital advertising revenue is also set to grow significantly to INR 162.5 billion⁵⁰ (\$3.8 billion); yet it will still contribute only around one-quarter of total advertising revenues in India.

Traditional media will use social media to create brand visibility online. For instance, 65% of American adults today use social networking sites, up dramatically from the 7% tallied in 2005. Social media is fast evolving into a personal online identity. Earlier, it was used to connect with friends and update your status. Now online citizens want to stay plugged into the online world around them, a world they have personalised through various media. They want to belong to the online communities of their choice, be recognized and have a voice.⁵¹ And they will use the platforms that give them the best – even if it is not the most affordable – user experience to do so.

49 [How OTT can speed up Digital India's success](#) CXO Today (last retrieved 24 July 2016)

50 [#shootingforthestars FICCI-KPMG Indian Media and Entertainment Industry Report 2015](#) (last retrieved 24 July 2016)

51 [#shootingforthestars FICCI-KPMG Indian Media and Entertainment Industry Report 2015](#) (last retrieved 24 July 2016)



WHAT

TV & print advertising to grow on localisation of content

OTT to grow on the back of better audience data which will help create differentiated/ original content and account for 25% of the market



WHY

Rural adoption of digital services due to better connectivity and convenience on the back of affordable smartphones, devices and rising spends on data plans, chiefly for entertainment



WHO

A larger, younger consumer base of millennials coming online and a growing number of consumers from rural areas



WHEN

Solid fixed line and mobile networks and superior content will converge to provide a rich user experience



HOW

Increased adoption allowing for organic digital literacy. Better consumer data will increase brands to leverage digital more and provide solid RoI for advertisers



WHERE

New audiences spread across tier II/ III towns and beyond inside rural India

Financial technology – Disrupting India

E-commerce would never have taken off in India the way it did if key players hadn't offered a "cash on delivery" option. The reason was simple: Indian consumers were just getting warmed up to shopping online and the last thing they wanted to do was pay up over a medium most scarcely understood and deemed risky. Today, an increasing number of consumers are happy to use e-wallets to pay for their purchases, if not credit cards or online banking options.

Mobile banking is here to stay, opening up unprecedented opportunities and allowing players in the fintech space to build new verticals (both in B2C and B2B) on this foundation. But that's just one part of the story. Fintech solutions reduce costs while increasing speed, convenience, accuracy and transparency. Little wonder then, that financial institutions across verticals are investing in financial technology in a big way – either setting up their own research and innovation centres or partnering with startups working in this space.

Mobility to drive growth

The move to use the Internet as a primary mode of retail payments began eight years ago when 10 banks formed the National Payments Council of India (NPCI) to set up a single affordable payments platform – or payment settlement switch – for the country. The Institute for Development and Research in Banking Technology (IDRBT) played a central role in the development of this financial platform. The aim of the NPCI was to end the domination of international financial payment settlement switches like MasterCard and Visa, and bring down the cost of financial settlements, which may be bad news for card companies but is music to the ears of a new generation of financial service providers like Paytm, Mobikwik, FreeCharge, Ezetap, and PayU. In fact, Vijay Shekhar Sharma, founder of e-wallet and e-commerce company Paytm, believes that India will skip the plastic (credit/debit card) generation and move directly to mobile faster than any other country.⁵²

Today, fintech is disrupting financial services just like e-commerce changed the face of retail, and is likely to have far more widespread impact on society and the Indian economy, both directly and indirectly. The sector is relatively young, and therefore smaller compared to others covered in this report: NASSCOM estimates that in 2016, the fintech market in India will be worth \$8 billion, having grown 20% over 2015. The fintech software market within this was pegged at \$1.2 billion (13%). The remaining 87% focus on services, primarily in payments (60% of the market, including ATM/Point of Sale [PoS]) and core banking services.⁵³

Enabling fintech = enabling disruption

"This is India's moment, using the network and the smartphone to make all Indians benefit from new age banking services," says Nandan Nilekani, co-founder and former CEO of Infosys and the man who helped set up what is now the world's largest biometric-data-driven platform, Aadhaar. Currently, ~1 billion people have already registered under Aadhaar.

Beyond the public sector, a striking example of Aadhaar-driven banking is mobile-only bank accounts offered in India by the Singapore-based DBS Bank, which hopes to open 5 million such accounts with 'digibank' and wallet services.⁵⁴

⁵² [How technology is disrupting financial inclusion in India](#) – YourStory.com (last retrieved 24 July 2016)

⁵³ <https://assets.kpmg.com/content/dam/kpmg/pdf/2016/06/FinTech-new.pdf>

⁵⁴ [DBS launches mobile-only bank in India](#) The Hindu Business Line (last retrieved 24 July 2016)

As of 2015, India still had an unbanked population of ~233 million. The Government's target of bringing down financial exclusion to <10% of the population can only be achieved with an ensemble cast comprising some smart policymaking, public-private partnerships, proliferation of smartphones, affordable access to the Internet, and in the lead role, innovation in financial technology. These are the factors that have helped drive growth of financial technology in the first phase of its growth. (See infographic on page 34.)

Driving growth & efficiency at the enterprise level: Fintech makes financial services more customer-centric by using technology-driven innovation. Large banks are viewing fintech as an enabler rather than a disrupter. They are tapping into the start-up ecosystem to incubate and create alliances on a variety of platforms such as wallets, investment intermediation, online client acquisition etc. They are not only developing platforms for such startups to thrive, but are also beginning to invest in such platforms. And as the table below shows, private banks have been implementing such changes and innovations a lot faster and more extensively than their PSU counterparts.

Bank	Investments
ICICI Bank	Conducted Appathon and shortlisted 10 from 2,000 applications and 3 winners to be given a chance to integrate their services on to the bank's mobile banking platform to be offered to customers
HDFC Bank	Organised 'Digital Innovation Summit', chose 5 ideas among 30 in artificial intelligence, marketing, quality assurance and payments
Axis Bank	Launches the first innovation lab "Thought Factory" to identify, mentor and possibly invest in fintech startups Focusing on startups and e-commerce as a business segment and has created a new business vertical within the corporate banking system Experimenting with emerging technologies such as blockchain, cloud "Hack for Hire" programme to identify and hire talent Working with NASSCOM 10,000 Startups, various technology and VC partners, global banks and academia "to create a vibrant ecosystem which transcends beyond India"
SBI	SBI inked a deal with IIT-Bombay business incubator SINE to promote innovation by fintech startups
Kotak Mahindra	Kotak fintech mobility hackathon has partnered with NASSCOM 10,000 Startups to identify founders developing apps around banking innovation
Yes Bank	Yes Bank is collaborating with T-Hub and three academic institutes to set up a centre of excellence and app store for the fintech start-ups

Fintech is also enabling enterprises to tackle major business challenges (e.g. online presence, more efficient operations management, improved risk management, and a larger customer base through better sales force productivity). With increasing focus on mobility and analytics-driven offerings, fintech solutions remove intermediaries, making systems and processes more efficient and transparent.

Government backing for innovation: The Government is the most important catalyst for the success or failure of fintech as a sector in a heavily regulated financial services sector.



Fintech in India

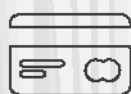
Demand Side



Large unbanked population without access to formal financial institutions



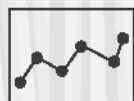
A larger, younger and digital-savvy population seeking newer, more efficient technologies driving convenience



Growth in e-commerce (travel and retail) needs smart solutions for better payment systems



Need to improve profitability, both by banks and their customers, specifically the large SME base

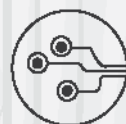


Need for rich, analysable data to address the growing needs of a large, unbanked population

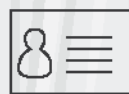
Supply Side



Increased proliferation of connected devices, coupled with falling device and data costs



Availability of new technology that improves speed, accuracy, efficiency and convenience of financial transactions



Initiatives such as Aadhar (UIDAI), UPI, PM's Jan Dhan Yojana and Digital India



The right policies and government initiatives for companies working on innovation in fintech



Emergence of startups working on newer technologies, backed by VC funding

1. Separately, the Government's largest digital initiatives have been largely focused on financial inclusion (UIDAI/Aadhaar, Jan Dhan Yojana, Bharat Bill Pay System, etc.), or are related to finance in some form (online filing of taxes, linking of Aadhaar and PAN databases, etc.). (See section on [Public Sector on page 21](#).)
2. One of the biggest recent developments in financial services is the launch of the Unified Payments Interface (UPI) by the RBI and NPCI. Together, NPCI and Aadhaar have kept smartphone banking at the centre of the financial services universe. UPI is a homegrown financial switch to enable consumers to use their mobiles to settle payments with merchants and retailers, and further, allow startups to integrate their payment solutions.
3. The Startup India policy announced in January 2016 includes a \$1.5 billion fund to support startups, as well as income-tax exemptions and rebates on patents.⁵⁵
4. The Government has proposed tax breaks and waiving of service charges/convenience fees to encourage electronic and card transactions at merchant establishments. It has also proposed changing authentication requirements through the UPI to enable greater convenience and thus, adoption of electronic and mobile payments.

The Reserve Bank of India has also set up an inter-regulatory Working Group to study the full spectrum of regulatory matters related to fintech and digital banking. The Group will review and appropriately reorient the regulatory framework, and respond to the dynamics of the rapidly evolving fintech scenario.

Having said that, many believe that the regulatory norms conveyed by RBI have been open to interpretation leaving a lot to be desired in terms of security compliance norms. So it remains to be seen how these evolve to keep step with the dynamic nature of fintech innovation.

Funding innovation: Funding has gained momentum in the Indian fintech industry. NASSCOM estimates peg funding in fintech startups in 2015 at \$420 million, 10x the \$40 million invested the previous year. 2015's biggest deal was wrapped up by FreeCharge (\$80 million, it was later acquired by Snapdeal) and BankBazaar at \$60 million. Mobile payments service provider Ezetap Mobile Solutions has raised \$24 million in Series C funding from existing investors.⁵⁶ The company is set to clock \$1 billion worth of transactions this year, and also made it to CNBC's Disruptor 50 list for 2016, right behind Uber and AirBnB.

FINTECH IN 2020

Overall, India's fintech market is expected to grow 1.7x between 2015 and 2020, according to NASSCOM. A recent Google/BCG report estimates that by 2020, half of all Internet users will use digital payments, driven by the high levels of functionality and a seamless user experience.

NASSCOM estimates that payment processing and trading solutions will increase their market share to 55% by 2020. Greater demand from telecom, media & entertainment, government and defence will generate more demand for fintech solutions, with mobility, analytics and security solutions dominating this space. Enterprises will increasingly leverage analytics-based solutions to spot high-yielding business opportunities.

The government's push for financial inclusion (e.g. Jan Dhan Yojana) will help fintech companies become data-rich, strengthening the unique national identity system (Aadhaar) and the ubiquity of mobile phones in India. Indeed, a large clutch of fintech companies are working on making sense of dark data and making it usable for the benefit of the larger population.

⁵⁵ [PM Modi announces tax relief, other sops for startups](#) (last retrieved 24 July)

⁵⁶ [The 13 biggest funded fintech stars of India](#) (last retrieved 24 July)



WHO

60% of the adult population will use one or more forms of online financial service in their daily life either for purchases or to access subsidies and services



WHEN

For purchases of all types – including small ticket items for goods and services – personal investments, accessing government subsidies under Aadhar, and other services (education, healthcare etc.)



WHY

Online will be the most convenient method for making payments. Speed, accuracy, efficiency, affordability and transparency will be the other reason



FINTECH IN 2020



HOW

Predominantly through mobile banking, including e-wallets, transaction gateways, trading solutions, ATM and PoS services



WHERE

Across India and more so in rural & semi-urban areas where physical financial institutions have a limited presence



WHAT

Payments will dominate the fintech landscape on the consumer side. Analytics-based and security solutions will be the chief preference for enterprises. Insurance and marketplaces will have moved online in a big way



Security & Risk Management

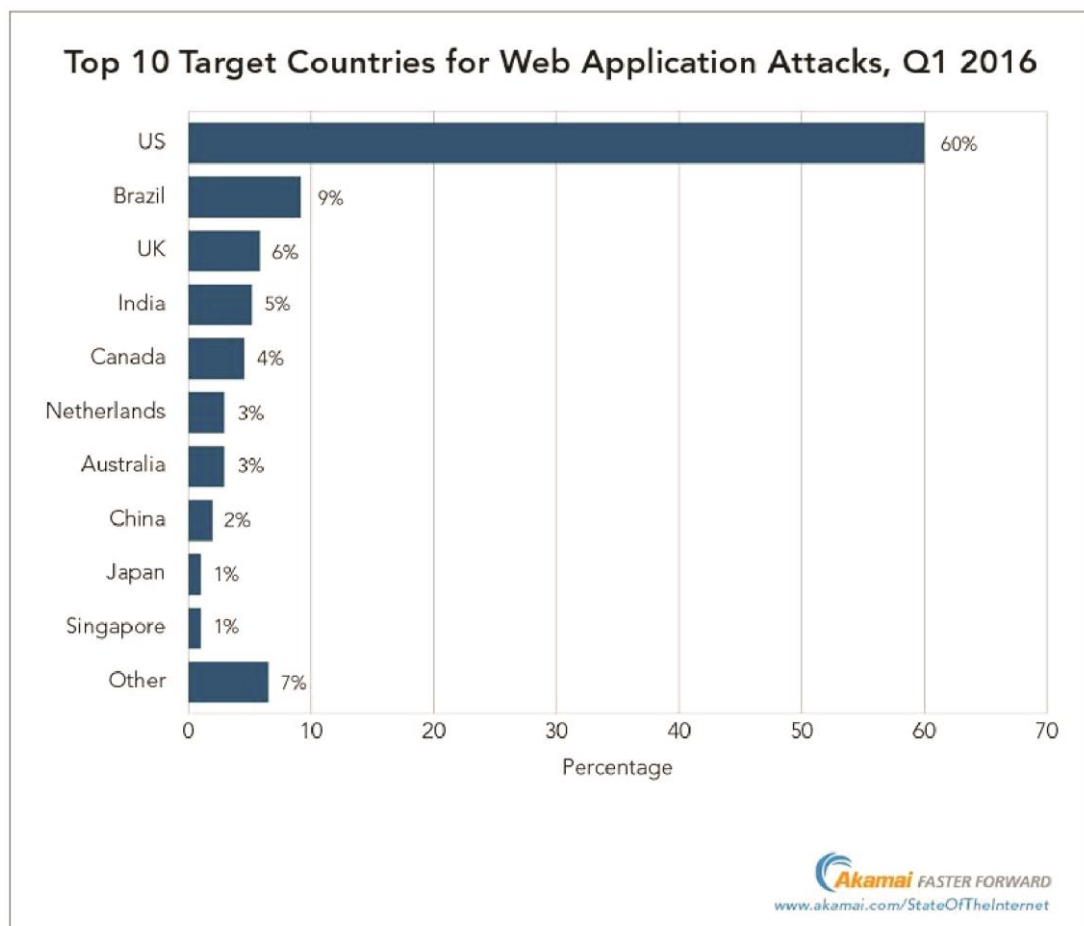


Security and Risk Management in Internet Adoption

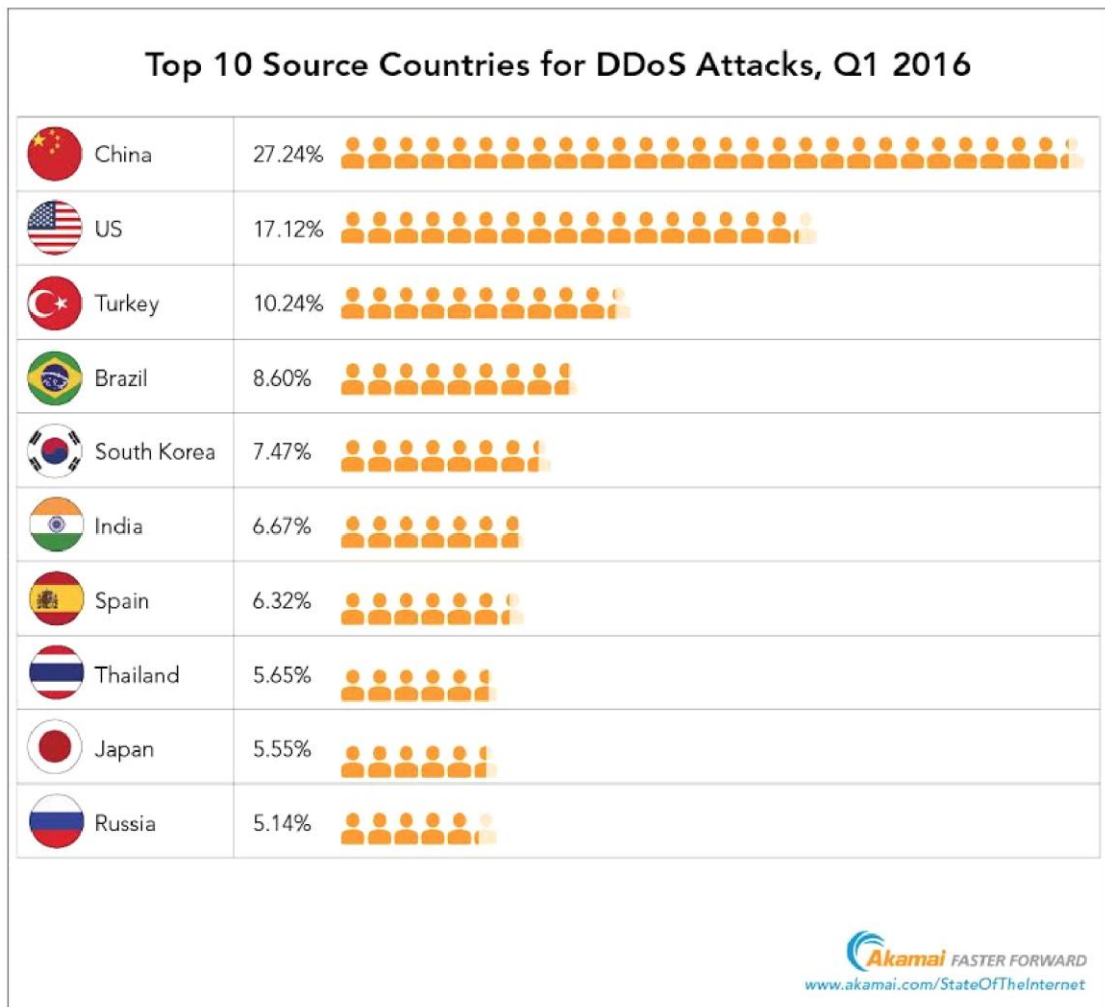
Widespread diffusion of the Internet in India will be contingent on trust in the medium, which in turn is dependent on provisions and perceptions of security of the medium. As with other parts of Asia, mobile data traffic is projected to witness spectacular growth, and could reach 1.7 Exabytes per month by 2020.

Content access and transactions will be defined by the processes, systems and technologies for security. Unfortunately, the size, frequency and vectors of threats are increasing globally. There is a growing number of web application and DDoS (distributed denial of service) attacks. It has become easier for attackers to launch or participate in an attack, and knowledge of application vulnerabilities is spreading. The number and availability of attack tools are proliferating, and DDoS-based extortion is on the rise in the BFSI sector.

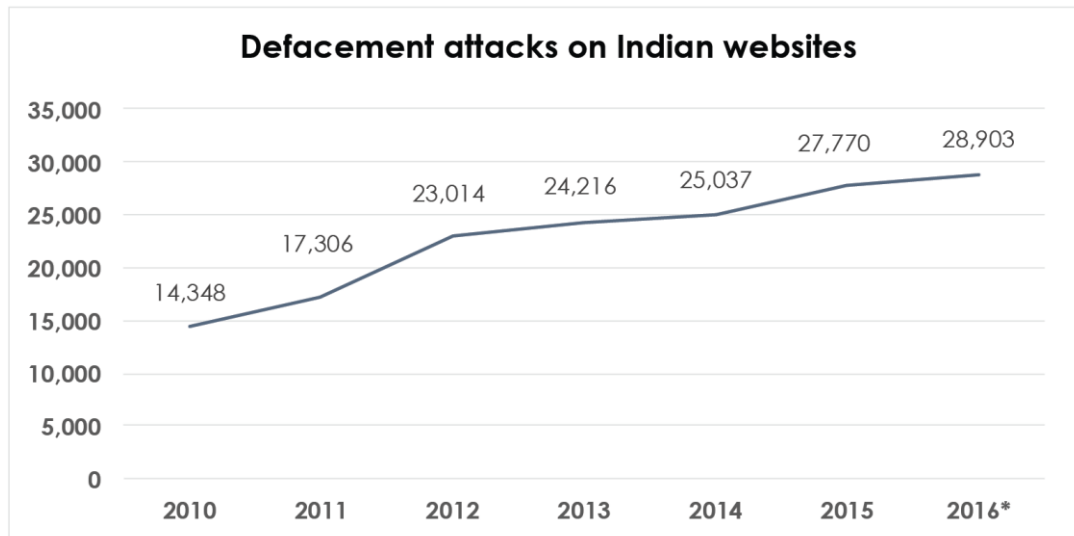
Attack tools have continued to grow more sophisticated, and many attack patterns are being replicated by copycat entities, according to Akamai's 'State of the Internet Report, Q1 2016'.⁵⁷ The most common attack vectors include, CHARGEN, DNS, HTTP Get, ICMP, NTP, SSDP and SYN floods; target sectors are business services, education, financial services, gaming, hotel and media. India unfortunately figures in the list of Top 10 source countries and Top 5 target countries for web application attacks in Q1 2016 (see figures below).



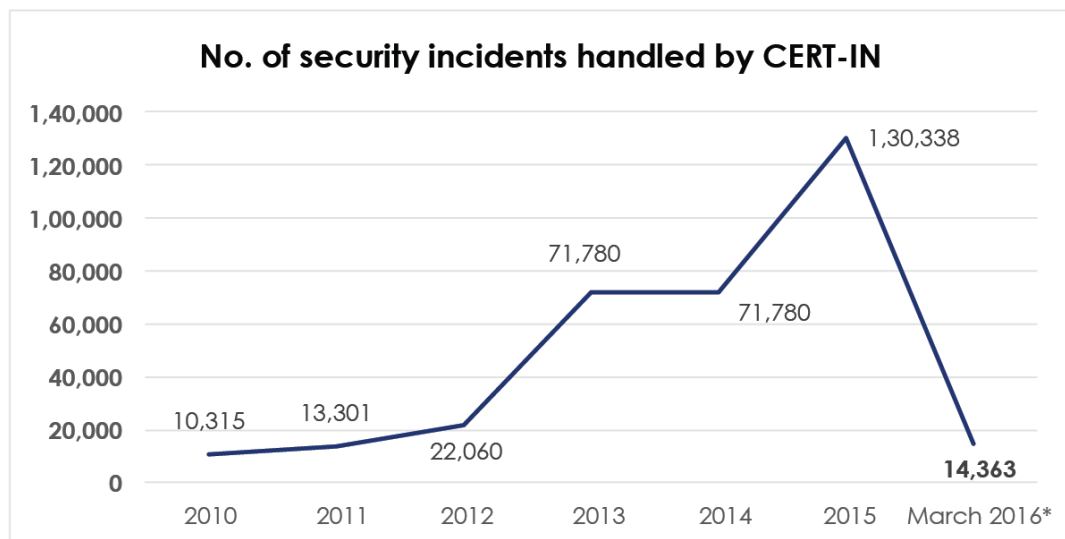
⁵⁷ [Akamai's \[State of the Internet\] Q1 2016 report](#) (last retrieved 01 August 2016)



India data from CERT-In also indicates a threat increase from 2013 to May 2016. Legislation around cybersecurity had been slow and open to interpretation, leading to 'check in the box' solutions across the board. Attack types include not just website defacement but more sophisticated attacks (see trend in the figure below).



Source: CERT-IN, PwC



Source: CERT-IN, PwC⁵⁸

These forms of attack include cybercrime, political hacktivism, espionage and cyber terrorism. The attacks are actioned with the following vectors:

- Application, endpoint, infrastructure threats
- DDoS threats targeting the network and application layers
- Application layer threats that cause data theft
- Direct to origin threats, that are easy to execute have been common occurrence in India

These forms of attack incur serious financial losses to companies and the economy, in terms of loss of revenue, consumer information, and damage to identity and brand. Some of these losses are directly quantifiable, others have broader qualitative impacts.

⁵⁸ [Turnaround and transformation in cyber security – India Update](#) PwC (last retrieved 24 July 2016)

Industry-specific security threats to the internet

Broken down by sector, for example, threats to the BFSI sector occur in forms such as DOS attacks, ransom attacks, defacements, data theft, and data exfiltration. For example, Union Bank of India reportedly had one of its offshore accounts breached in a cyber attack⁵⁹ From the year 2011-12 to 2014-15, the rise in mobile banking transactions has been accompanied by increasing cyber-frauds.

In the media sector, the digital arena opens up higher levels of piracy as compared to traditional media, according to the FICCI-KPMG 2015 report, 'Shooting for the Stars'.⁶⁰

Among government agencies, websites that have been hacked include TRAI, Indian Army, ISRO and CBI⁶¹ as well as those of Indian states such as Assam and Andhra Pradesh.⁶²

Government initiatives to hasten internet security

A number of government departments are involved in the process of hastening internet security, and cooperation between them helps align and harmonise the legislation. These include Department of Electronics and Information Technology (DeitY), National Critical Information Infrastructure Protection Centre (NCIIPC), CERT-In, the Telecom Regulatory Authority of India (TRAI), Education and Research Network (ERNET), National Informatics Centre (NIC) and the Data Security Council of India (DSCI). DeitY has released notifications on the National Cyber Security Policy, and is preparing policy papers on cybercrime and the international law framework, including recommendations on what the Indian approach could be. DeitY is also directly responsible for institutes like UIDAI and National Internet Exchange of India.⁶³

NCIIPC tracks and alerts government agencies (e.g. banks, railways, power, defence) about potential cyber-attacks. Indian Computer Emergency Response Team (CERT-In) (under the Ministry of Electronics and Information Technology) addresses a range of cyber security threats to infrastructure and coordinates cyber incident response activities.

ERNET's security activities include providing government agencies with the latest antivirus signature. NIC's offices in each state of India provide anti-virus support and security services at state and district levels on a regular basis. The Data Security Council of India (DSCI), set up by NASSCOM, develops best practices and frameworks on security, and publishes studies and papers on the topic.

Corporate Initiatives

Akamai has set up a new Security Operations Center (SOC) in Bangalore as part of its global cyber defence network, and is expected to become the second largest Akamai SOC in terms of human resources outside of the US by the end of 2016. Symantec has also opened a new global Security Operations Center (SOC) in Chennai, along with SOCs in the UK, USA and Australia.

⁵⁹ [Union Bank of India reports cyber breach on offshore accounts](#) (last retrieved 24 July 2016)

⁶⁰ [#shooting for the stars – FICCI-KPMG Indian Media & Entertainment industry report 2015](#) (last retrieved 01 August 2016)

⁶¹ [Indian websites that have recently been taken down by hackers](#) (last retrieved 24 July 2016)

⁶² [Govt websites hacked](#) – NDTV.com (last retrieved 24 July 2016)

⁶³ [An overview of india's cyber security agencies](#) Medianama (last retrieved 24 July 2016)

Microsoft has launched a cyber security engagement centre⁶⁴ in India, with solutions like cyber monitoring, use of machine learning-based detection technology, and ensuring rapid response and resolution to cyber threats to enterprise customers in India. The Gurgaon centre is one of the seven centres globally, and will serve as a dedicated hub for Microsoft in India.

Security solutions that scale with the internet adoption in India

With the increasing profile of the SMAC stack in business, government and consumer lives, cloud providers need to do more to improve their security procedures. They can draw on the intelligence and protection measures from security product suites such as Akamai.

In India, internet traffic will reach 60.5 Exabytes a year by 2020. In India, mobile data traffic will reach 1.7 Exabytes per month by 2020 (the equivalent of 430 million DVDs each month), up from 148.9 Petabytes per month in 2015.⁶⁵

With proper preventive and responsive measures, activities across the board – communication, content access and transactions – can become more secure and robust. Device proliferation – including smartphones and IoT – will continue to open up new forms of risks alongside opportunities, and government and industry will need to come up with creative solutions to make Internet access secure as well as convenient and user-friendly, especially for the new wave of rural users.

Conclusion

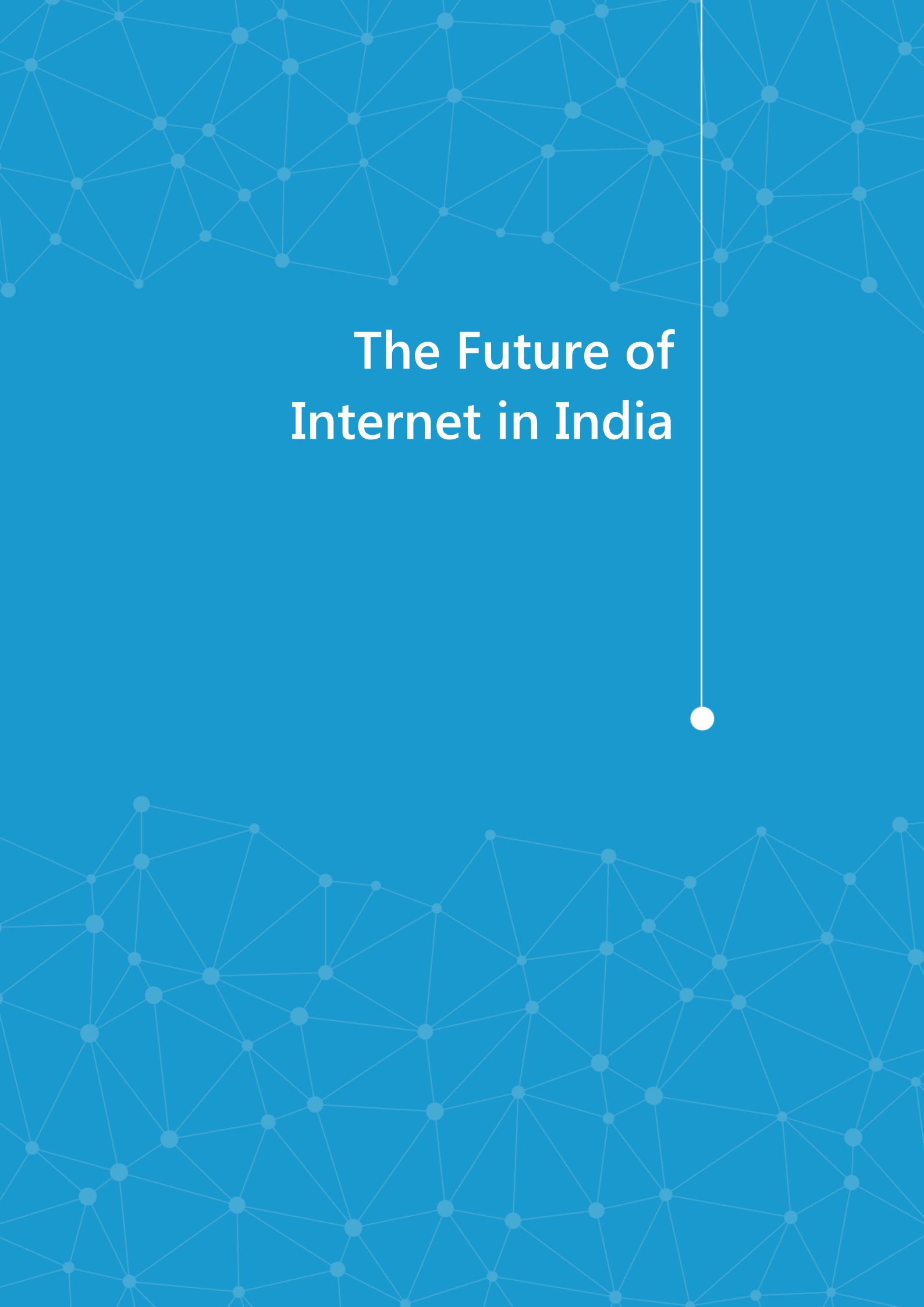
In sum, security and risk management will have to become key considerations across a wide spectrum of users – parents, children, SMEs, corporates, educational institutes and government alike. Responses will range from high-level policies and technical committees to industry guidelines, consumer education and investments in technology.

Implementation of Cloud Services is relevant considering the various cost benefits that Cloud Computing offers to the companies to achieve economies of scale, according to TRAI's Consultation Paper on Cloud Computing (June 2016).⁶⁶ The paper also refers to security and data protection acts from countries such as Singapore and New Zealand, in response to threat patterns like data theft, steganography attacks, botnets, phishing, malware and DDoS attacks.

⁶⁴ [Microsoft launches cyber security engagement center in India](#) (last retrieved 24 July 2016)

⁶⁵ [VNI Mobile Forecast Highlights, 2015-2020](#) Cisco (last retrieved 24 July 2016)

⁶⁶ [Consultation paper on issues related to digital terrestrial broadcasting in India – TRAI \(Consultation Paper No. 8/201\)](#) (last retrieved 24 July 2016)

The background of the slide is a solid blue color. It features a subtle, abstract pattern of light blue dots connected by thin, light blue lines, resembling a network or a molecular structure. This pattern is most prominent at the top and bottom edges of the slide. In the center, the title "The Future of Internet in India" is written in a bold, white, sans-serif font. A single white dot is positioned on the right side of the slide, aligned vertically with the title.

The Future of Internet in India

The Future of Internet in India

India to remain the fastest growing internet destination

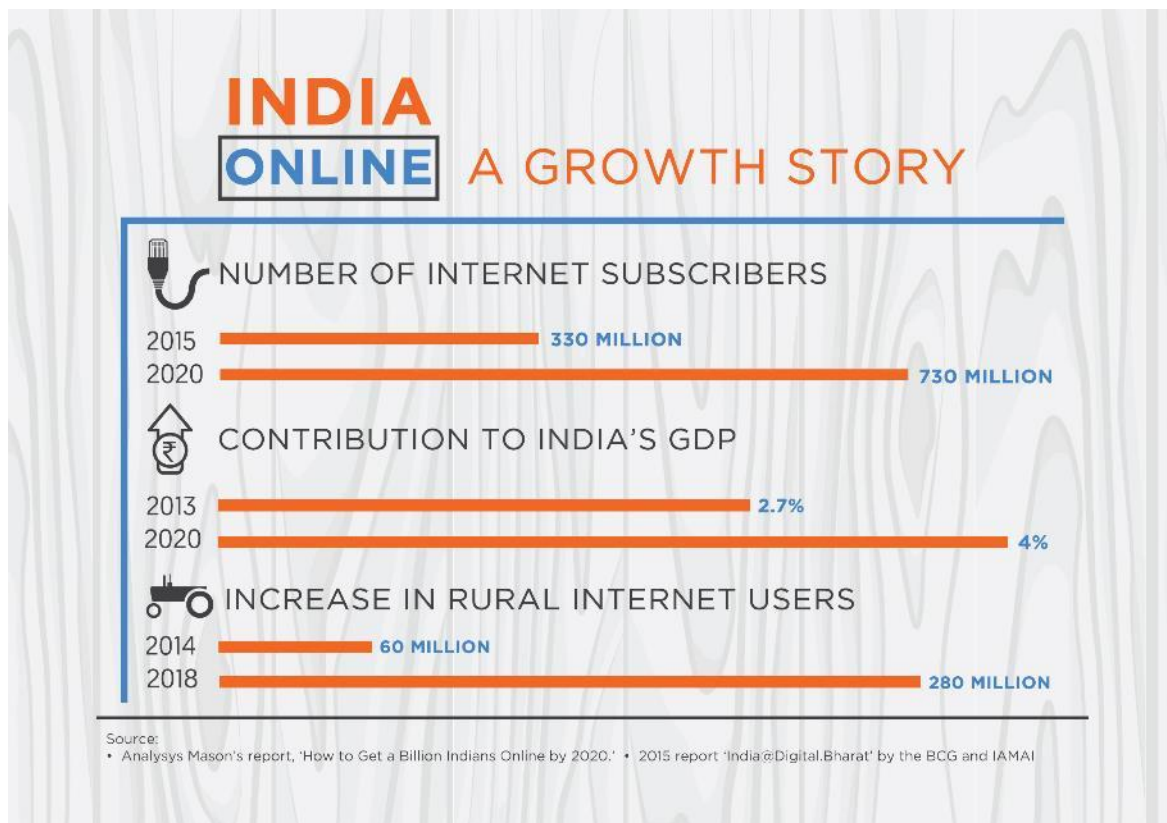
India's internet user base has already surpassed the US, and today is second largest after China. Globally, the number of internet users is expected to touch 4,170 million by 2020, growing at a CAGR of ~6%, and adding ~960 million in the next five years. However, internet user growth in India is expected to be 3x the world average, growing at a CAGR of ~20%. India will add ~400 million users, which is over 40% of incremental internet users worldwide in the next five years.

The type of internet users in India is set to change dramatically

Less than 10% of India's population lives in Tier 1 cities. Internet penetration in these areas has already reached saturation, and we estimate that 75-80% of new user growth will come from rural areas in the next five years. Internet businesses will have newer set of customers who will:

- Access content via mobile phones and not laptops and desktops,
- Want content in local (Indic) languages and not in English,
- Prefer to consume content via videos, rather than text

This poses a huge opportunity for companies developing local language apps and sites, search interfaces, video streaming and broadcasting, download managers, among many others. At the same time, it presents challenges to prevalent go-to-market models and will require significant retooling of approach for Internet-centric businesses.



“From 22 top-level domains (TLDs) such as .com, .net, and .org that existed for many years, the Internet now has over 1,000 new gTLDs such as .dabur, .paris and .club, both in English and in other languages. The IDN programme will enable the global community to use a domain name and access content in their native language or script.”

- Samiran Gupta
Head of India, ICANN

“Even though the Internet has been around for more than 20 years, it currently caters only to 4% of Indians who are online. In the next decade alone, local language content will be produced and consumed in explosive quantities. The Indian Internet policy must regulate and standardise the usage of Indic-language fonts for a clean foundation. Safe search for local language content must also be regulated.”

- Vivekanand Pani
Co-founder, Reverie Technologies

Last-mile connectivity to be enabled by government, telcos and technology providers

Multiple stakeholders will need to work in tandem to bring the next generation of Internet users (rural, mobile-centric, and local-language consumers) online in India.

While the Government's Digital India initiative aims to deploy the National Optical Fibre

“Startups are yet to figure out how to use the Internet to scale up their services. The hardest thing to do is to get people to discover you.”

– Deep Kalra
Founder,
MakeMyTrip

“Today, everyone is focusing on delivering services over low speed networks. The startup community should lobby to have faster networks and building great services for businesses and consumers.”

– Abinash Tripathy
Founder & CEO, Helpshift

Network (NOFN) providing broadband connectivity to cover 250,000 gram panchayats, the onus of bringing this Internet to end users falls on telcos and technology companies. The NOFN will have to be linked with telecom towers to deliver wireless broadband services to rural households, but setting up telecom infrastructure in remote areas remains a challenge.

So companies such as Google, Facebook, and Microsoft are coming up with unconventional methods. While Google wants to use a network of Helium balloons to relay signals to remote areas, Facebook plans to use drones as an alternative. Microsoft plans to use unused spectrum in frequencies used by TV channels to carry data.⁶⁷ The pilot projects are expected to start in 2016-17. Telecom companies, state governments and the Union Government will need to partner with Internet-based technology giants to drive up adoption.

⁶⁷ [Drones, balloons, white spaces: Google, Facebook, Microsoft vie for Modi's smart cities plans](#) Firstpost (last retrieved 9 August, 2016)

“ Governments should ensure connectivity is available in rural regions so that the power of the Internet and smartphones can be enjoyed by all. ”

– Vijay Shekhar
Sharma
Founder, Paytm

“ The Government has launched so many initiatives. Efforts must be doubled to increase network connectivity. ”

– Yogendra
Vasupal
Founder, Stayzilla

“ There is a need to enable people to use service consistently. The Government has the building blocks to make the Internet available in all schools and public institutions. ”

– Rohith Bhat
Founder, Robosoft

Businesses and consumers to come online, creating an ecosystem of SMBs and micro-entrepreneurs

Today, there is an Internet business for almost everything – selling old furniture, shopping online, booking travel, networking with friends, making payments, consulting doctors...the list goes on. Even offline businesses are trying to get a part of their value chain online. Google plans to bring 20 million businesses online by 2017 and train over 2 million Indian developers in Android.⁶⁸

Where there are businesses, that's where customers will flock. By 2020, the number of online shoppers are likely to cross 175 million, growing 3.5x over 2015. Technology will enable easy and efficient transactions. The launch of new devices such as Samsung Galaxy Tab Iris, featuring an iris scanner that is Aadhaar and STQC-certified, will enable cashless and paperless services for banking, passport, taxation and healthcare among others. We will continue to see adoption of payment solutions such as mobile wallets, cash cards, platforms, and POS (point-of-sale) services, dawning the age of well-connected digital economy. At the same time, the Internet is creating a network of SMBs, and micro-entrepreneurs/startups – an ecosystem, with the potential to create thousands of direct and indirect jobs.

From an Internet Economy to the Internet of Things – marching ahead to connect India

Prime Minister Narendra Modi's 'Digital India' envisages building 100 smart cities across the country. For creating smart cities, India needs a balanced focus in terms of modernising city infrastructure and leveraging technology to improve the efficiency and capacity of city services. In terms of city infrastructure, investments are required to modernise city services like water, energy, public transportation, roads and sewage. Investments are also required to take up technology initiatives in core city subsystems like energy, water, transportation, public safety, citizen services, city governance, healthcare and education, and overall at the city level to improve collaboration amongst these subsystems, improve citizens' participation and to wring out efficiencies from infrastructure assets. The essence of smartness in a city lies in integrating core city subsystems and carrying out a deep analysis of the resultant data in

⁶⁸ [Google aims to train 2 million Indians on Android platform](#) The Economic Times (last retrieved 9 August 2016)

ways that are meaningful to all stakeholders. All of this can be facilitated by leveraging advances in Internet technologies as well as by synergising with several investments already made in creating technology infrastructure.

Dawn of an era of digital literacy

The Internet is redefining literacy in India. With so many tech startups enabling local language content, digital literacy across India is becoming both possible and significant. The goal is to create one 'e-Literate' person in every Indian household by 2020. The Government, NASSCOM, and the private sector have joined hands to form the National Digital Literacy Mission (NDLM) which is working towards making the goal a reality.

Role of cyber security to become paramount

With digital connectivity, the risks of cyber-crimes increase. With multitudes of people using e-commerce and transacting online, there is a huge need for technologies that can prevent data theft. India features in the top 10 source countries for DDoS attacks – an attempt to make an online service unavailable by overwhelming it with traffic from multiple sources]. There has been a significant increase in Internet scams and hacks, with IoT devices being most vulnerable, as they are the major sources of data. The RBI is directing banks to deploy cyber security policies, and cyber crisis management plans. Going forward, these policies will get more stringent and prescriptive with broader issues in cyber security being covered under its ambit.

“Consumption has changed because of the Internet and with that the way people are targeted has also changed. The Government is already talking about Digital India and Startup India. The Internet is the key to making these initiatives change the country into an economic powerhouse.”

– Naveen Tewari
Founder, InMobi

India is also collaborating with the US to develop a complete framework on the India-US cyber relationship. The spending on cloud-based security solutions will continue to increase across verticals, leaders here being the BFSI and online retail companies. The Government too has set in motion a number of initiatives that will take effect in the coming years. Among these the focus is on protecting national critical information and infrastructure. This would aim to protect key installations and systems across different verticals.

Corporates such as Microsoft and Akamai are also establishing specialised centres to develop machine-learning based detection technologies. Specialised teams trained in mitigation of a variety of attacks are also being actively deployed by these technology giants in India. We need more such initiatives to be able to tackle cyber threats in the country. What it boils down to is indigenous talent and resources with the right skill-sets to execute such projects. India is witnessing a huge demand for such security professionals (technologists and analysts, alike). In line with these growing demands, security has become one of the key focus areas for NASSCOM's Sector Skills Council, which working towards creating the right cybersecurity skill sets among Indian IT professionals.

“ Payments have been revolutionised thanks to the Internet. The risk is in data protection and making sure that it is accessed by the necessary teams. ”

– Abhijit Bose
CEO, Ezetap

“ The risks are in securing data and making sure that the clinical data is protected. The Government should embrace the smartphone to help access healthcare services through the smartphone. ”

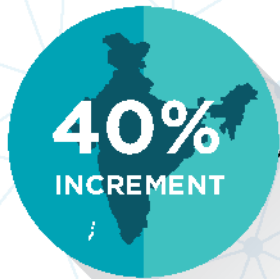
– Rohit C A
MD, CloudNine

Specific policies and regulations need to be created to drive growth of Internet in India

The Government will need to continue to build momentum in creating new policies to drive Internet adoption and to support the growth of Internet businesses. Whether around broadband spectrum, Internet adoption/availability, data protection, or cyber security, what was applicable five years back is no more relevant in today's context, and new policies will need to be futuristic. They will also need to be cognizant of India's challenges and figure out ways to mitigate those challenges. The goal, then, is to create a sustainable environment of public-private partnerships where the ultimate beneficiaries are the citizens of India.

“ We have continued to witness significant growth in the number and frequency of DDoS and web application attacks launched against online assets, and Q1 2016 was no exception. Interestingly, nearly 60% of the DDoS attacks we mitigated used at least two attack vectors at once, making defence more difficult. Perhaps more concerning, this multi-vector attacks functionality was not only used by the most clever of attackers, it has become a standard capability in the DDoS-for-hire marketplace and accessible to even the least skilled actors. ”

– Stuart Scholly
Senior Vice President and General Manager,
Web Security, Akamai



India to add over 40% of the world's incremental Internet users in the next 5 years

Internet consumption to increase, with multimedia being accessed on mobile devices



Last mile connectivity to be enabled by government, telcos, and technology providers

Both businesses and people to come online, also creating an ecosystem of SMBs and micro-entrepreneurs



By 2020, the number of online shoppers is likely to cross 175 Mn, growing 3x over 2015, with a proportional increase in SMBs

The Internet of Things (IoT) will power smart cities, along with increased public/private partnerships



Role of cyber security to become paramount

Technology providers to partner with the government and other enterprises to develop skill sets and secure transactions without impacting end-user experience



NOTES

NOTES



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YOUR STORY INSPIRE
INNOVATE
IGNITE