

Digital Life Index Of Indian Cities

MODELS • DYNAMICS • CASES

DIGITAL LIFE INDEX OF INDIAN CITIES

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Acknowledgement

The Digital Life Index of Indian Cities has been prepared by a team at the Punj Lloyd Institute of Infrastructure Management, Indian School of Business, comprising Farhan Ahmed, Tryambakesh Shukla, Vignesh Manninathan, Ashish Mohan and Suprotim De. The analysis of the results and text of the report was authored by Farhan Ahmed with Tryambakesh Shukla and Vignesh Manninathan as co-authors. Ashish Mohan assisted in developing the demand and supply parameters and Suprotim De helped in collecting and feeding Google Trends data and generating maps.

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The team takes complete responsibility for the inadvertent errors that might have occurred despite our best attempts. Please do send us your feedback and suggestions at punjllloydinstitute@isb.edu so that the next edition of this Index is better aligned to your needs.

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EXECUTIVE SUMMARY

Internet and digital accessibility in India, currently in its primary stage, continues to pick up pace. According to the Internet and Mobile Association of India and IMRB International report, the number of internet users in India is likely to increase to about 450-465 million by June 2017. Overall, internet penetration in India is about 31%. Internet penetration in urban areas (estimated population of 444 million) is as high as 60%¹. The Indian government launched the Digital India Programme in 2015 to transform India into a digitally empowered and knowledge economy. The programme was launched to fulfil the potential and promise of digital interface and Information Communication Technology (ICT) to transcend the structural shortcomings of India and address key concerns of urbanisation and economic growth.

There is a lack of comprehensive and coherent data and evidence on the state of the existing digital infrastructure in Indian cities. This gap provided the motivation for the Digital Life Index of Indian Cities report. Our report on the Digital Life Index of 15 Indian Cities provides a quantitative measurement of the demand for and supply of digitisation across seven indicators – transport, finance, retail, healthcare, education, media and administration. The cities have been selected based on their population (as per Census 2011).

For most of these sectors, the demand for digital services outstrips the available supply. For instance, in the administration sector, only a few municipal corporations offer services through their portals/ websites. In the healthcare sector, the demand for online information on availability of doctors and hospitals, appointments, etc., as measured by internet searches, is huge. With the advent of some start-ups, this demand is partially being met in select cities. The situation for the media sector will also change as the focus on providing news/ information/ entertainment on-the-go gains momentum.

Likewise, the demand for online banking and loan services will increase with the recent move to push digital and phone banking. In the education sector, the demand for online courses offered by universities has picked up. Online platforms such as Coursera, Udemy, edX and others are also offering a number of online courses. The retail sector has taken to the online platform in a significant way. In the transport sector, the arrival of cab aggregators such as Uber and Ola has pushed digital penetration and resulted in a paradigm shift towards on-demand mobility.

^{1 1} Chopra, A. (2017, March 02). Number of Internet users in India could cross 450 million by June: report. Livemint. Retrieved from <http://www.livemint.com/Industry/QWzIOYEsfQJknXhC3HiuVI/Number-of-Internet-users-in-India-could-cross-450-million-by.html>

The report is organised as follows:

Chapter 1 – *From Access Infrastructure to Full Digital Life* provides a brief description of the Digital India Programme. It explains the methodology adopted for deriving the Digital Life Index.

In all, seven sectors were considered, namely, transportation, finance, health, administration, education, retail and media. To analyse the demand, we used Google Trends data to find out the popularity, by region, of a pre-determined list of key search words for the seven sectors. Demand side data was collected for 2015 and 2016 (except for media where data on the demand side was collected for 2016). To analyse supply, we examined different factors indicating the presence and scale of digital infrastructure development in 15 cities. The most recent data available for supply was considered.

The data points were normalised with the population of the city. Thereafter, points and relative points were allotted. The final score of the city was determined by average place in rankings for each measurement. To analyse the relationship between demand and supply, we calculated the correlation coefficients.

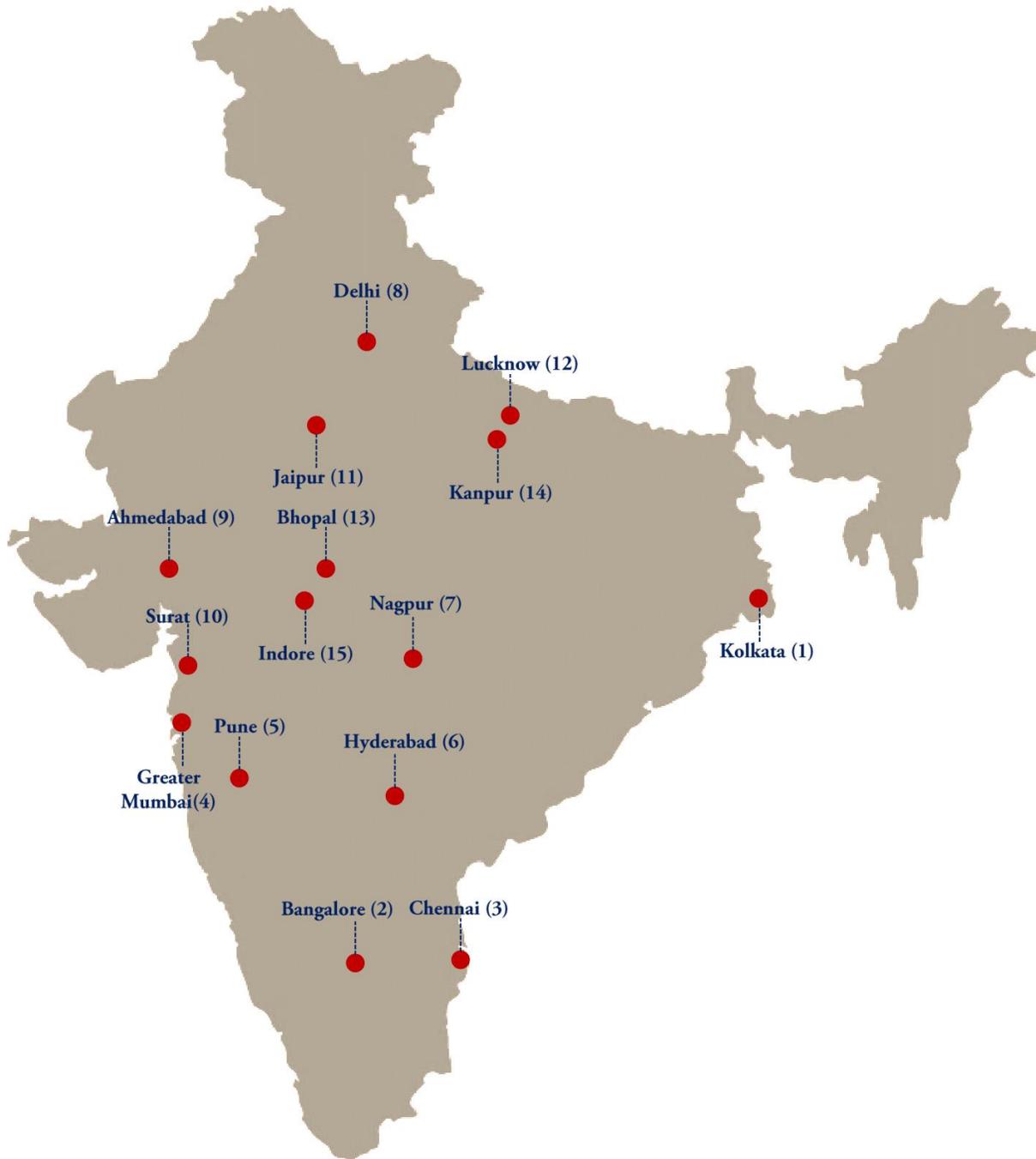
Chapter 2 – *Digital Life of Indian Cities: General Analysis* provides the Digital Life Index ranking of 15 Indian cities. The cities have been clubbed under four categories based on their ranking for 2015 and 2016: Leaders, Stable, Picking up Pace and Lagging Behind.

Chapter 3 – *Digital Life Dimensions* highlights the digital state of seven sectors in 15 cities and details the key performance indicators of top-ranked cities on the demand and supply metric.

Chapter 4 – *Digital Life of Cities* maps the digital performance of 15 cities across seven sectors.

Chapter 5 – *Digital Case Kit* provides case studies of innovations by organisations, explaining their current status, module, scale and future plans.

Digital Life Index Map 2016



I. FROM ACCESS INFRASTRUCTURE TO FULL DIGITAL LIFE

From Access Infrastructure to Full Digital Life

India: Digital India Programme



Pillars of Digital India

Accessed from Digital India website on July 31, 2017 (Source: <http://www.digitalindia.gov.in/>)

The Digital India Programme was launched by the Indian government on July 1, 2015 with the objective of transforming India into a digitally empowered society and knowledge economy.

There are three core vision areas:

- **Digital Infrastructure as a Core Utility for every citizen:**

- Availability of high-speed internet as a core utility for delivery of services
- Mobile phones and bank accounts for citizen participation in the digital and financial space
- Easy access to a Common Service Centre which are access points for delivery of various electronic services to its citizens

- **Governance and Services on demand:**

- Integrated services across departments
- Availability of services in real time from online and mobile platforms
- Making financial transactions electronic and cashless

- **Digital Empowerment of Citizens:**

- Universally accessible digital resources
- Collaborative digital platforms for participative governance
- Citizens not required to physically submit government documents/certificates

Initiatives under the Digital India Programme are spread across three segments: infrastructure, services and empowerment. There are 31 initiatives in the infrastructure

segment, 68 initiatives in the services segment and 16 initiatives in the empowerment segment.

Digital India is an umbrella programme covering multiple government ministries and departments. It has a number of elements with different goals and objectives, all of which must be intertwined to achieve the objective. It will pull together many existing schemes that will be restructured, revamped and re-focused.

There are nine key pillars of the Digital India Programme. These are Broadband Highways, Universal Access to Mobile Connectivity, Public Internet Access Programme, e-Governance: Reforming Government through Technology, e-Kranti — Electronic Delivery of Services, Information for All, Electronics

Use of Social Media in the Digital India Programme

Key topics of Digital India initiatives such as digital governance, digital empowerment, digital infrastructure and others were widely

Manufacturing, IT for Jobs and Early Harvest Programmes.

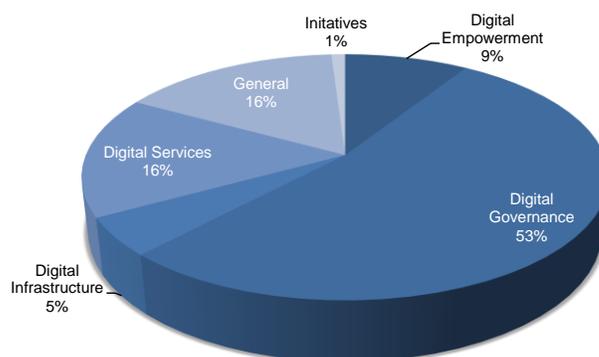
These nine pillars have definite objectives and time targets for completion. Most of the initiatives are targeted for completion in three years.

The Department of Electronics and Information Technology (DeitY) is the coordinating agency for Digital India.

DeitY has also launched a digital platform named “myGov” (<http://mygov.in/>) to facilitate collaborative and participative governance. The platform seeks to ensure wider consultation and discussion across government, industry, civil society and citizens on various issues to arrive at innovative solutions for achieving the desired outcomes.

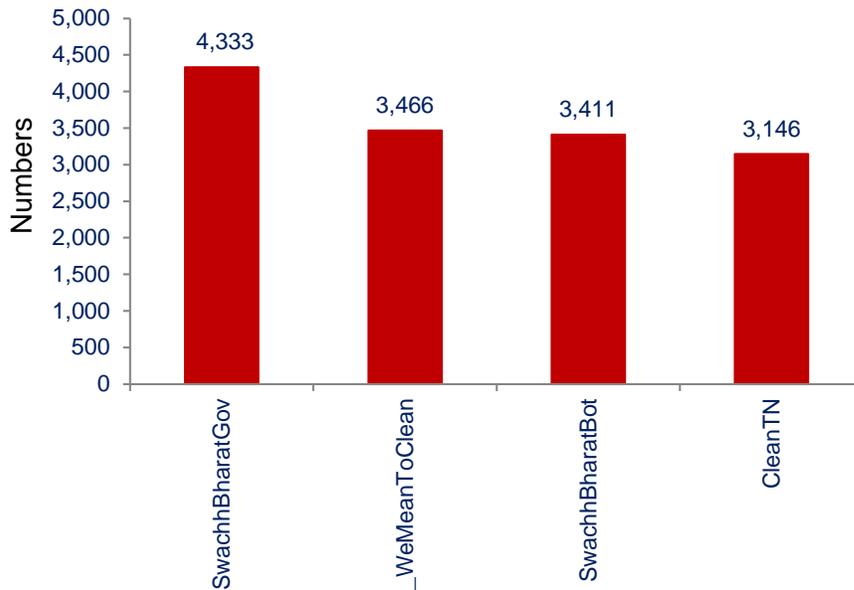
reviewed in 2016 using different social media platforms (these include Facebook, MyGov, RSS feed and Twitter).

Category-wise Reviews Using Social Media



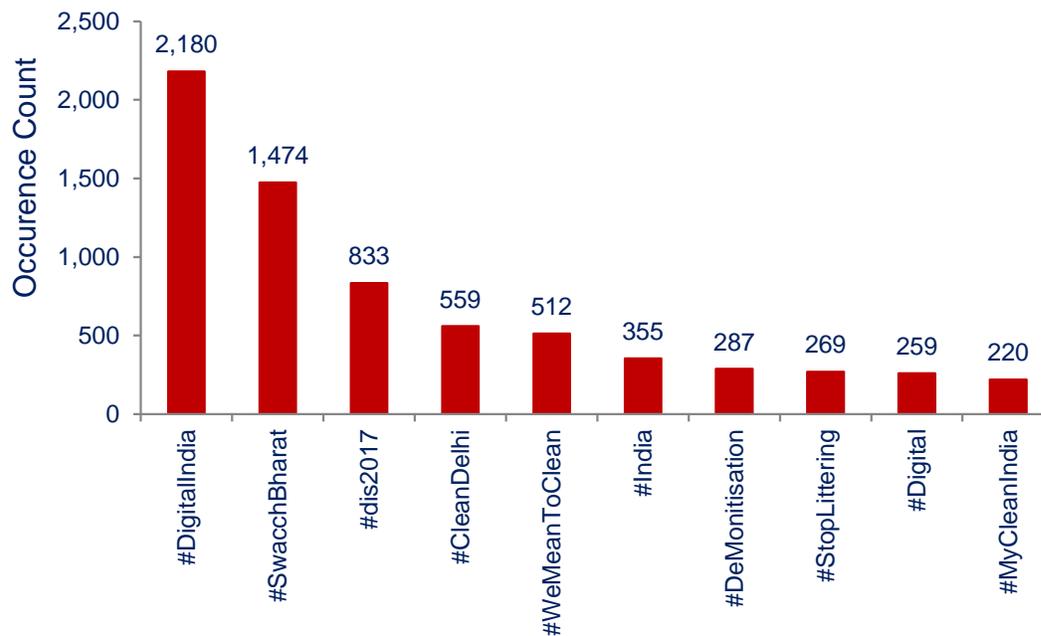
Source: Ministry of Electronics & Information Technology

The top four tweets for 2016 focused on issues of governance and government programmes.



Source: Ministry of Electronics & Information Technology

Likewise, the occurrence count of the top 10 hashtags for 2016 concerns matters relating to Digital India, government programmes, cleanliness and demonetisation.



Source: Ministry of Electronics & Information Technology

Need for a Digital Life Index

The concept of Smart Cities and a "Digital India" is taking centre stage in various forums and discussions. Digital technology enhances the quality of life of citizens by providing them with information and services at the click of a button.

Our Digital Life Index covers the top 15 most populated cities (selected on the basis of population as per Census 2011) and provides their rankings for 2015 and 2016. Seven sectors have been considered: transport, finance, healthcare, retail, education, media and administration.

Methodology adopted in the research

We explored seven sectors of digital technology application: transportation, finance, health, administration, education, retail and media (as shown in the figure below), and developed indices to assess supply and demand for each of the sectors.

To analyse demand, we used Google Trends data to gauge the popularity, by region, of a pre-determined list of search words relating to each of the seven sectors.

To analyse supply, we examined different factors indicating the presence and degree of digital infrastructure development in the 15 cities.

We looked at different components of the seven sectors for all the selected cities. For administration, the availability of municipal services was assessed; for health, the websites of public hospitals were assessed with respect to patient services; for media, the number of newspaper publication houses based in a city with digital platforms was taken into consideration; for transport, the presence of online cab aggregators and online availability of public transport schedules was explored; for finance, the number of bank branches with digital banking facilities was assessed; for education, the number of online courses offered by universities was looked into; and for retail, the number of pin codes served per 1,000 population per city by Amazon, Myntra, Flipkart and Snapdeal was analysed.

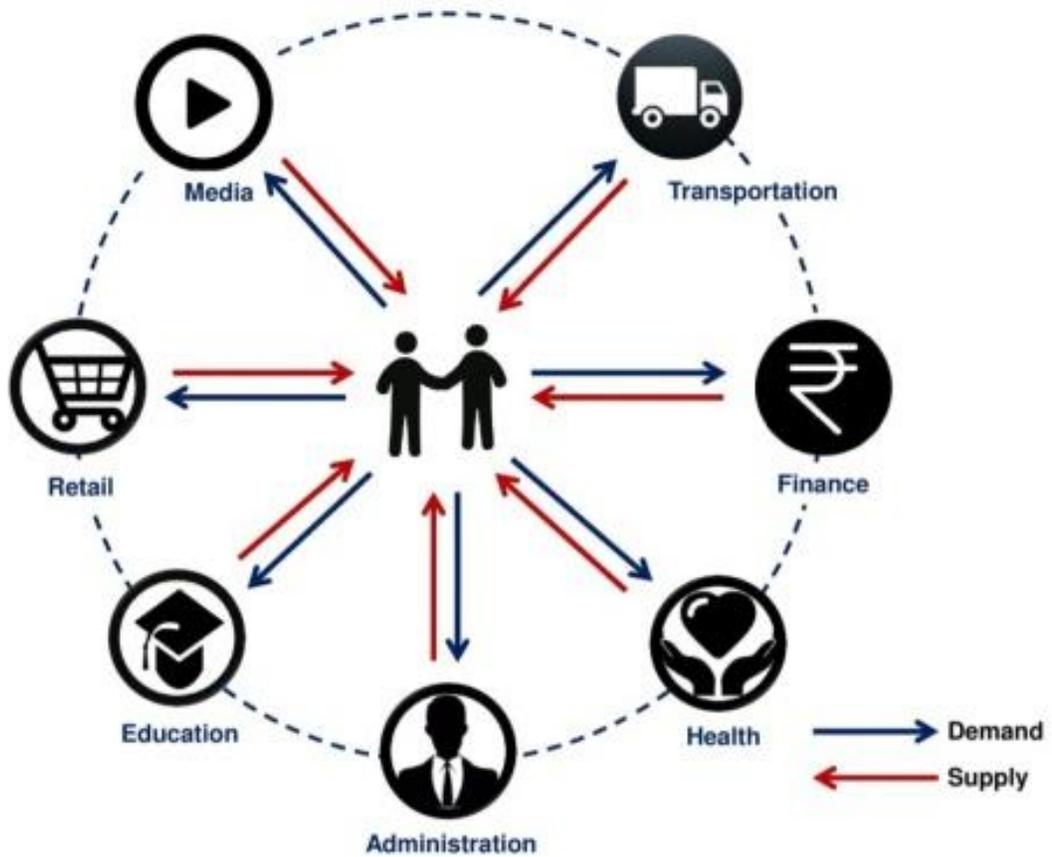
The results obtained were normalised taking into account the population of the city. The final score of the city for 2015 was determined by its average place in the rankings for each measurement.

Thereafter, we allotted points and then allotted relative points (based on the following calculations 1st place = 14 points; last place = 0 points). The score for 2016 was derived accordingly. Wherever the ranking of two or more cities was found to

be equal, the points and relative points allotted were kept the same.

To analyse the relationship between demand and supply, we calculated the correlation coefficients.

Graph: Model of Everyday Urban Life



Metrics Used in the Index

	Supply	Demand
Administration	1. Availability of municipal services on their respective websites (water and electricity bills, property & estate tax, birth and death registration, e-hospitals and vaccination services, land & building services, crematorium services, availability of mobile applications).	1. Key search words related to city web portals and online e-payment services on Google Trends.
Health	1. Functional assessment of the website of three public hospitals per city with regard to services available to patients (online portal for outpatient services, online appointment scheduling, online history of patient and lab reports, video consultation) 2. Availability of web-based medical consultancy services in each city (Practo, Lybrate and Zoctr).	1. Key search words related to online doctor scheduling, hospitals and pharmacy services on Google Trends.
Media	1. Number of newspaper publication houses based in a city with digital platforms	1. Number of Twitter and Facebook followers of newspapers per 1,000 residents in a city.
Transport	1. Availability of online public transport schedules (trains, metros, bus rapid transit systems (BRTS), buses) on local transport websites. 2. Presence of online cab aggregators in a city.	1. Key search words related to online schedules and other possible related combinations on Google Trends. 2. Number of city transport apps download per 1,000 population from Google Play Store.
Finance	1. Number of bank branches with digital banking facilities for the top 5 banks.	1. Key search words for online banking and other possible combinations on Google Trends.
Education	1. Number of online courses offered by universities in a city.	1. Key search words for online education and other possible combinations on Google Trends.
Retail	1. Number of pin codes served per 1,000 population per city by Amazon, Flipkart, Myntra and Snapdeal.	1. Key search words related to online shopping and related combinations on Google Trends.

II. DIGITAL LIFE OF INDIAN CITIES: GENERAL ANALYSIS

Digital Life of Indian Cities: General Analysis

Indian Cities: Internet Penetration

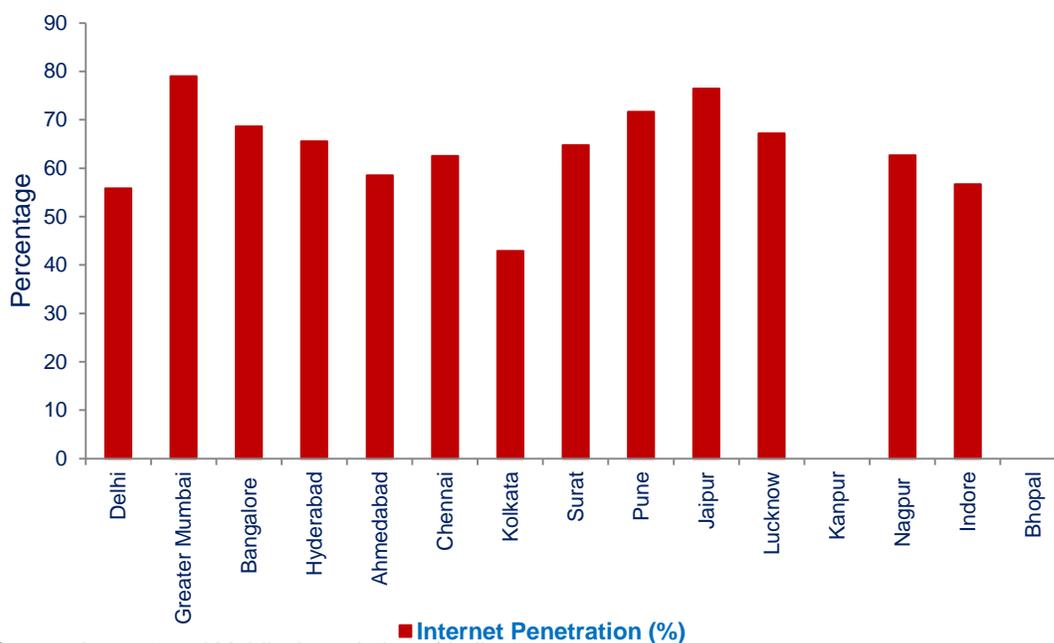
The number of internet users in Mumbai (16.4 million) and Delhi (12.15 million) is much higher than in all the other cities. Kolkata comes a distant third with 6.27 million internet users. Internet penetration² is highest in Mumbai (79%), followed by Bangalore (69%) and Hyderabad (66%).

Internet penetration in Delhi is about 56%. There is a very strong correlation between the economic output per person of the 15 selected

cities and the number of internet users. The correlation coefficient stands at 0.74.

This begs the question: Is the economic prosperity of a city a precursor to accessing digital opportunities and services?

Graph: Internet Penetration in Indian Cities



Source: Internet and Mobile Association of India, 2014

(Data on internet penetration for Kanpur and Bhopal was not available)

² Internet penetration is calculated based on the number of internet users (2014) as against the extended urban agglomeration (UA) population of the city (Census 2011).

Digital Life Index of Indian Cities

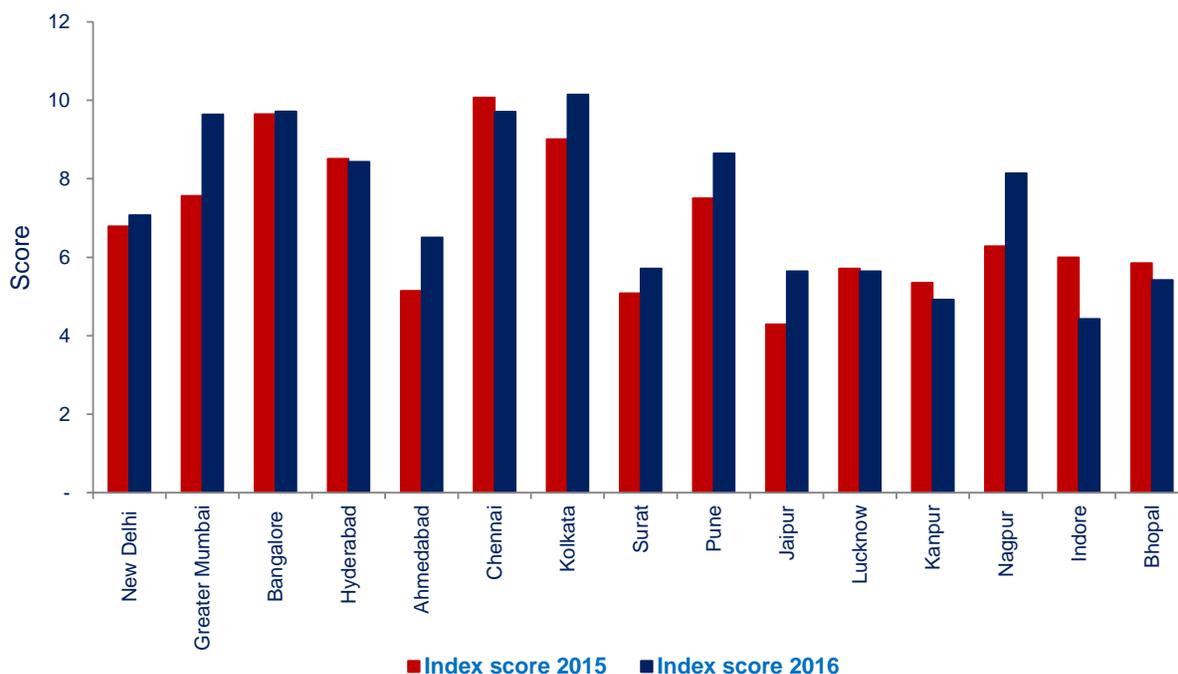
The interplay of supply and demand and digital life development in Indian cities leads to the following observations:

- **Leaders:** The cities in this group have high performance and high dynamics. These cities have not only performed admirably over the two-year period, but have also improved their index scores in 2016 as against 2015. The leaders include Greater Mumbai, Kolkata and Pune. In Greater Mumbai, for instance, there was an upsurge in the demand for services in the education, finance, retail and transport sectors in 2016. Other sectors (administration and health) showed a relatively small increment in demand. The overall index score for Greater Mumbai was 7.56 in 2015 and 9.64 in 2016.
- **Stable:** The cities in this group had high index scores in 2015 but recorded a marginal increase or slight decline in 2016. Stable cities include New Delhi, Bangalore, Chennai, Hyderabad and Lucknow. In Delhi, for example, there was an increase in demand for services in the administration and education sectors in 2016 compared to 2015, whereas there was a decrease in demand in the finance and retail sectors in 2016 compared to 2015. The demand in the health and transport sectors remained constant in 2015 and 2016. The overall index score for Delhi was 6.79 in 2015 and 7.07 in 2016.
- **Picking up pace:** The cities in this group had relatively low index scores in 2015 but are picking up. In fact, their dynamics are comparable to or even higher than top-ranked cities. Cities that are picking up pace include Ahmedabad, Surat, Jaipur, and Nagpur. As an example, in Nagpur, there was a significant increase in demand for services in the education, retail and transport sectors in 2016 compared to 2015. The overall index score for Nagpur was 6.28 in 2015, escalating to 8.14 in 2016.
- **Lagging behind:** The cities in this group had recorded a significant decline in their index scores in 2016 as against 2015. Cities in this group include Indore, Bhopal and Kanpur. In Indore, for instance, there was a significant decrease in demand for services in the administration, education, health, retail and transport sectors. The overall index score for Indore was 6.00 in 2015, declining to 4.43 in 2016. Similarly,

in the case of Kanpur, some sectors, such as administration, finance and transport saw a significant decline in the demand for services in 2016

compared to 2015. The overall index score for Kanpur was 5.35 in 2015 and 4.92 in 2016.

Graph: Variation in Digital Life Index in 2015 & 2016



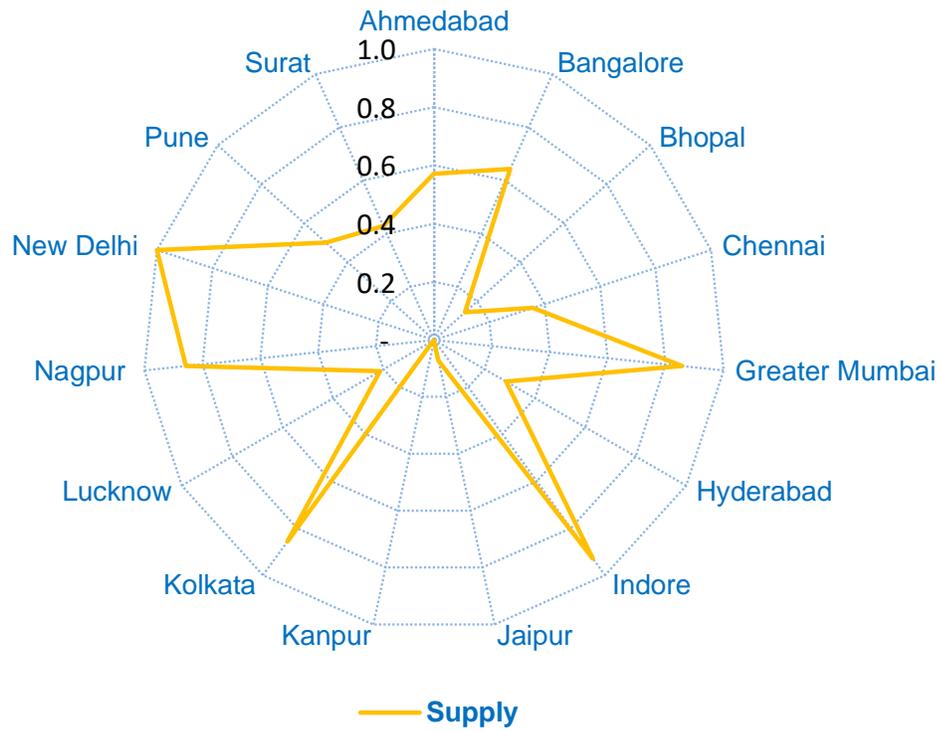
The growth in digitisation overall is primarily driven by the demand metric. The average index score increased from 6.85 in 2015 to 7.32 in 2016.

The correlation coefficient of only four cities stays positive for both 2015 and 2016. These are New Delhi, Ahmedabad, Kolkata and Kanpur. The correlation coefficient of three cities, namely, Hyderabad, Surat and Nagpur, goes from positive to negative from 2015 to 2016. The remaining nine cities have a negative correlation coefficient for both 2015 and 2016. These are Greater

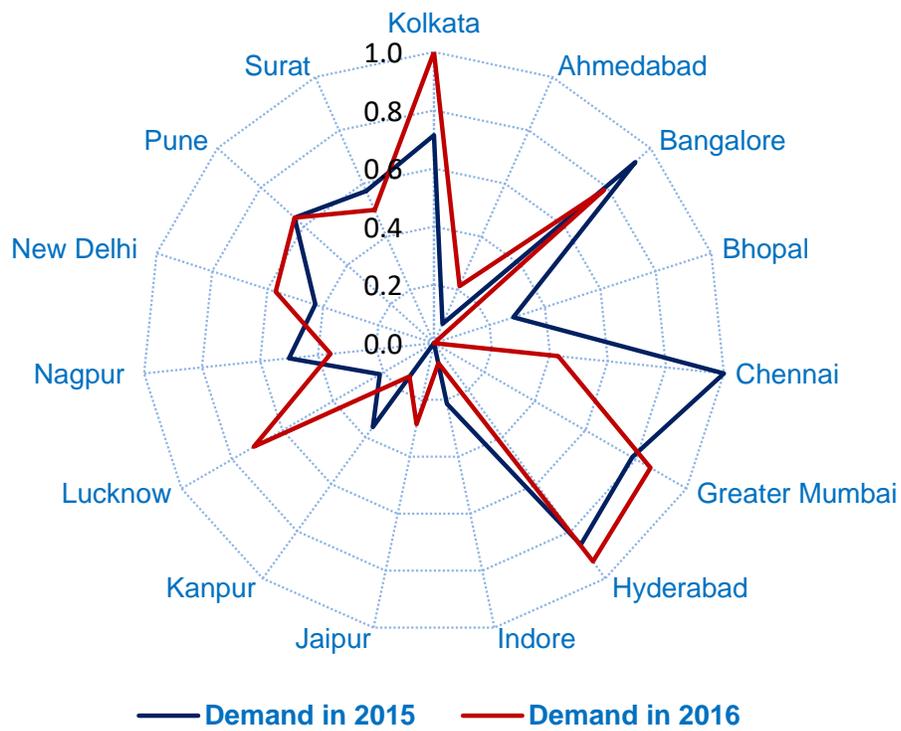
Mumbai, Bangalore, Chennai, Pune, Jaipur, Indore, Bhopal and Lucknow.

In the context of sectors, only transport and healthcare have a positive correlation coefficient for 2015 and 2016. As against this, finance, education and administration have a negative correlation coefficient for 2015 and 2016. The correlation coefficient of retail turns from negative in 2015 to positive in 2016. The correlation estimate for media was available for only 2016, and it is negative.

Graph: Dynamics of Supply by City

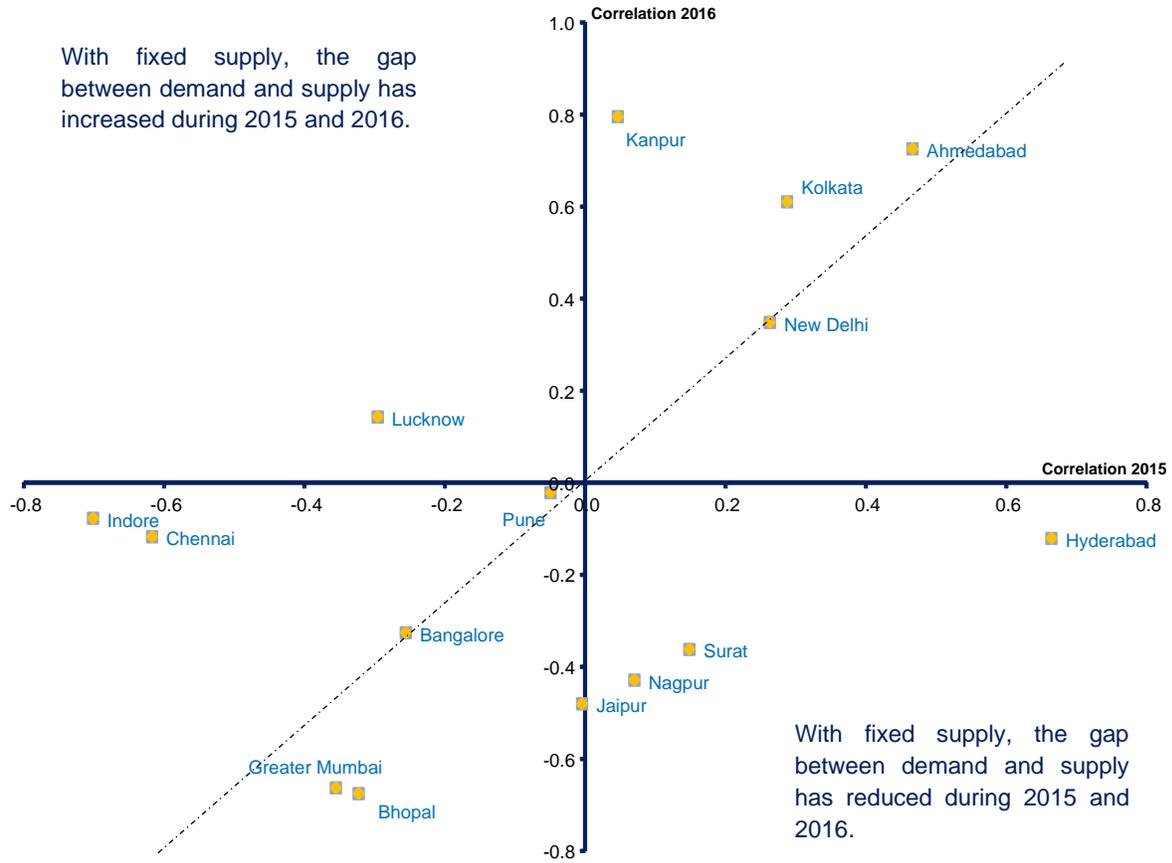


Graph: Dynamics of Demand by City



Note: The media estimate is not available for 2015. Hence, the demand graph for 2016 does not contain a media estimate to prevent a skewed representation.

Graph: Dynamics of Correlation by City

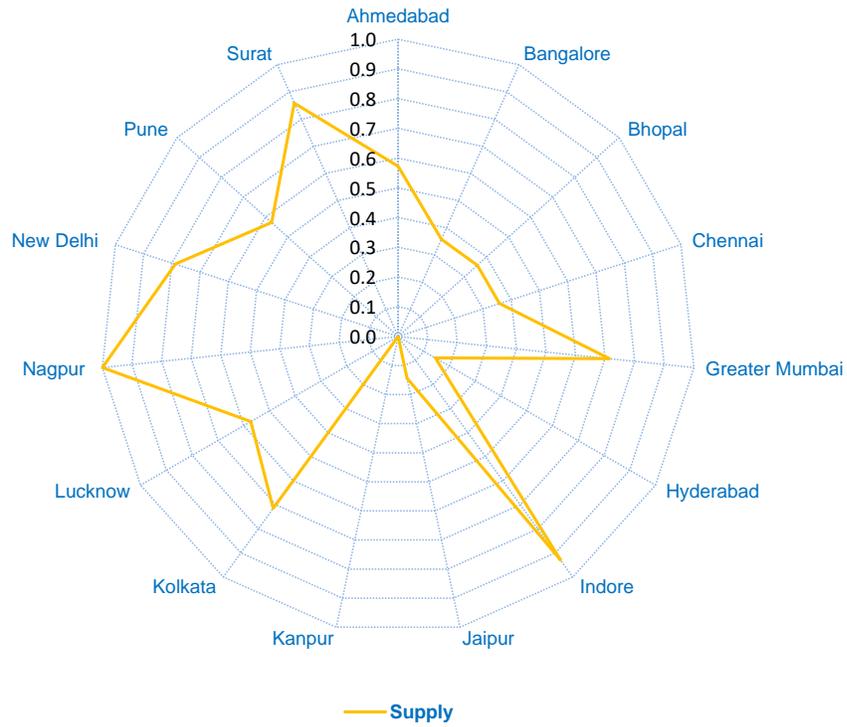


Graph: Dynamics of Correlation of Sector

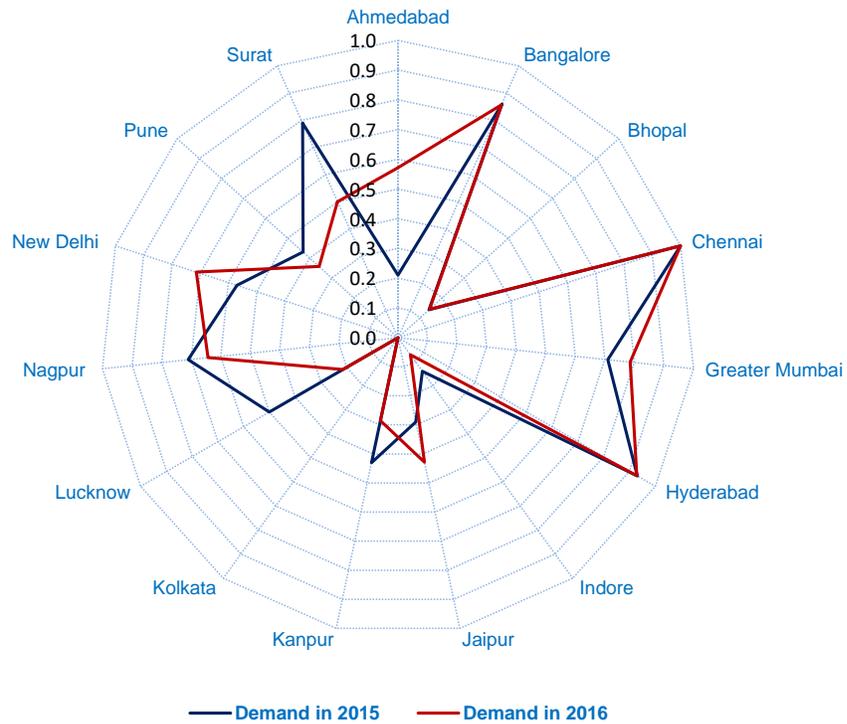
	Transport	Finance	Retail	Healthcare	Education	Administration	Media
Correlation 2015	0.04656	-0.20118	-0.06071	0.71719	-0.44489	-0.10186	NA
Correlation 2016	0.30263	-0.29643	0.02143	0.65966	-0.10436	-0.15741	-0.0829

III. DIGITAL LIFE DIMENSIONS

Graph: Digital Supply in Administration



Graph: Digital Demand in Administration



Administration

To assess the functionality of the city web portal/ municipal websites, 13 services were considered in the administration segment. These 13 services were further broken down into 26 distinct components, and we assessed how many of these were offered through city web portals/ online platforms.

Supply: Nagpur provided the largest number of administrative services such as payment of water bills, property taxes, venue booking, land and building services, online registration of birth and death certificates, etc., followed by Indore, Surat and Delhi.³ On the other side of the spectrum, Kanpur, Jaipur and Hyderabad are the bottom three cities offering the least number of services online (online registration of death and birth, and online property taxes through a web portal).

Demand: Chennai, Hyderabad and Bangalore have high demand for administrative services that can be offered on an online platform. Overall, the demand for online availability of administrative services increased for most of the cities in

both 2015 and 2016. These include Ahmedabad, New Delhi, Greater Mumbai and Jaipur. Some cities like Nagpur, Indore, and Surat recorded a decline in demand for services during the corresponding period.

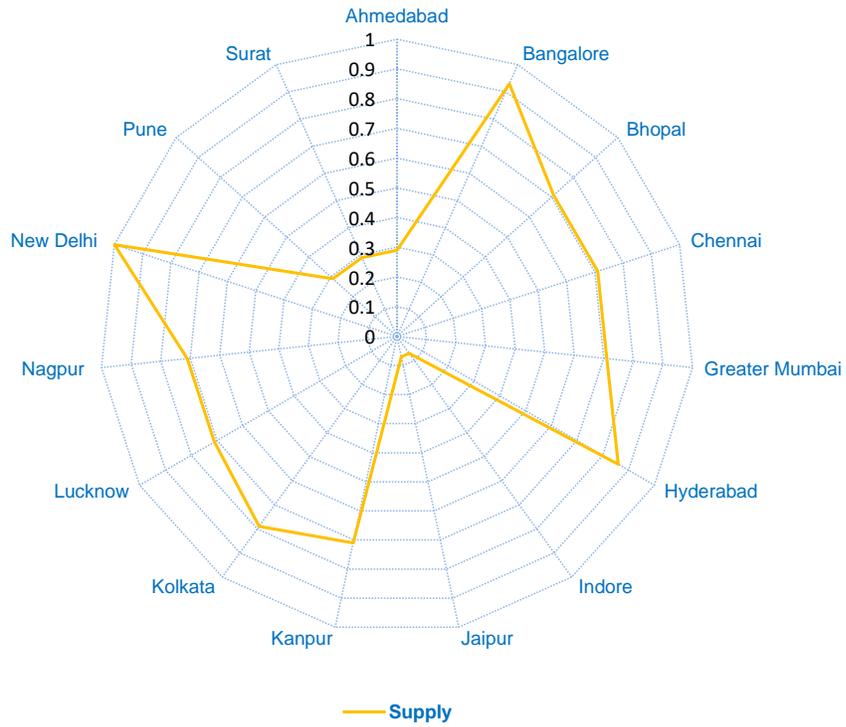
Correlation: The demand for administrative services offered through websites/ online portals far outstrips the available supply. Even though some cities have taken the lead in providing such services, most offer few services through their websites. The study shows a negative correlation coefficient of -0.1 in 2015 and -0.15 in 2016 between demand and supply. This means that cities have a high demand for services but tend to have a low supply.

The “Digital India” programme promises to take good governance practices to the people to ensure effective functioning of the local and central governments using the ICT platform.

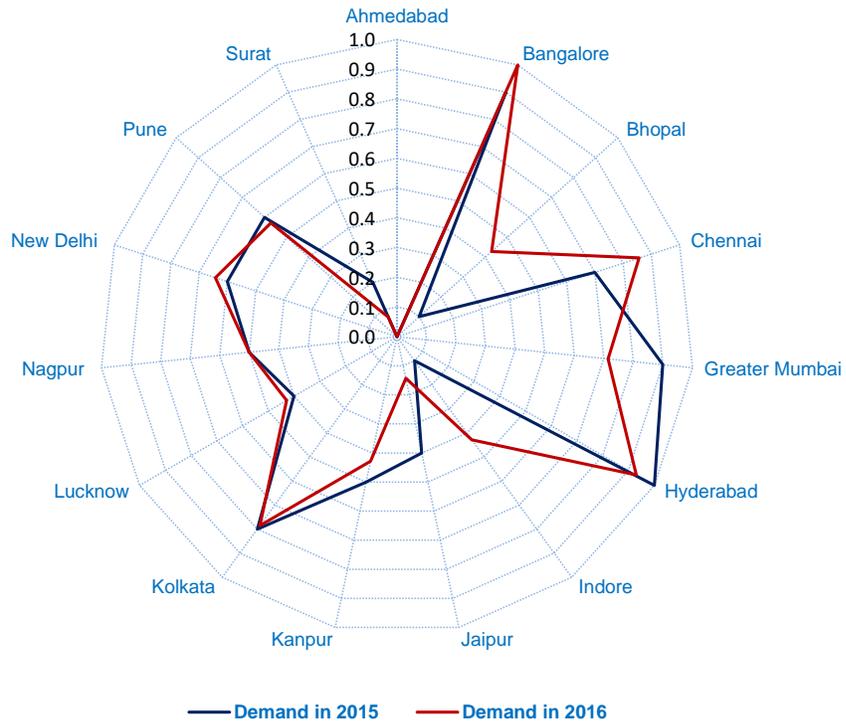
Government to citizen services in the urban landscape include electronic tax payments for property and utilities (water, electricity, estate, etc.), building plans and permission services, registration services (birth, marriage and death certificates and electric crematorium services), and electronic healthcare services (vaccinations, hospitalisation, emergency and disaster management), among others.

³ Delhi has five municipalities – New Delhi Municipal Corporation, three Municipal Corporations of Delhi (South, East and North) and Delhi Cantonment Board. These municipalities have different jurisdictional areas in Delhi. The study collated the services offered by these municipalities before taking an average for services offered in Delhi. If only New Delhi Municipal Corporation was considered, the city would score the highest in terms of services offered online.

Graph: Digital Supply in Health



Graph: Digital Demand in Health



Health

For the health segment, we looked into medical and related services offered by city-based public hospitals through an online platform/ web portal. The study focused on seven distinct services and assessed how many of these services were offered by hospitals through their websites. Three public hospitals were considered for each city. It also looked into the availability of web-based consultancy services for doctors and telemedicine in the 15 selected cities.⁴

Supply: Public hospitals in Delhi provided the highest number of services through their websites/ web portals of all the cities, followed by Bangalore and Hyderabad. These services included online portals for OPD services, online appointments for new patients and follow-up patients, patients' admission history, online lab report facilities, online video consultation, etc. As against this, public hospitals in Indore and Jaipur offered the least number of services.

Demand: Mega cities like Delhi, Kolkata, and Bangalore with swelling populations

and stretched healthcare resources have high demand for healthcare and related services in 2015 and 2016. Other cities that recorded an increase in demand for healthcare and related services include Pune, Jaipur and Greater Mumbai.

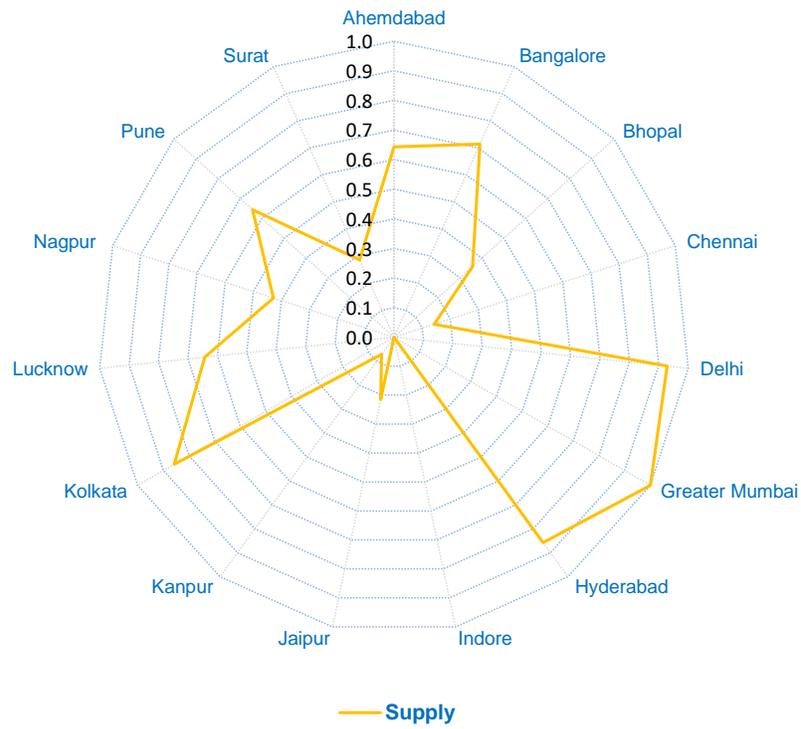
Correlation: The demand for availability of doctors and hospitals, scheduling online appointments, and availability of pharmacies and medicines is huge in most Indian cities. There is a slight decline in the correlation between supply and demand for healthcare services from 0.72 in 2015 to 0.66 in 2016. In the years to come, with more systems and better infrastructure in place, the demand for these services is expected to rise.

Universal access to high-quality healthcare is one of the greatest challenges for India.

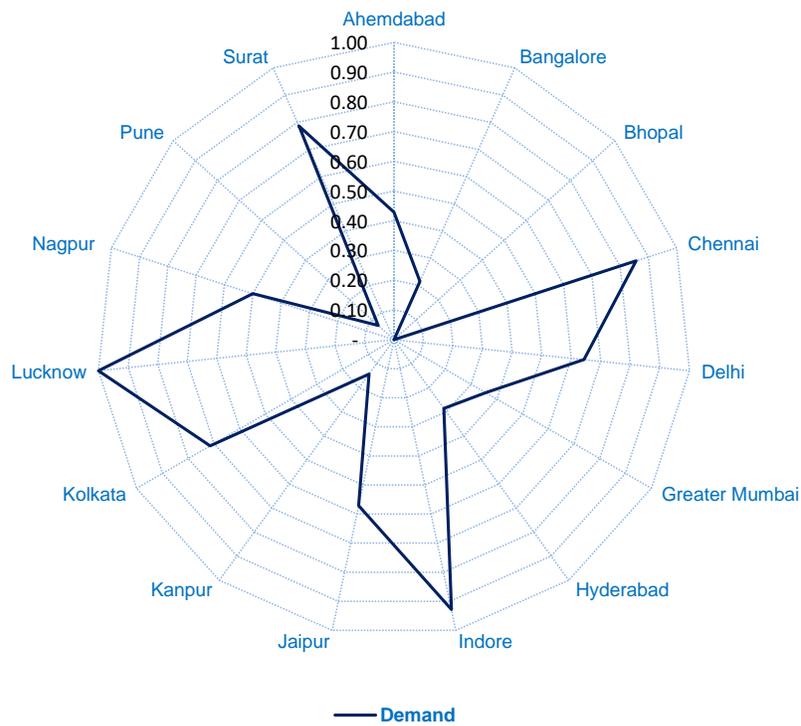
The future of e-healthcare services depends on technologies like health informatics, mobile technology, cloud systems, ultra-fast scans, wearable technologies, digital diagnostics (accessibility), digital therapy, etc. Access to these and other related technologies will prove invaluable in improving the quality of healthcare systems in India.

⁴ Note: For supply, most recent data available has been considered. The supply side data has been accessed through city public hospitals' website. Demand side data for 2015 and 2016 has been derived using key search words relating to online doctor scheduling, doctor appointment, medicine availability, hospitals, etc. The demand side data has been generated using Google Trends. The correlation coefficient has been derived for Demand 2015 and Demand 2016 vis-à-vis the available supply.

Graph: Digital Supply in Media



Graph: Digital Demand in Media



Media

To assess digital/ online penetration of media, we looked at 80 different newspapers in seven different languages. The newspapers were carefully selected, and each has an online web portal and can be accessed digitally.⁵

Supply: The largest number of newspapers out of the selected newspapers are published in Greater Mumbai, followed by New Delhi, Hyderabad and Kolkata.

Demand: To assess the demand for the selected newspapers /publications, we looked at their Twitter and Facebook follower numbers. Also, it was assumed that the followers were in the city where the newspapers were published. The number of Twitter and Facebook followers was then normalised with the population of each city. Bhopal and Jaipur scored highest on the demand metric.

Correlation: Most media agencies continue to focus on using the traditional route (print and television) to reach out to their readers. The demand for digital access to newspapers is beginning to pick up. With

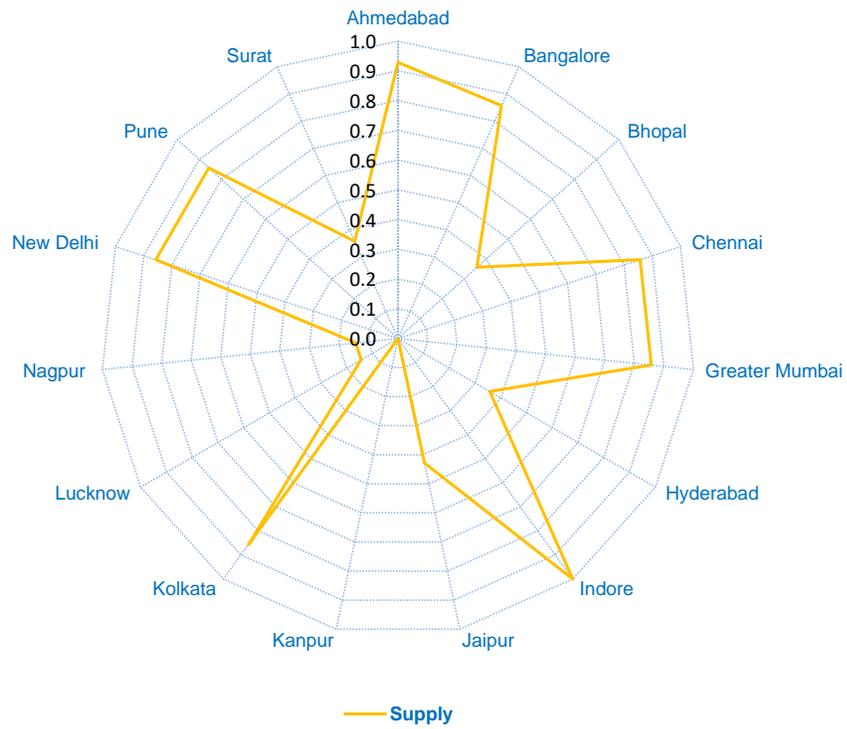
greater internet penetration and a greater focus on providing news/ information on-the-go, this will change going forward. The supply-demand correlation for 2016 stood at -0.08.

Online media consumption happens through browsing websites and applications including calls, video calls, messages, emails, photos, videos, games, blogs, podcasts, e-books, e-newspapers, e-journals and magazines, e-docs (personal and office), webinars, etc.

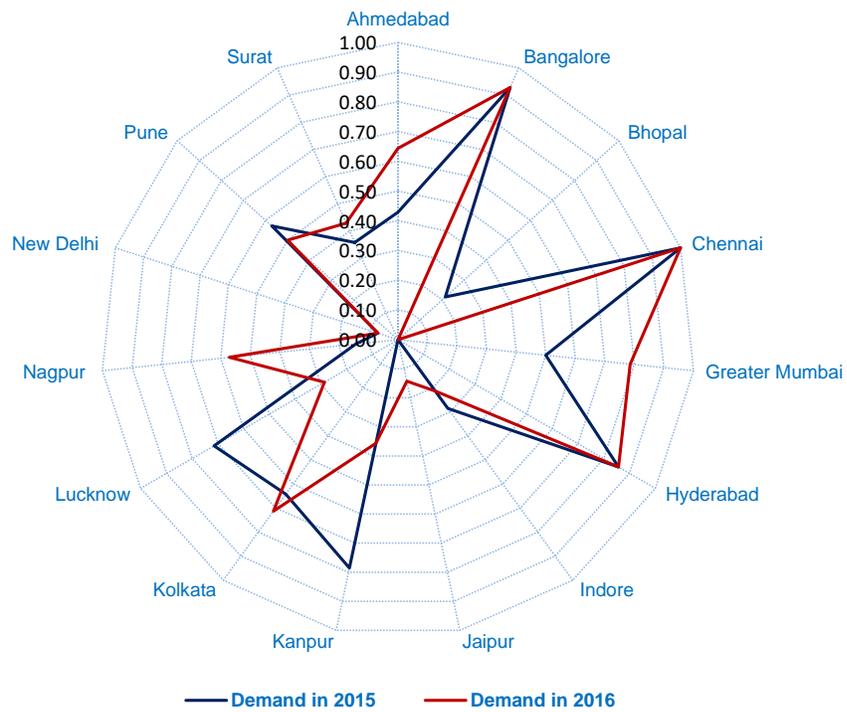
Going forward, online media consumption will grow exponentially with the increasing number of smartphone and internet users in India.

⁵ Note: For supply, 80 newspapers with digital accessibility have been considered. Demand side data has been derived by aggregating the normalised number of Twitter and Facebook followers for each publication for each city. Demand side data is only available for 2016. The correlation coefficient has been derived for Demand 2016 vis-à-vis the available supply.

Graph: Digital Supply in Transport



Graph: Digital Demand in Transport



Transport

The transport segment had four distinct parameters. These include availability of online public transport schedules (trains, metros, BRTS, buses), presence of online cab aggregators and online booking, availability of electronic displays at transit stations and availability of local transport schedules on city transport agencies' websites.⁶

Supply: Mega cities like New Delhi, Greater Mumbai, Bangalore and Kolkata have more options for urban transport services/ mobility and score high on the supply index. Indore and Ahmedabad also score high due to the good performance of their existing public transport services.

Demand: The demand for digital information on transportation services is high for Chennai, Bangalore and Hyderabad for both 2015 and 2016. The maximum increase in demand for queries relating to transport services in 2016 was recorded in Nagpur, Ahmedabad and Greater Mumbai.

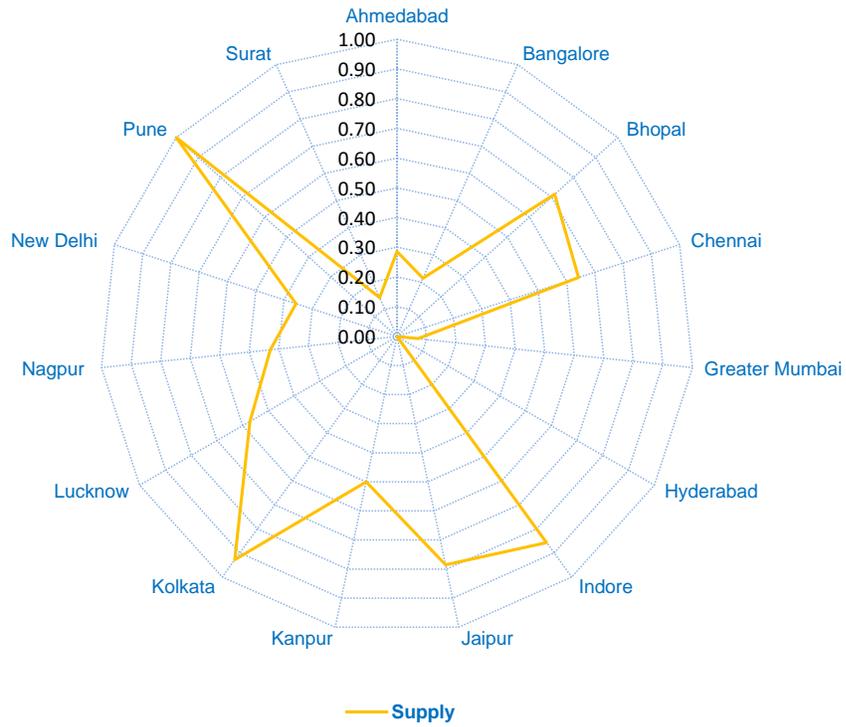
Correlation: The supply-demand correlation between 2015 and 2016 shows a healthy positive trend (0.046 in 2015 to 0.302 in 2016). This can be attributed to a higher demand for planned travel in cities and the availability of different modes of transport services — metro, buses and BRTS.

The accessibility, performance and comfort of public transport systems contribute significantly to the quality of life, productivity and healthy environment of a city.

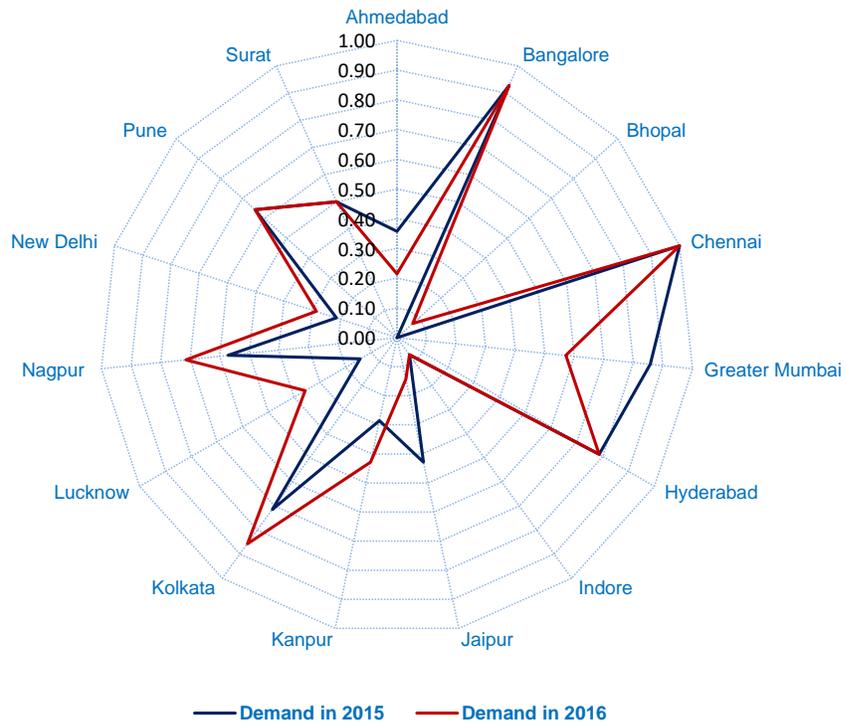
The performance of existing public transport systems can be improved using a variety of technological solutions. Technology solutions have been employed across the globe to develop online schedules and information displays at transport stops that can be updated on a real-time basis through the use of geospatial mapping and positioning systems. Analytics and artificial intelligence have been used to optimise routing of services based on the dynamic demand for ridership.

⁶ Note: For supply, the most recent data available has been considered. The supply side data has been accessed through city public transport agencies' websites. Demand side data for 2015 and 2016 has been derived using key search words relating to online public transport scheduling, ticket booking, public transport timings, route, public transport application, etc. The demand side data has been generated using Google Trends. The correlation coefficient has been derived for Demand 2015 and Demand 2016 vis-à-vis the available supply.

Graph: Digital Supply in Finance



Graph: Digital Demand in Finance



Finance

To assess the penetration of online and digital banking systems in India, five major banks were considered in the finance segment – State Bank of India, ICICI Bank, Punjab National Bank, Bank of Baroda and HDFC Bank — based on their total number of branches and their online digital banking system.

Supply: Even though Delhi and Greater Mumbai have the most branches, the number of branches⁷ per 1,000 population was found to be highest in Pune followed by Kolkata and Indore.

Demand: The demand for digital banking facilities and loan application/ disbursal facilities offered stood high for Bangalore, Hyderabad and Chennai for 2015 and 2016. Most cities, with the exception of Kanpur, Lucknow and Nagpur, recorded an increase in demand for digital banking and online loan application.

⁷ District-wise number of bank branches has been considered as a proxy for city-wise number of branches

Note: For supply, the most recent data available has been considered. Supply side data has been accessed through the respective banks' websites and other secondary sources. Demand side data has been derived using key words like online banking, digital banking, online loan application, etc. Demand side data has been generated using Google Trends. The correlation coefficient has been derived for Demand 2015 and Demand 2016 vis-à-vis the available supply.

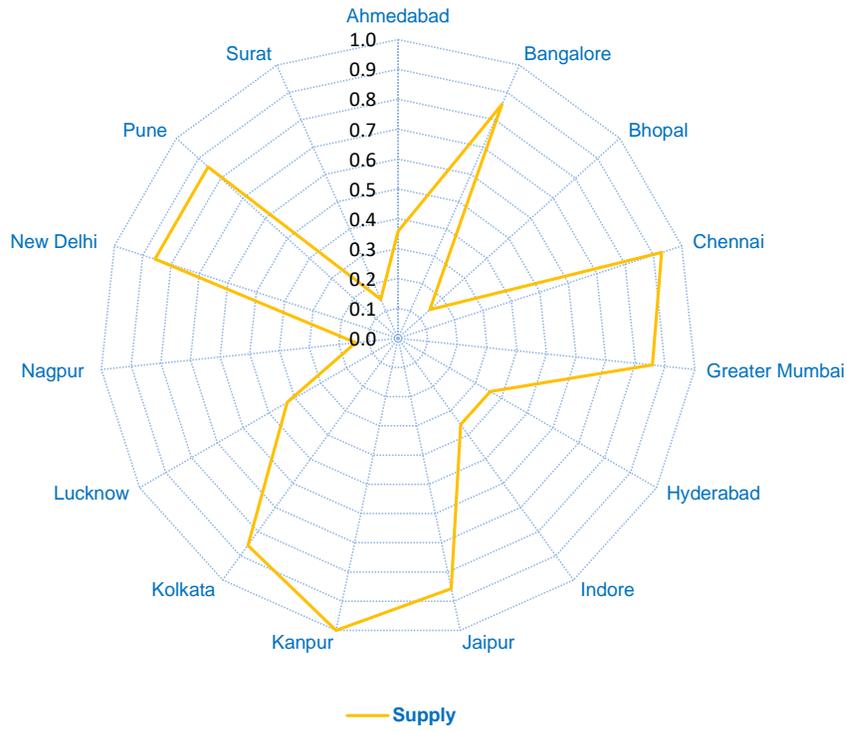
Correlation: The reserve money to broad money ratio — an indicator of the scale of cash in circulation — is high in India compared to other developing economies. Even though the push for digital and online banking has increased post-demonetisation, banks will play a key role in ensuring a greater uptake of digital and online banking systems through awareness creation and persistence. The correlation coefficient for 2015 stood at -0.20 which further declined to -0.29 in 2016.

Online or e-banking has caught the imagination of not just urban India but is also making inroads into rural India.

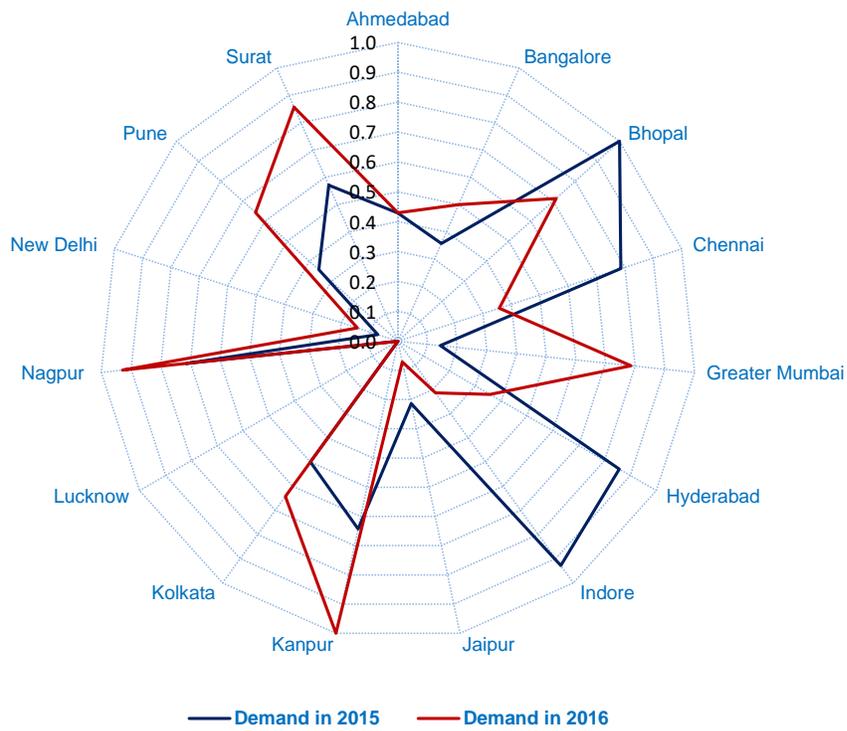
Nearly all the banks in India offer e-banking products and services including ATMs, internet & mobile/ phone banking, electronic clearing cards & services, smart cards, doorstep banking, electronic fund transfers (NEFT), etc., the benefits of which include convenience, shorter queues at banks and round-the-clock service.

Cyber security must be made robust, especially in a large and populous country such as India with millions of transactions that need to be monitored and secured from external threats.

Graph: Digital Supply in Education



Graph: Digital Demand in Education



Education

For the education segment, the National Institutional Ranking Framework 2016 was used to list universities in the 15 cities of the study. In addition, online courses offered by the Indian Institutes of Management, Indian School of Business, Indian Institute of Technology and massive open online courses (MOOC) were considered.⁸

Supply: Cities that had universities/institutes with better online infrastructure and a larger number of online courses scored high. Some of these include Kanpur (246 courses), New Delhi (167 courses), and Chennai (363 courses).

Demand: The demand for online courses is high, both in mega cities and smaller cities. Compared to 2015, there is a massive increase in demand for online courses in Surat and Nagpur in 2016. Mega cities have access to substantially better educational infrastructure and more acclaimed universities and colleges offering educational services.

Correlation: There is a positive trend in correlation between supply and demand for 2015 and 2016. For 2015, the correlation coefficient is -0.444 as against -0.104 in 2016. This trend will continue to improve as access to online resources increases.

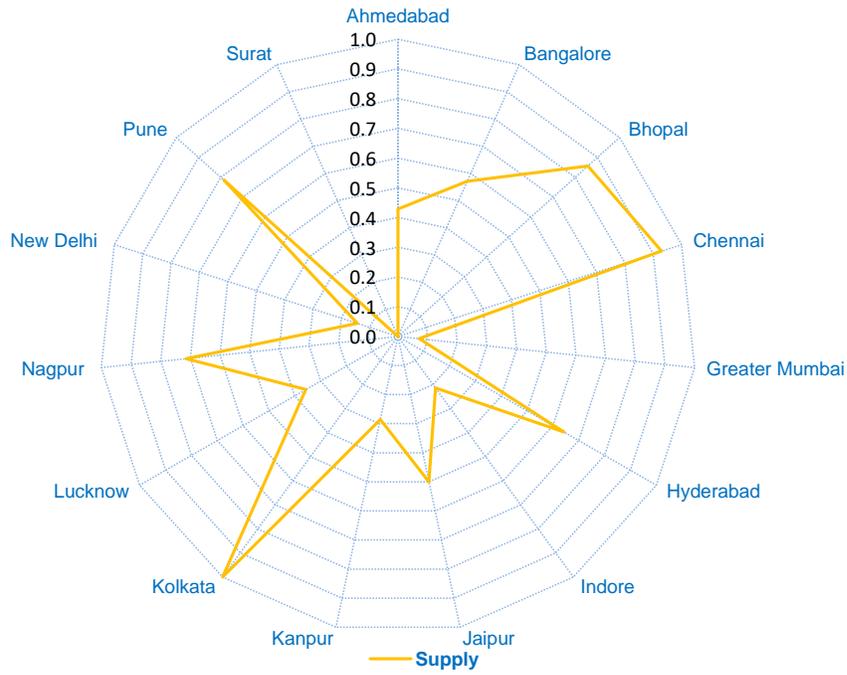
Online education is at the cusp of a digital transformation through cheaper and better devices like mobiles, tablets and computers; improved communication technologies like mobile internet and VOIP services (e.g. Skype and Line) and social networks, information sharing and communication applications.

What makes online education promising is that there are opportunities for classroom-like interaction and elements such as online laboratories, examinations and practice sessions built into the courseware. These could potentially sway the perceptions of industry towards a greater acceptance of online education on par with traditional programmes.

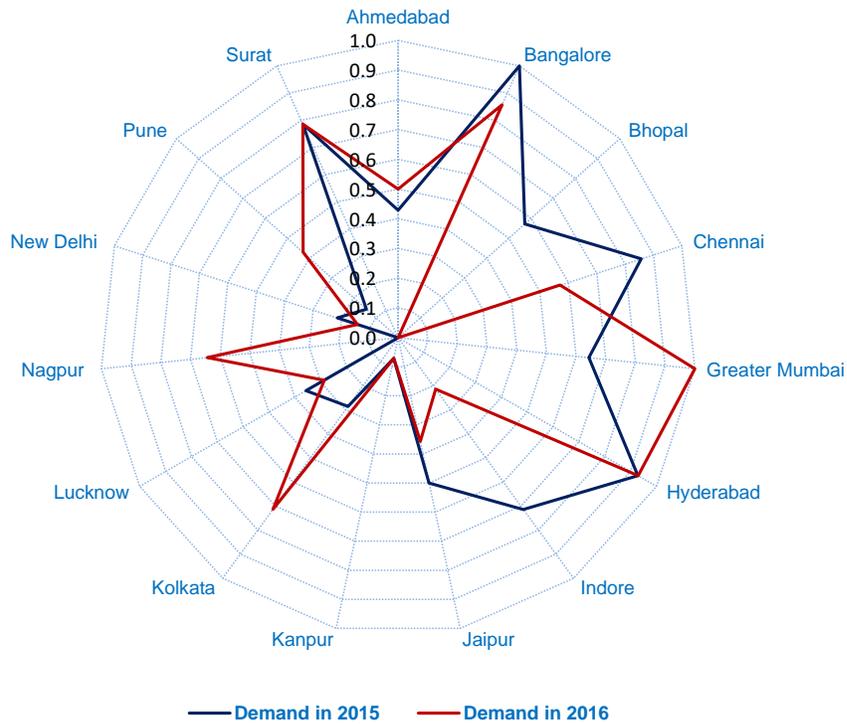
With entry, logistical and financial barriers lifted, MOOCs, with all the advantages they offer, can potentially capture a significant size of the education pie if certification and accreditation for providing quality online content is achieved through unique industry-academia partnerships.

⁸ Note: For supply, the most recent data available has been considered. The supply side data has been accessed through the National Institutional Ranking Framework 2016. Demand side data has been derived using key words like online education, online admission, online courses, online university, online college, etc. The demand side data has been generated using Google Trends. The correlation coefficient has been derived for Demand 2015 and Demand 2016 vis-à-vis the available supply.

Graph: Digital Supply in Retail



Graph: Digital Demand in Retail



Retail

Four major e-commerce entities — Amazon, Flipkart, Snapdeal and Myntra⁹ — were considered in assessing the supply and demand of retail services in 15 cities. These four e-commerce companies account for over 80% of the total market share. On the supply side, the number of delivery points, i.e., number of pin codes served per 1,000 population, was considered. On the demand side, search queries related to online shopping in the 15 cities were assessed.

Supply: Even though New Delhi has the largest number of delivery points, the number of delivery points per 1,000 population was found to be highest in Kolkata, followed by Chennai and Pune.

Demand: Retail digitalisation in India has grown at a rapid pace with many players setting up supply chains in India. Mega cities like Mumbai, Pune, Kolkata and Hyderabad continue to exhibit strong demand for online shopping. Other urban centres like Nagpur and Surat also recorded

an increase in demand for online shopping in 2016.

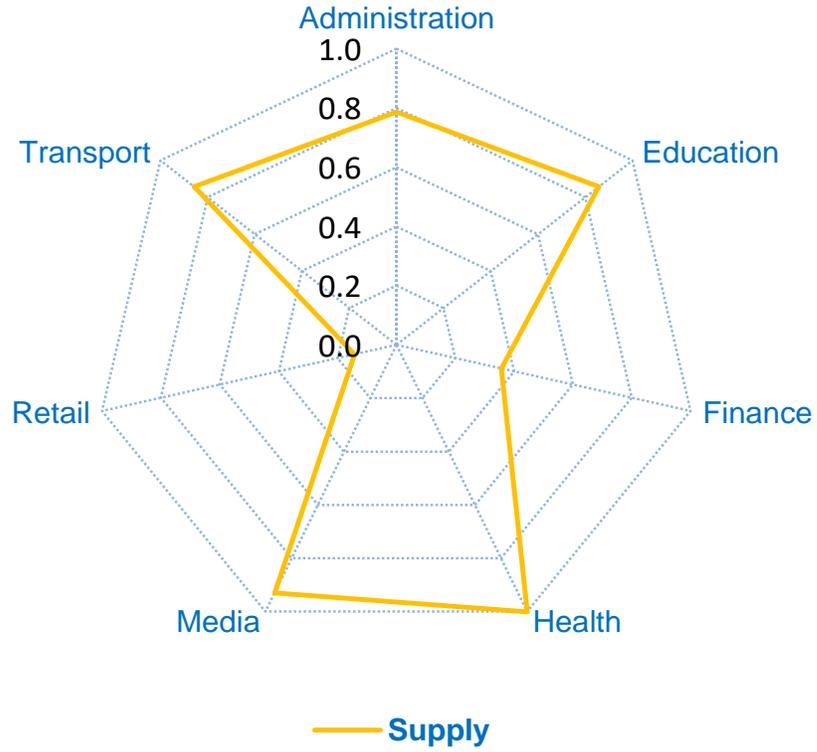
Correlation: There is a strong upward trend for online retail (demand vs. supply) for the years 2015 and 2016. The correlation increased from -0.060 in 2015 to 0.021 in 2016.

With the retail boom in India and the resulting market driven growth, global players like Amazon, eBay and Snapdeal have emerged as key players in the space, offering a range of goods and services and competing with the market leader Flipkart. The online retail market has continued to mature with the inclusion of new players who are offering niche products and retail services online and have their own customer bases and supply/ value chains. These include furniture and furnishings (Pepperfry), clothing and fashion wear (Myntra), hotel booking (Trivago), coupons for travel, food and retail (Nearbuy), online grocery shopping (Big Basket), etc. With renewed emphasis on digital payments and increased online mobility, urban India is making greater use of online platforms for shopping and making informed choices. The industry is nicely poised to make greater strides and consolidate its market further by taking a larger share away from traditional retail in the years to come.

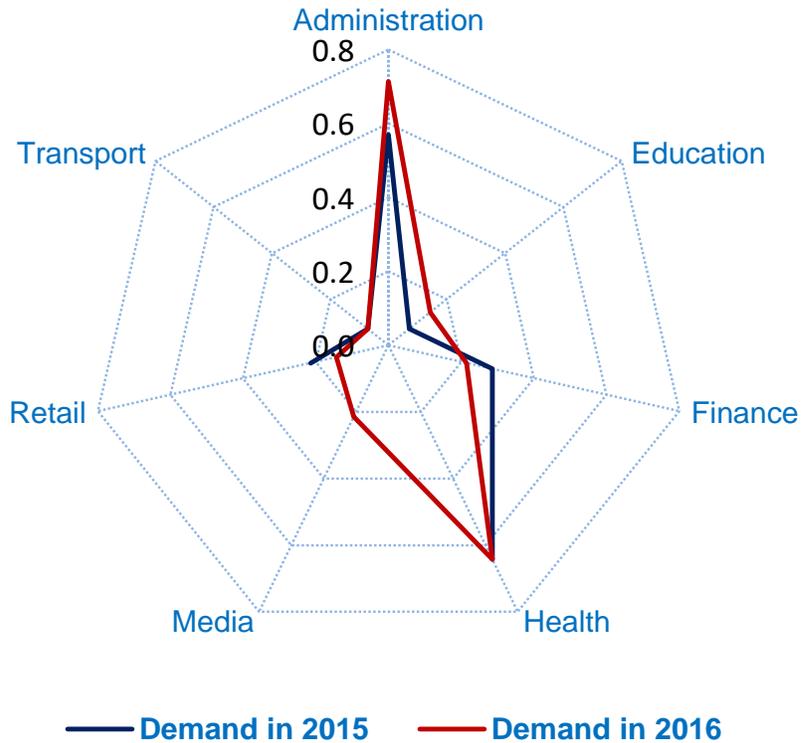
⁹ Note: For supply, the most recent data available on the number of delivery points for nine products (mobile phones, apparel, consumer durables, electronics, home furnishings, books, jewellery, cameras and other products) has been considered. Demand side data has been derived using five key words for each of the top four e-tailors. The demand side data has been generated using Google Trends. The correlation coefficient has been derived for Demand 2015 and Demand 2016 vis-à-vis the available supply.

IV. DIGITAL LIFE OF CITIES

Graph: Digital Supply in New Delhi



Graph: Digital Demand in New Delhi



1. New Delhi

Area: 1484 sq.km

Population: 13482997 (2011)

New Delhi scored high on the supply side for health, media, transport, education and administration. Growth on the demand side was slightly less in 2016 compared to 2015.

Supply: New Delhi ranked 1st in the health sector, 2nd in the media sector and 3rd in the transport sector. Its lowest ranking was in the retail sector, i.e., 13th position, and next lowest was in the finance sector, i.e. 10th position.

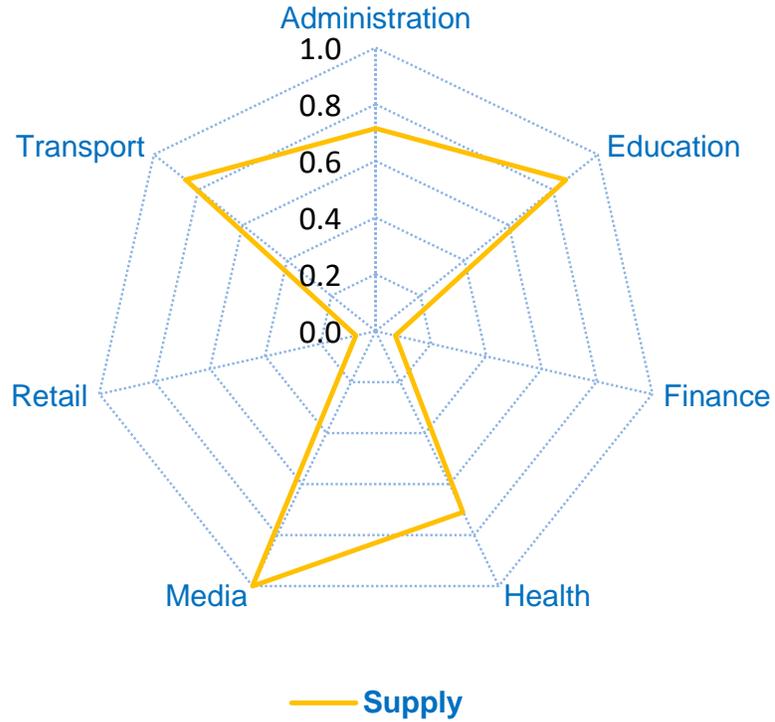


Demand: In 2016, there was a slight increase in the demand side in the education, finance and administration sectors. The demand in the health sector remained constant both in 2015 and 2016. The retail sector experienced a slightly smaller decline in demand in 2016.

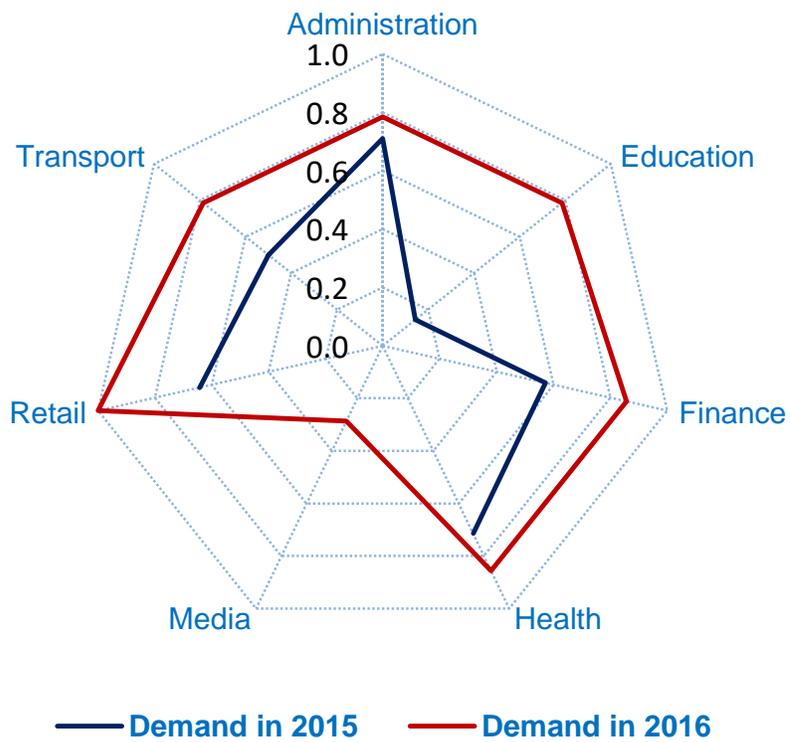
Correlation of Supply and Demand increased slightly from 0.263 in 2015 to 0.348 in 2016.

	Supply	Demand	
		2015	2016
1 st place	Health	-	-
2 nd place	Media	-	-
3 rd place	Transport	-	-

Graph: Digital Supply in Mumbai



Graph: Digital Demand in Mumbai



2. Mumbai

Area: 603.4 sq.km

Population: 12478447 (2011)

Mumbai experienced an increase in demand in all seven sectors in 2016. Demand and supply were balanced for the administration, transport and education sectors. There was a huge gap between demand and supply in the retail and finance sectors.

Supply: Mumbai ranked 1st in the media sector and 3rd in the transport sector. The city ranked lowest, i.e., 14th position, in the finance and retail sectors.

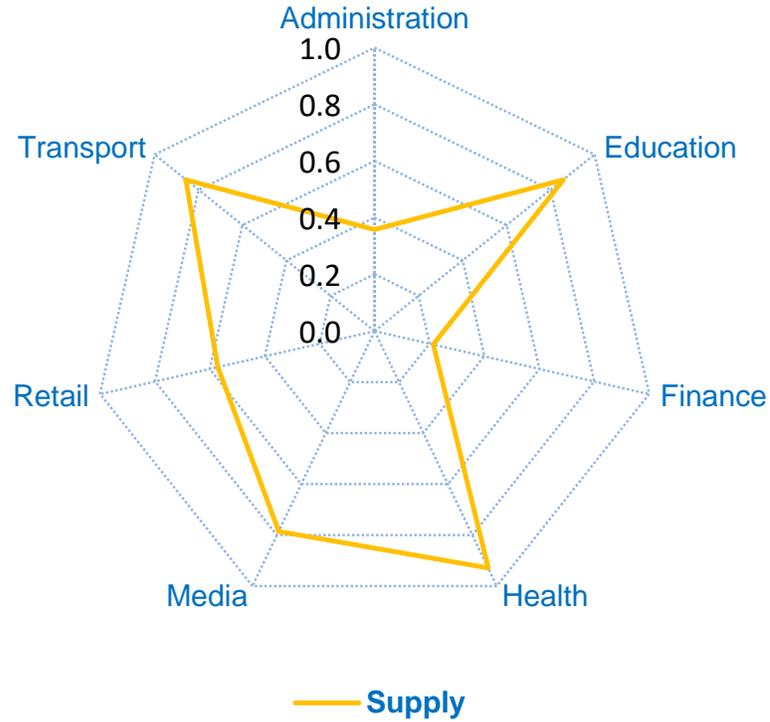
Demand: In 2016, demand in the education sector rose dramatically, whereas the finance, health, retail, transport and administration sectors experienced a moderate increase.

Correlation of Supply and Demand decreased from -0.355 in 2015 to -0.663 in 2016.

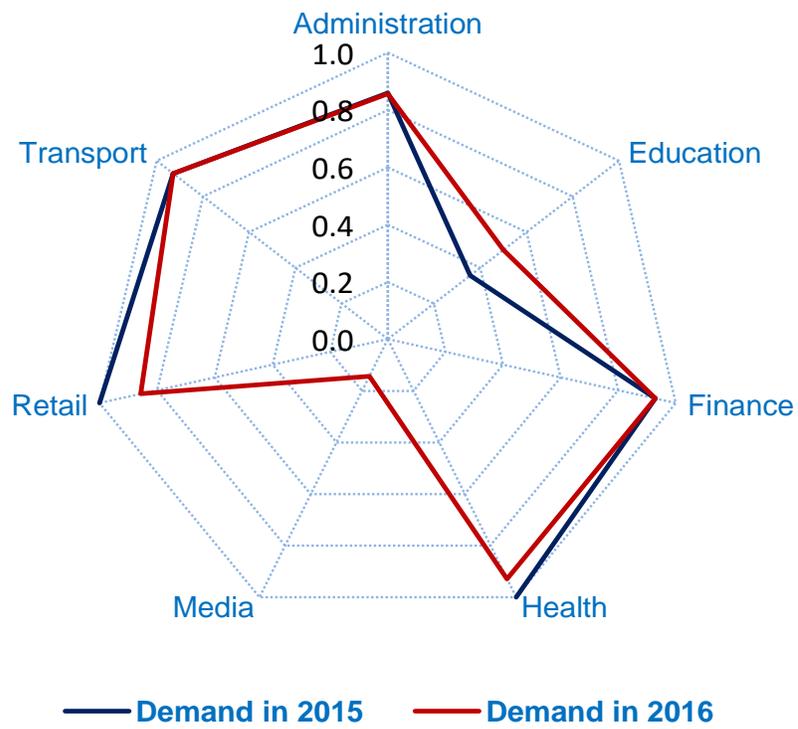


	Supply	Demand	
		2015	2016
1 st place	Media	-	Retail
2 nd place	-	-	-
3 rd place	-	-	Finance, Health

Graph: Digital Supply in Bangalore



Graph: Digital Demand in Bangalore



3. Bangalore

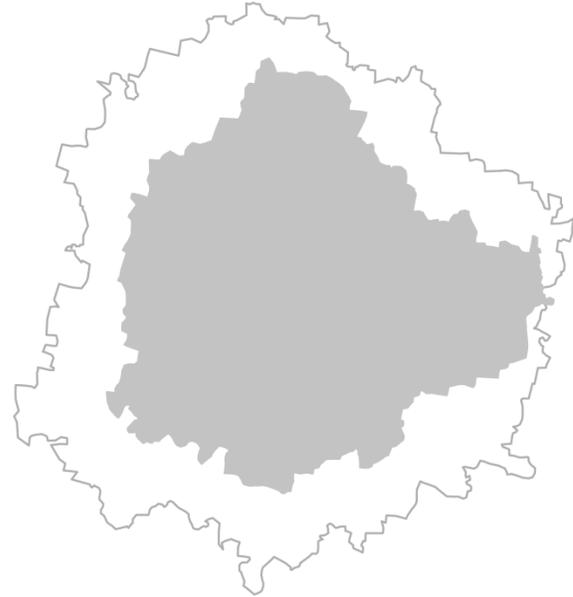
Area: 800 sq.km

Population: 8425970 (2011)

The transport and health sectors in the city were well balanced in terms of both demand and supply, whereas there was a gap between demand and supply in sectors like media and finance.

Supply: Bangalore ranked 2nd in the health sector and 3rd in the education and transport sectors. The city ranked low in the administration and finance sectors, i.e., 10th and 12th position, respectively.

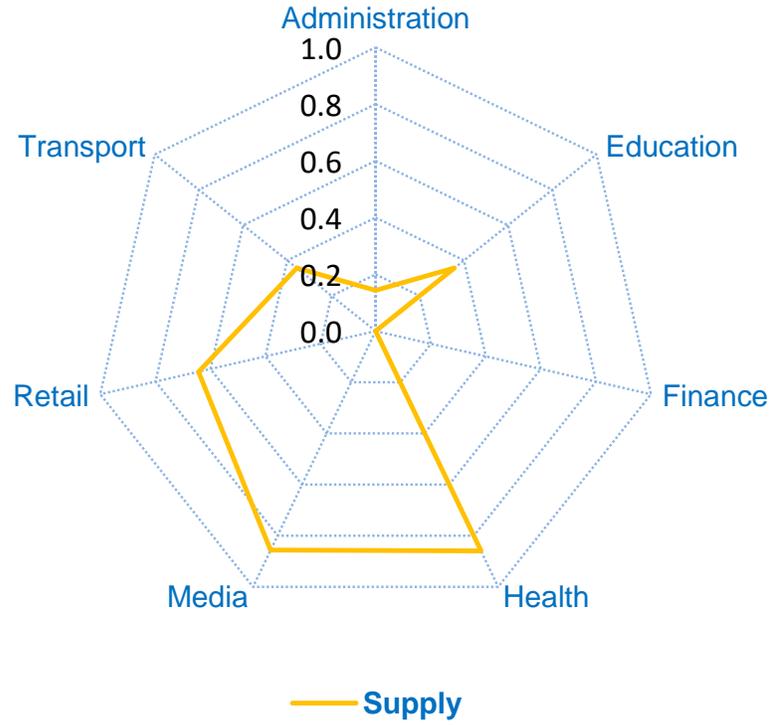
Demand: There was a significantly larger demand for services in the administration and finance sectors, whereas other sectors such as retail and transport saw smaller growth in demand.



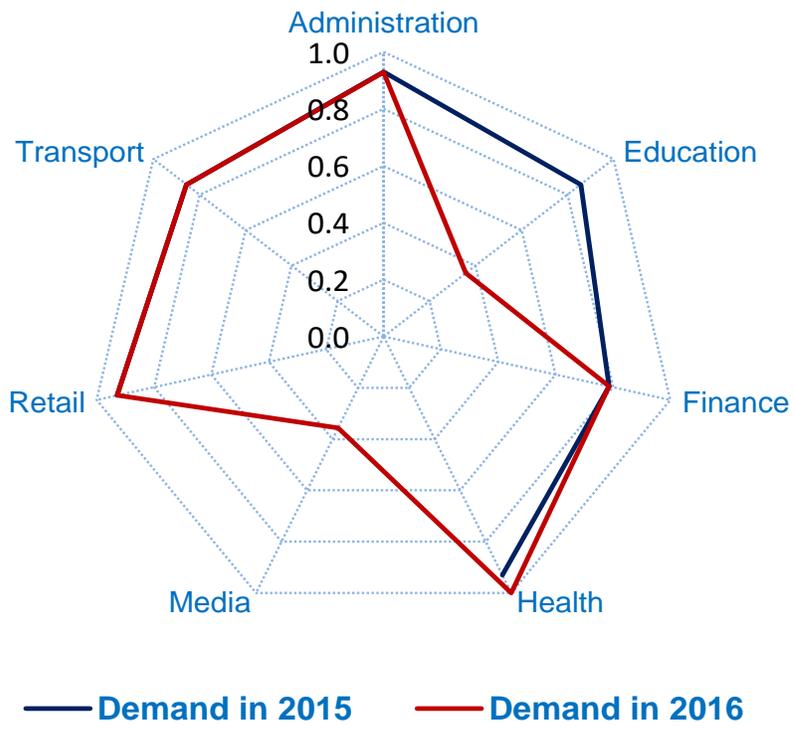
Correlation of Supply and Demand decreased from -0.256 in 2015 to -0.356 in 2016.

	Supply	Demand	
		2015	2016
1st place	-	Health, Retail	-
2nd place	Health	Finance, Transport	Finance, Health, Transport
3rd place	Transport	Administration	Administration, Retail

Graph: Digital Supply in Hyderabad



Graph: Digital Demand in Hyderabad



4. Hyderabad

Area: 650 sq.km

Population: 6809970 (2011)

There was a big gap between demand and supply in Hyderabad.

Supply: Hyderabad ranked the lowest in the finance sector in 15th position, and also had low rankings in administration (13th position), education (11th position) and transport (10th position). The city did better on the supply side in the health and media sectors, ranking 3rd in both.

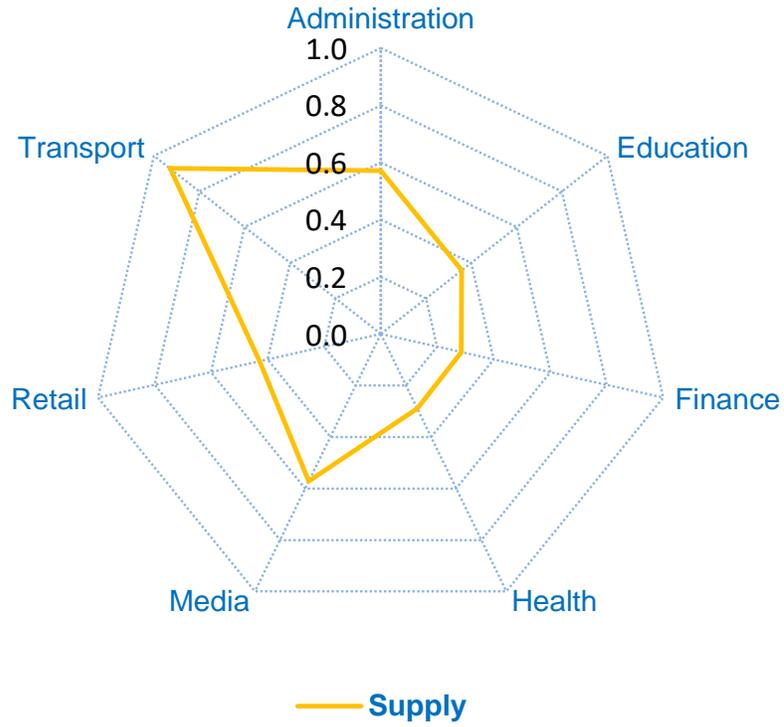


Demand: The education sector showed a decline in demand in 2016 as compared to 2015. However, the city showed fairly high demand in other sectors such as administration, finance, retail and transport.

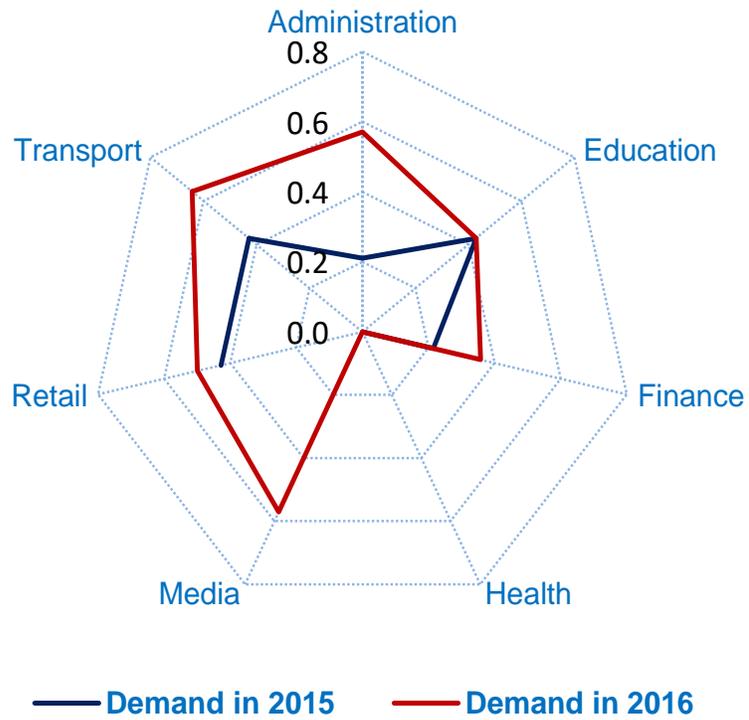
Correlation of Supply and Demand decreased sharply, reversing the sign to negative from 0.664 in 2015 to -0.121 in 2016.

	Supply	Demand	
		2015	2016
1st place	-	-	Health
2nd place	-	Administration, Health, Retail	Administration, Retail
3rd place	Health, Media	Education, Transport	Transport

Graph: Digital Supply in Ahmedabad



Graph: Digital Demand in Ahmedabad



5. Ahmedabad

Area: 464.64 sq.km

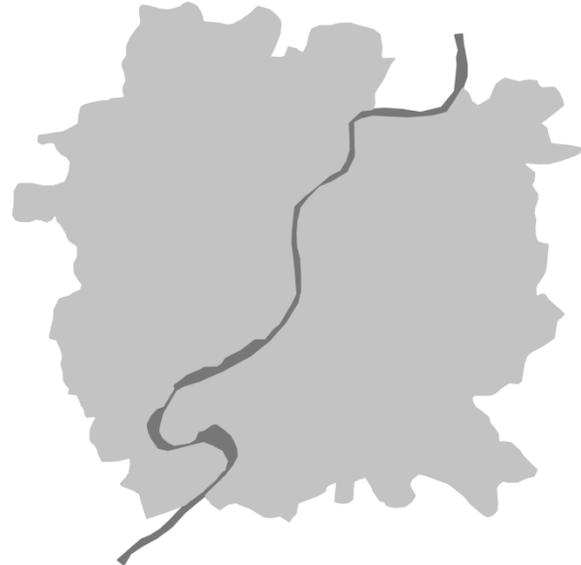
Population: 5570585 (2011)

There was a fair increase in demand for several sectors in Ahmedabad; however, there was a contrast in demand and supply for health and transport. Both of these sectors showed a decrease in demand.

Supply: Ahmedabad ranked 2nd on the supply side in the transport sector; its lowest rankings were in the finance and health sectors (11th position).

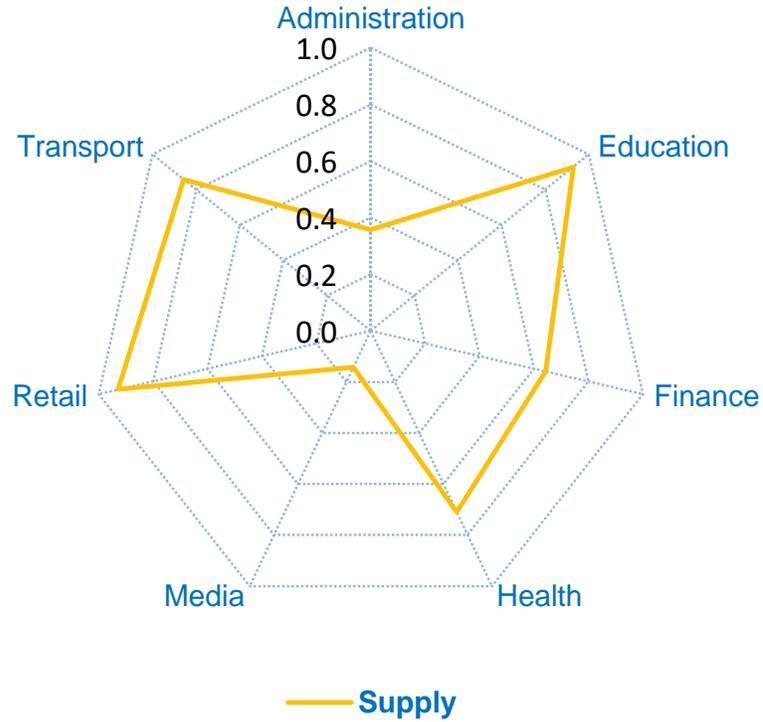
Demand: Demand in 2016 increased in the retail, transport, finance and administration sectors when compared to demand in 2015.

Correlation of Supply and Demand increased from 0.466 in 2015 to 0.725 in 2016.

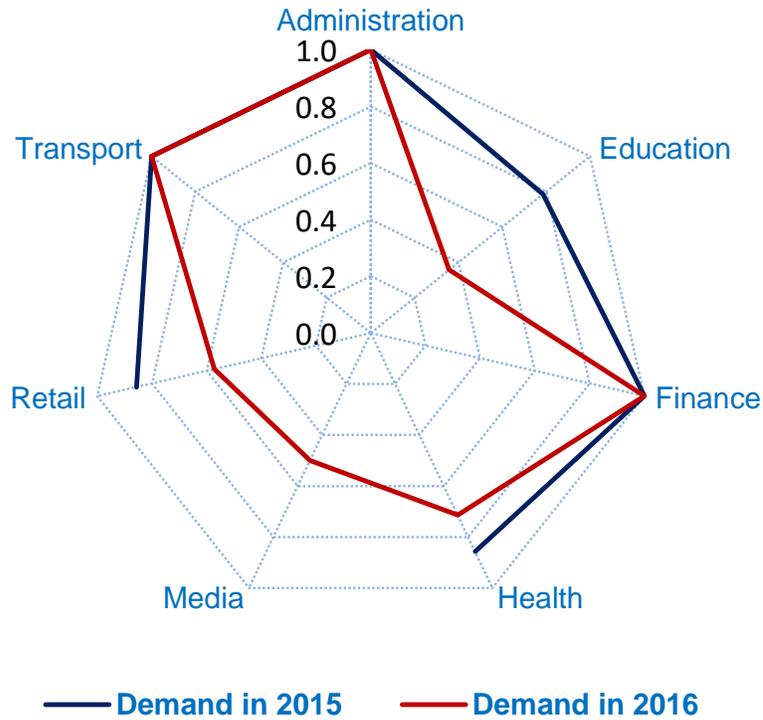


	Supply	Demand	
		2015	2016
1 st place	-	-	-
2 nd place	Transport	-	-
3 rd place	-	-	-

Graph: Digital Supply in Chennai



Graph: Digital Demand in Chennai



6. Chennai

Area: 426 sq.km

Population: 4681087 (2011)

The city experienced a growth in demand in most of the sectors.

Supply: Chennai ranked 2nd in the education and retail sectors and 3rd in transport. The city ranked relatively low in the administration sector (10th position) and media sector (13th position).

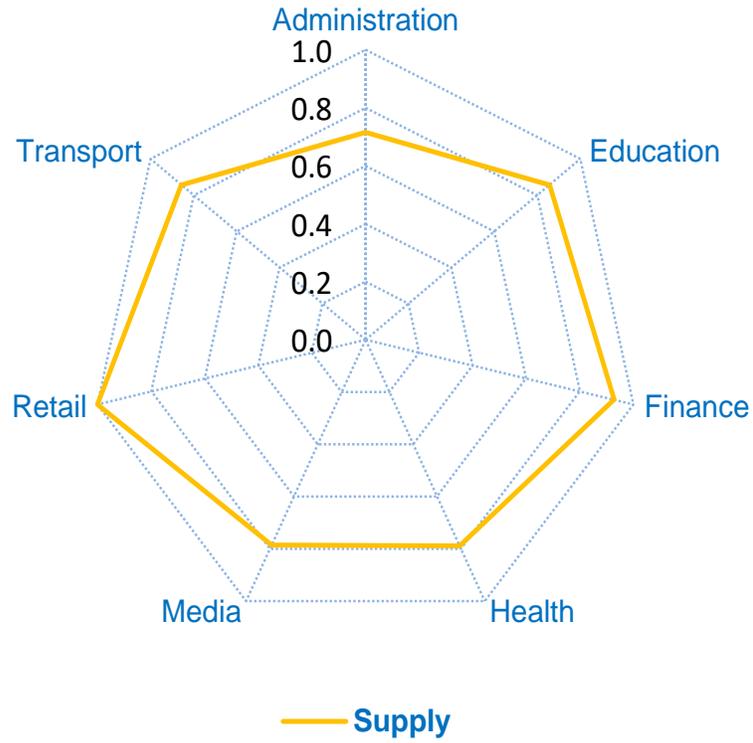
Demand: The city showed increased demand in all sectors except retail and education. It ranked 1st on the demand side in the administration, finance and transport sectors both in 2015 and 2016. The education sector showed a decline in demand in 2016.



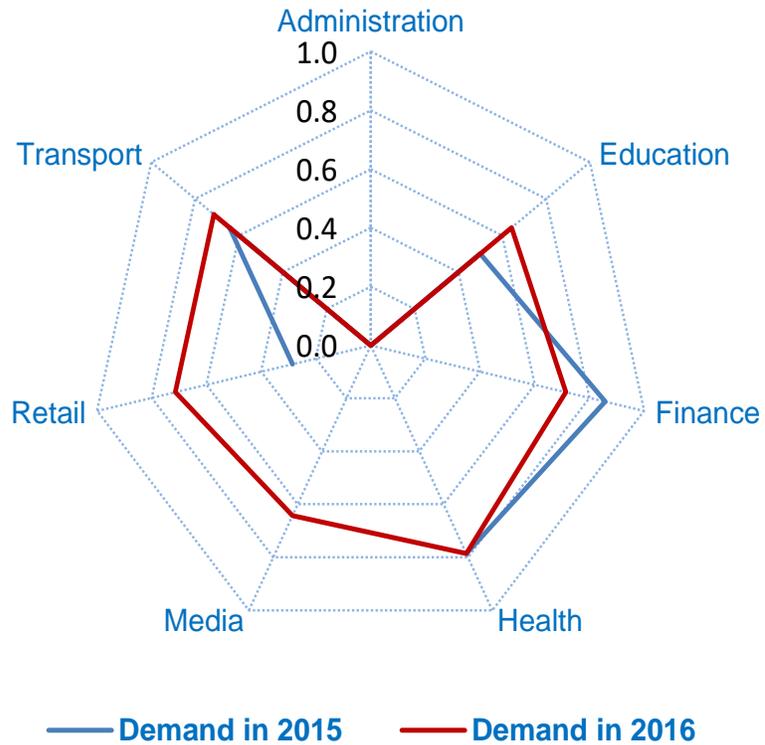
Correlation of Supply and Demand increased from -0.617 in 2015 to -0.118 in 2016.

	Supply	Demand	
		2015	2016
1st place	-	Administration, Finance, Transport	Administration, Finance, Transport
2nd place	Education, Retail	-	-
3rd place	Transport	Health, Retail	-

Graph: Digital Supply in Kolkata



Graph: Digital Demand in Kolkata



7. Kolkata

Area: 197.54 sq.km

Population: 4486679 (2011)

There was a balance between supply and demand in the transport, education, finance and health sectors in Kolkata. There was a huge gap between demand and supply in the administration sector.

Supply: Kolkata ranked 1st in the retail sector, 2nd in the finance sector and 3rd in the transport sector. Its lowest ranking was in the education sector at 7th position.

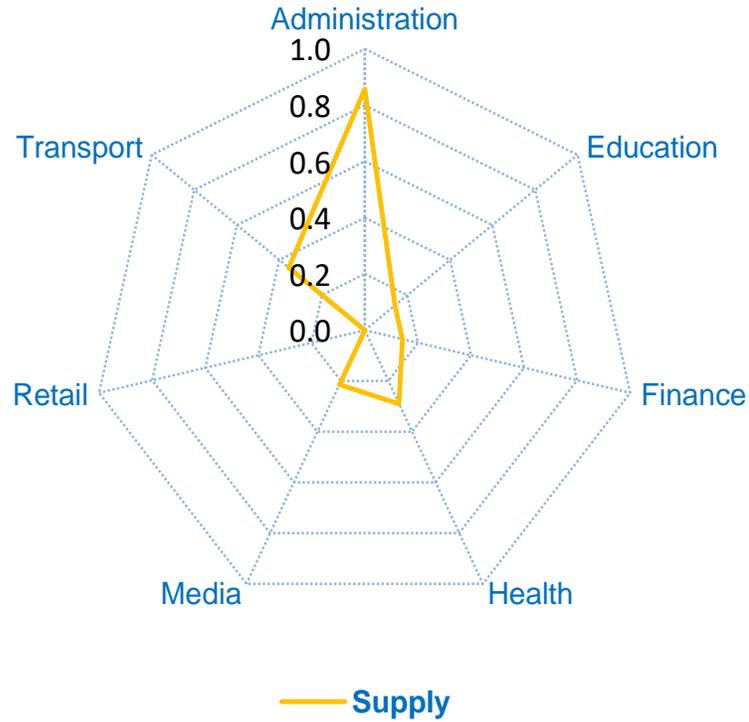
Demand: The demand was the same in 2015 and 2016 for all sectors other than education, where demand slightly increased, and finance, where demand slightly decreased.

Correlation of Supply and Demand increased from 0.288 in 2015 to 0.610 in 2016.

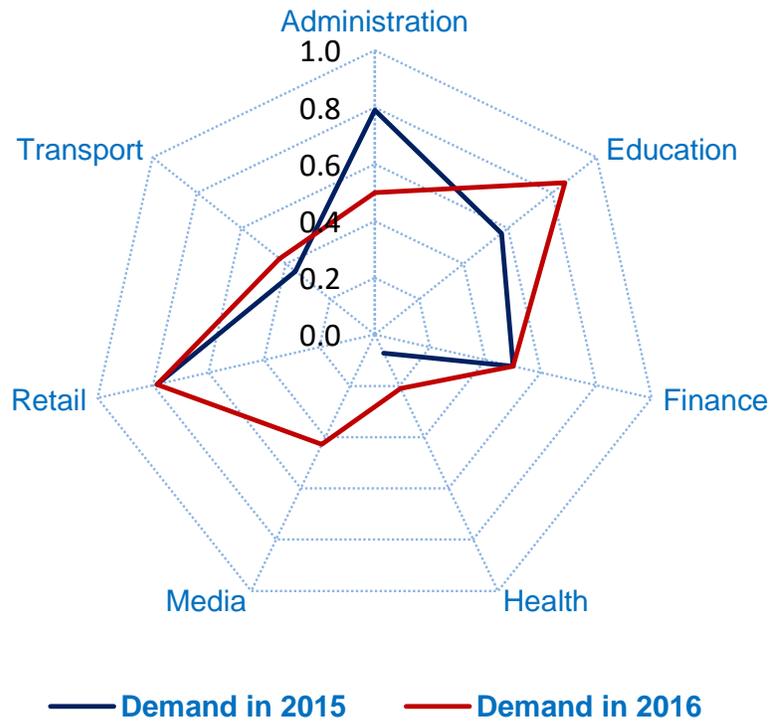


	Supply	Demand	
		2015	2016
1 st place	Retail	-	-
2 nd place	Finance	-	-
3 rd place	Transport	Finance	-

Graph: Digital Supply in Surat



Graph: Digital Demand in Surat



8. Surat

Area: 335.82 sq.km

Population: 4462002 (2011)

The city had a large demand and supply gap. There was huge demand in the retail sector but supply was very low. Similarly, demand was higher than supply in the education and finance sectors.

Supply: The city ranked 3rd in the administration sector, while the rest of the sectors ranked low. It ranked lowest in the retail sector at 15th position.

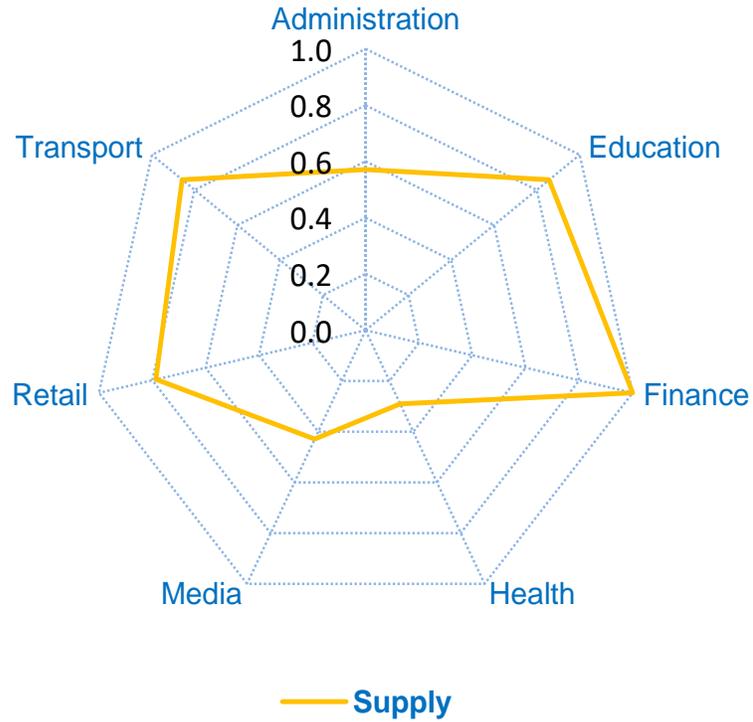
Demand: The city witnessed demand in each sector. The demand in the education sector increased in 2016 whereas demand in the administration sector slightly decreased in 2016.



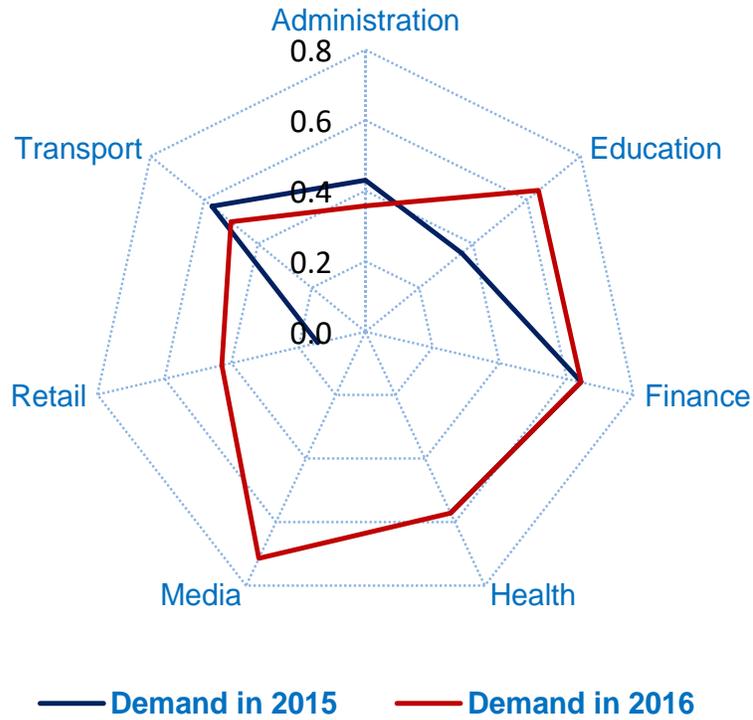
Correlation of Supply and Demand decreased sharply from 0.149 in 2015 to -0.362 in 2016, reversing the sign to negative.

	Supply	Demand	
		2015	2016
1 st place	-	-	-
2 nd place	-	-	-
3 rd place	Administration	-	Education

Graph: Digital Supply in Pune



Graph: Digital Demand in Pune



9. Pune

Area: 700 sq.km

Population: 3115431 (2011)

The city showed gaps in demand and supply in several sectors. Demand and supply in the education sector remained constant, but sectors such as transport, administration, finance and retail experienced a decline in demand.



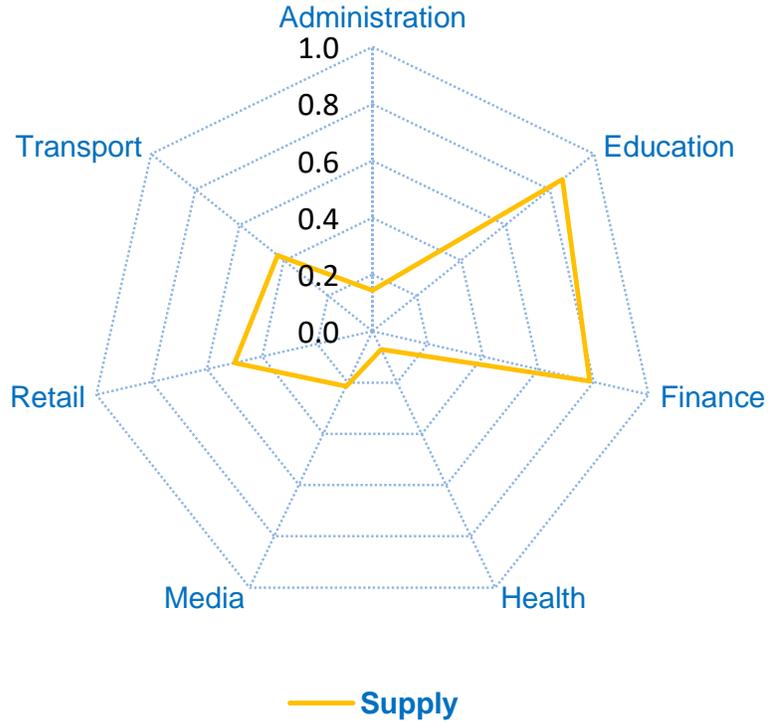
Supply: Pune ranked 1st in the finance sector and 3rd in the transport sector. The city ranked lowest on the supply side in the health sector (11th position).

Demand: Demand in the education and retail sectors increased in 2016, whereas demand in the finance and health sectors remained constant. Demand in the transport and administration sectors showed a gradual decline.

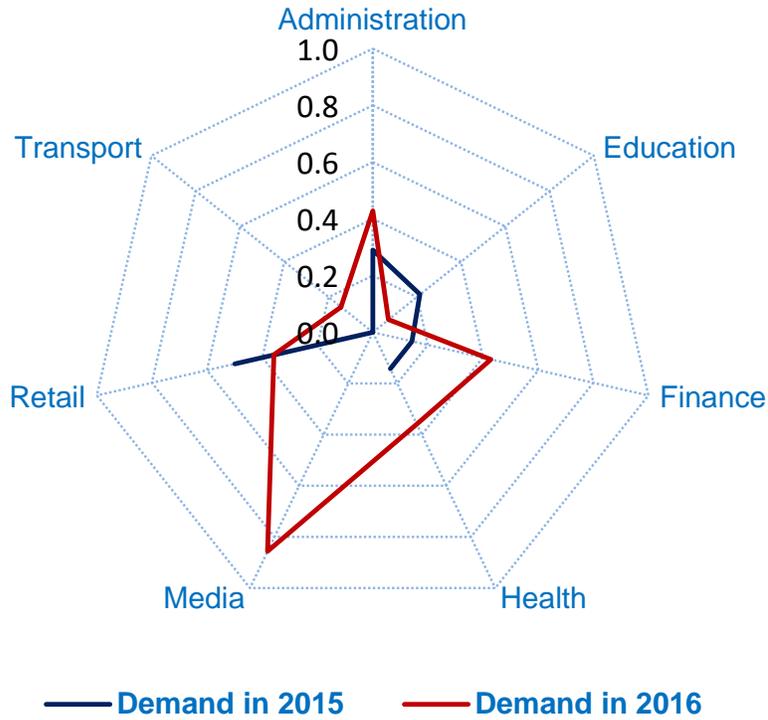
Correlation of Supply and Demand increased from -0.049 in 2015 to -0.022 in 2016.

	Supply	Demand	
		2015	2016
1 st place	Finance	-	-
2 nd place	-	-	-
3 rd place	Transport	-	-

Graph: Digital Supply in Jaipur



Graph: Digital Demand in Jaipur

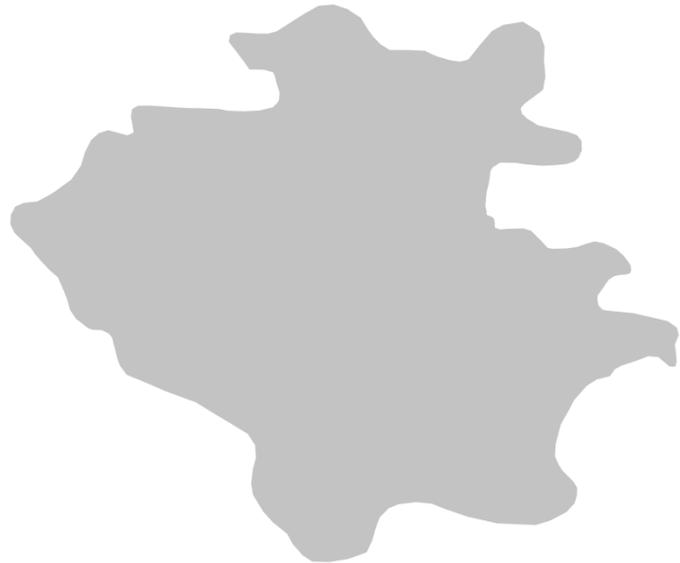


10. Jaipur

Area: 484.64 sq.km

Population: 3073350 (2011)

The city had a huge gap in demand and supply in the finance and education sectors in Jaipur. The administration and media sectors showed an increase in demand compared to supply.



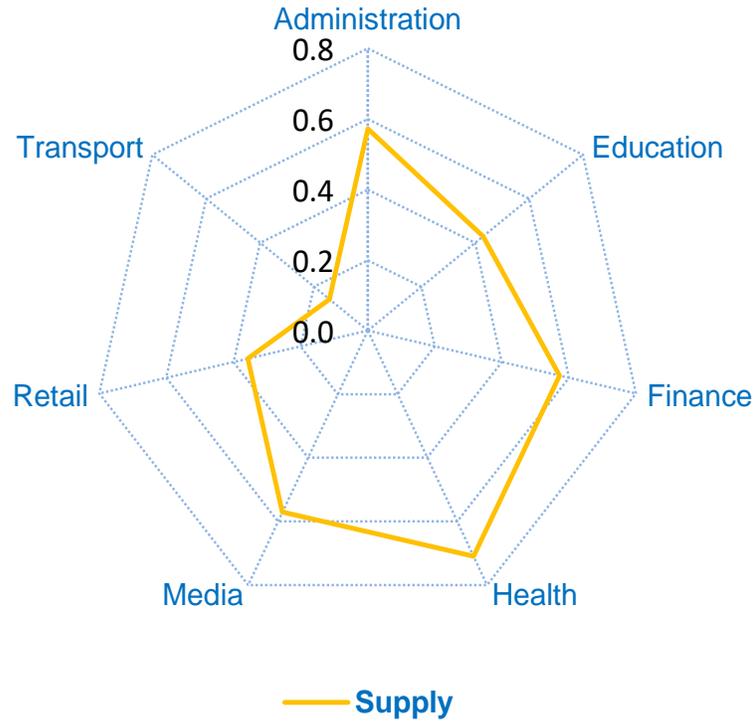
Supply: On the supply side, the city ranked 8th and 4th in the education and finance sectors, respectively. It ranked relatively low in other sectors, with its lowest ranking in the health sector.

Demand: The demand in the media sector increased significantly, whereas demand in the administration, finance and health sectors increased slightly.

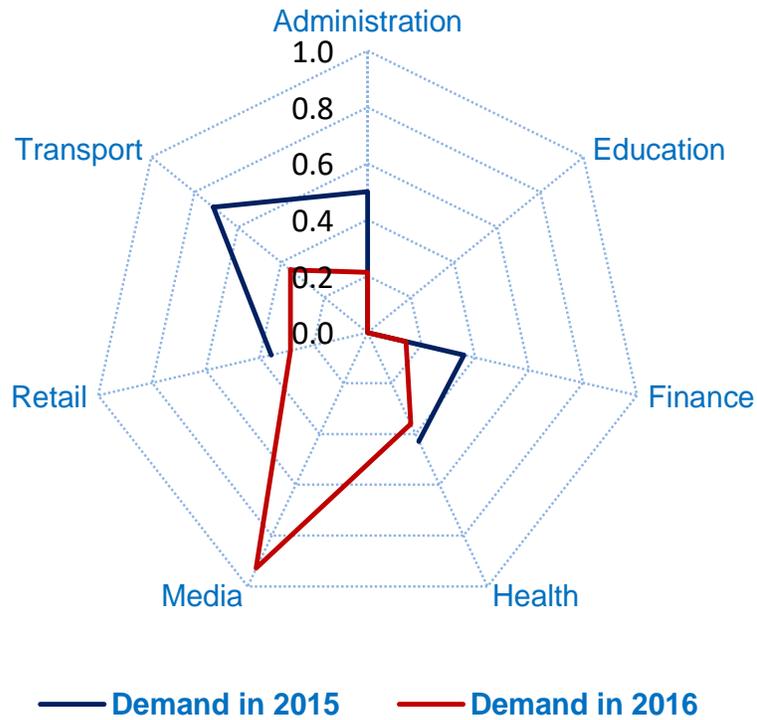
Correlation of Supply and Demand decreased from -0.004 in 2015 to -0.481 in 2016.

	Supply	Demand	
		2015	2016
1 st place	-	-	-
2 nd place	-	-	-
3 rd place	-	-	Media

Graph: Digital Supply in Lucknow



Graph: Digital Demand in Lucknow



11. Lucknow

Area: 337.5 sq.km

Population: 2815601 (2011)

In Lucknow, the education, administration, finance and health sectors saw less demand compared to supply. There was a huge surge in demand in the media sector.

Supply: The city ranked 5th on the supply side in the health sector, followed by finance and administration (7th position). It scored lowest in the transport sector at 13th position.

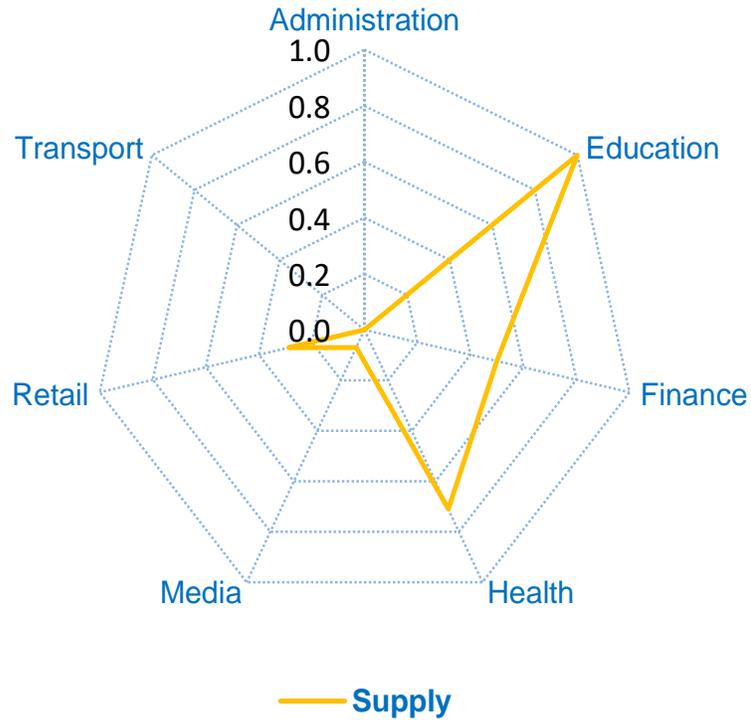
Demand: The education sector showed no demand and ranked 15th. Similarly, the finance, administration, transport, retail and health sectors experienced a slight decrease in demand in 2016 compared to 2015. The highest demand was in the media sector, in which the city ranked 2nd.



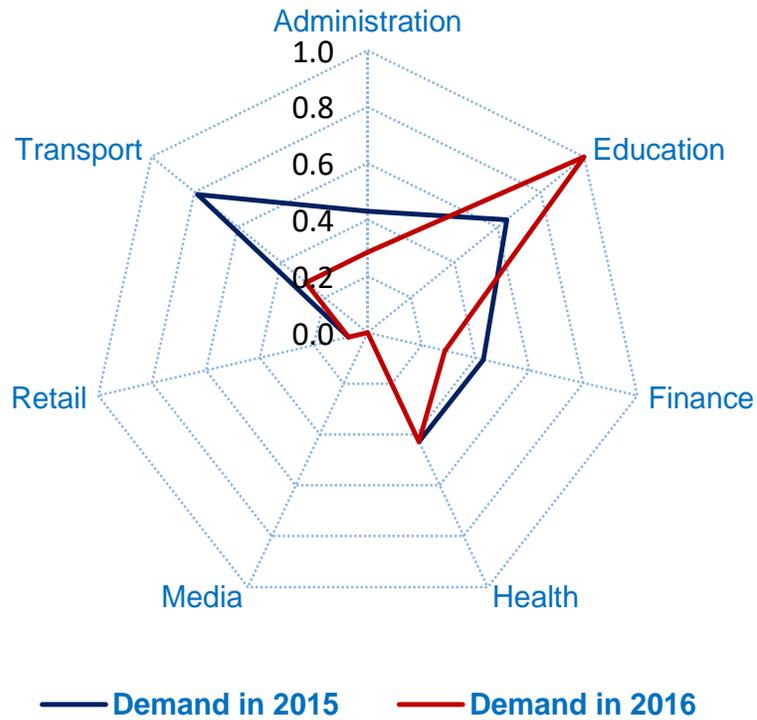
Correlation of Supply and Demand increased from -0.296 in 2015 to 0.143 in 2016.

	Supply	Demand	
		2015	2016
1 st place	-	-	-
2 nd place	-	-	Media
3 rd place	-	-	-

Graph: Digital Supply in Kanpur



Graph: Digital Demand in Kanpur



12. Kanpur

Area: 300.09 sq.km

Population: 2767031 (2011)

The city experienced well-balanced growth of demand and supply in the education sector.

Supply: Kanpur ranked 1st on the supply side in the education sector and lowest (15th position) in the administration and transport sectors.

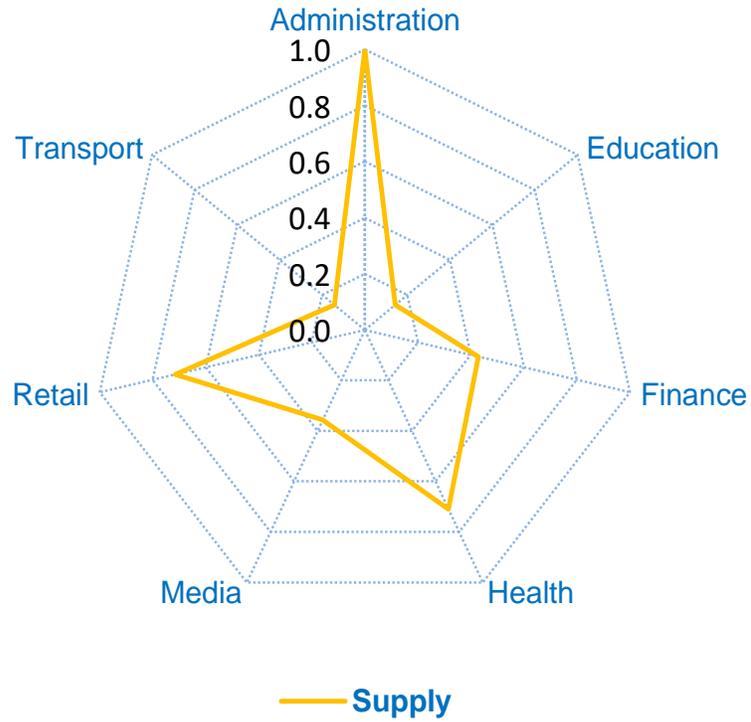
Demand: Demand in the transport, administration and finance sectors increased in 2015; however, in 2016, there was a gradual decrease in demand. Demand in the health sector remained constant in both 2015 and 2016. The media sector experienced no demand at all.



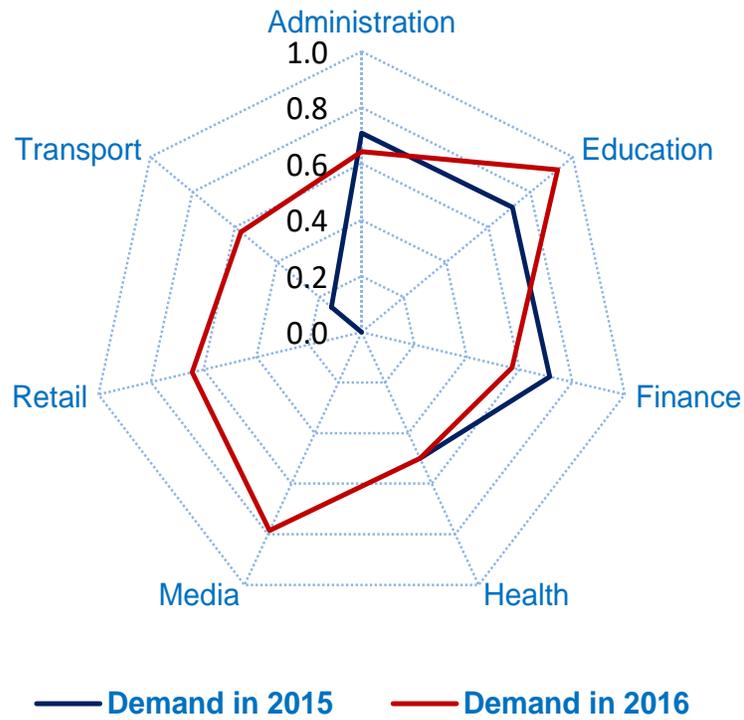
Correlation of Supply and Demand increased from 0.047 in 2015 to 0.795 in 2016.

	Supply	Demand	
		2015	2016
1 st place	Education	-	-
2 nd place	-	-	-
3 rd place	-	-	Education

Graph: Digital Supply in Nagpur



Graph: Digital Demand in Nagpur



13. Nagpur

Area: 229.2 sq.km

Population: 2405421 (2011)

The city experienced a huge gap in demand and supply in the education and transport sectors.

Supply: Nagpur ranked 1st in the administration sector and lowest (13th position) in the education and transport sectors.

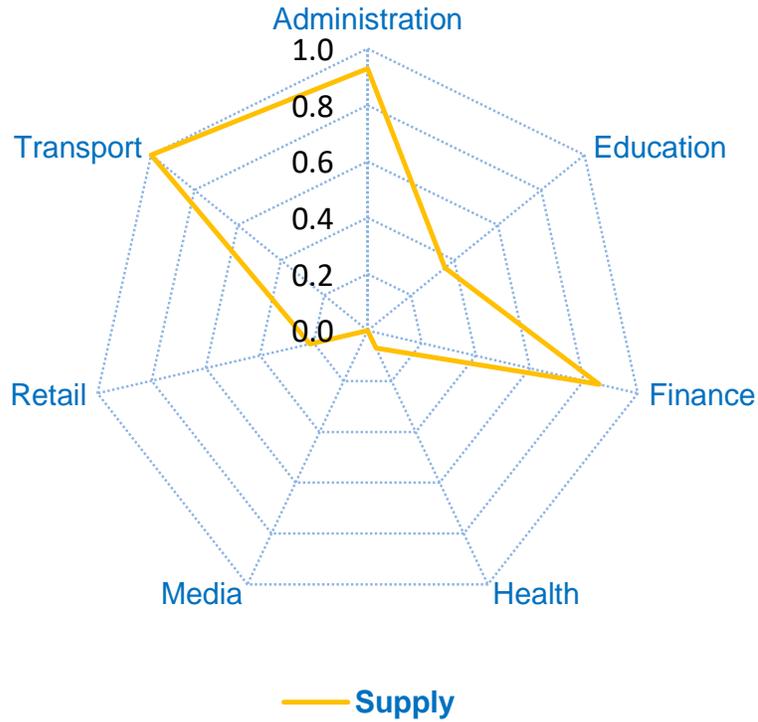
Demand: There was demand in all the sectors, especially in the education sector, where there was a notable increase in demand. There was a slight decline in demand in the administration and finance sectors.



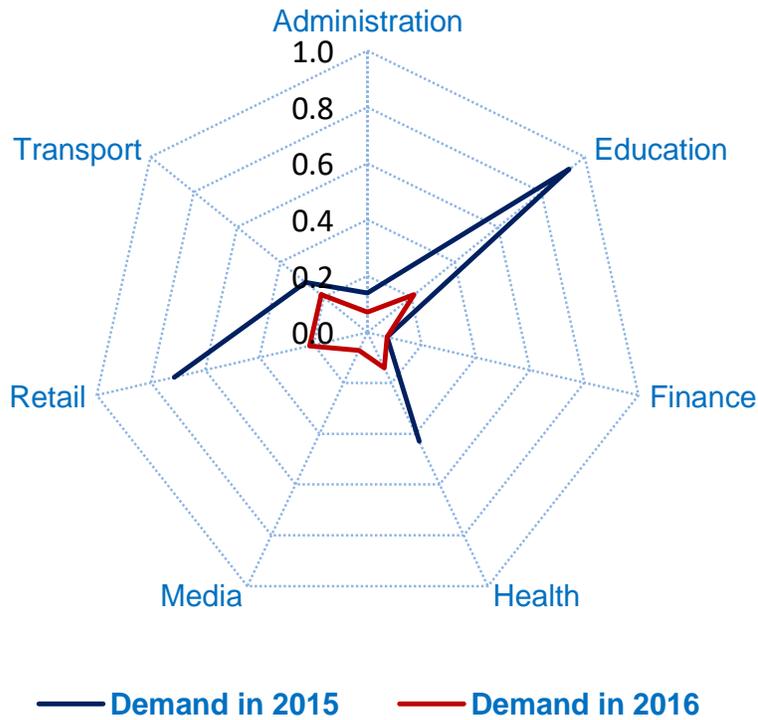
Correlation of Supply and Demand decreased, sharply reversing the sign to negative from 0.070 in 2015 to -0.429 in 2016.

	Supply	Demand	
		2015	2016
1 st place	Administration	-	-
2 nd place	-	-	Education
3 rd place	-	-	-

Graph: Digital Supply in Indore



Graph: Digital Demand in Indore



14. Indore

Area: 389.8 sq.km

Population: 1960631 (2011)

Indore saw high demand in 2015, which declined significantly in 2016.

Supply: Indore ranked 1st in the transport sector, 2nd in the administration sector and 3rd in the finance sector. The city ranked lowest in the media (15th position) and health (14th position) sectors.

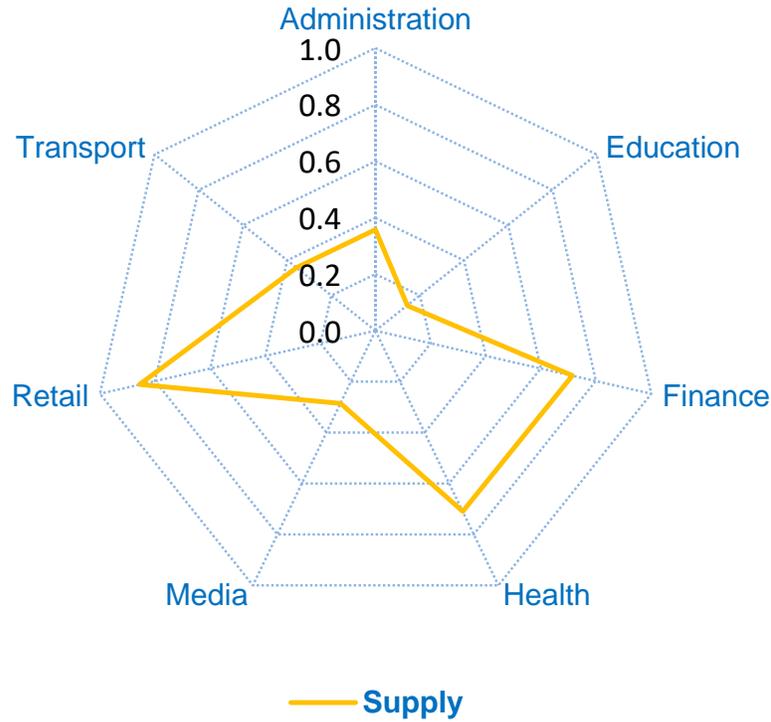
Demand: Demand in 2016 declined compared to demand in 2015. Demand in the education sector declined sharply in 2016. Likewise, other sectors also experienced a decline in demand in 2016.

Correlation of Supply and Demand increased marginally from -0.701 in 2015 to -0.077 in 2016.

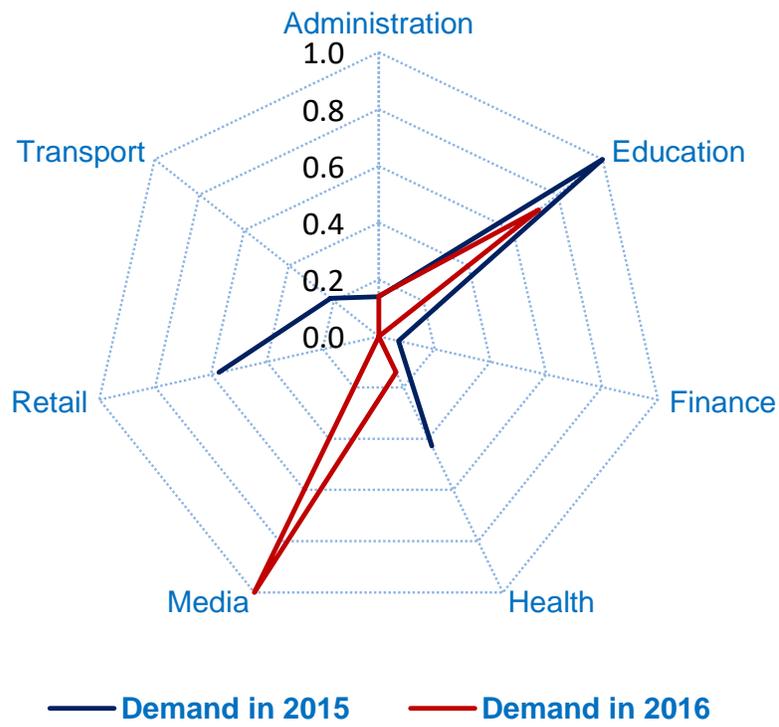


		Demand	
		2015	2016
1 st place	Transport	-	-
2 nd place	Administration	Education	-
3 rd place	Education	-	-

Graph: Digital Supply in Bhopal



Graph: Digital Demand in Bhopal



15. Bhopal

Area: 298.48 sq.km

Population: 1795648 (2011)

Bhopal saw very high demand in the media and education sectors in 2016

Supply: The city ranked 3rd on the supply side in the retail sector.

Demand: The demand in the education sector was high in 2015, but gradually declined in 2016. The media sector witnessed higher demand in 2016. The retail, health and finance sectors also experienced a decline in demand in 2016.



Correlation of Supply and Demand decreased from -0.323 in 2015 to -0.675 in 2016.

	Supply	Demand	
		2015	2016
1 st place	-	Education	Media
2 nd place	-	-	-
3 rd place	Retail	-	-

V. CASES

Digital Case Kit

With the onset of a mobile revolution and the ensuing telecom boom in India, access to digital information has increased manifold. Digital platforms are being effectively used by the government to reach out to people to stimulate the economy through entrepreneurial and governance solutions.

India has the third largest digital start-up community in the world. It has the necessary creative energy and entrepreneurial skills to grab opportunities in this space and become the fastest growing base of online start-ups worldwide, according to NASSCOM (2016).¹⁰

Discussed below are some of the most innovative start-up franchises across the seven sectors.

Administration

Mahila E-Haat (Government of India, Delhi)

What? Mahila E-Haat is an online platform created by the Ministry of Women and Child Development, through which women

entrepreneurs can sell their products directly to consumers without having to bear any cost. It is specifically designed for rural women who cannot afford to go to far-off places to sell their produce or products.

Why? The government helps women from the economically weaker sections of society (both urban and rural) form self-help groups (SHGs). Financial assistance from government-owned banks helps them produce products (clothing, handicrafts, organic products, toys and others) that have good local demand.

However, unlike urban women, women in rural areas do not have market accessibility; further, demand may be too low to sell economically viable volumes. Hence, the government came up with the idea of an online platform that specifically caters to rural women to provide them with a wider audience for their goods.

Products made by rural women that are popular with urban dwellers typically include bags, toys, handicrafts and organic products. Satisfying the needs of the urban populace for goods produced in rural areas using an online platform is a revolutionary idea that has improved the lives of many rural people by giving them an opportunity to expand their businesses and employ

¹⁰

http://www.nasscom.in/sites/default/files/NASSCOM_Annual_Report_2016-17.pdf

more people while also satiating the demand from urban dwellers for their goods.

How? The model is simple: the government creates the digital infrastructure (i.e., website, online content and support systems) and the women entrepreneurs register themselves in order to sell their products, which are listed in different categories. To register on the website, the women entrepreneurs must submit information online or by email/ letter in the required format. The site moderators then select the products to be displayed and inform the vendors. The sellers can also price their products at their own discretion. The government does not charge a fee or commission to either the buyer or the seller. The website also has a provision for customised orders.

Who? This model helps women save on several fronts including time, travel, use of intermediaries, set-up costs for shops and other expenses, which in turn adds to their profits. The government also stands to be a great benefactor despite not charging buyers or sellers for creating and maintaining the online infrastructure and digital assets and content. It is achieving the objective of reaching out to its target population and advancing their socio-economic progress. The urban consumer also benefits by having the option to support local communities and businesses and also by having a wider

selection of products to choose from than those offered by larger domestic or foreign businesses.

What's next? As on October 2016, just four months after its launch in June, Mahila E-Haat had achieved sales of INR 350,000 through its portal. A vast variety of goods are displayed on the site including clothes, jewellery, gift items, natural and organic products, as well as services including tailoring.

Health

Practo, Bangalore

What? Practo is a healthcare company whose online product www.practo.com is used by patients to find and book appointments with doctors. Practo Ray is cloud-based software as a service (SAAS) clinic management software used by doctors to manage their practice.

Why? While the healthcare industry was among the first in the country to adopt digital technologies for advanced medical care equipment and tools, the healthcare services industry still functioned in the traditional way in terms of appointments, treatment and reports. This practice has hindered efficiency and is not patient/ attendant friendly.

Practo aims to transform the healthcare industry and centre it on the patient through what it calls its “patient first” approach. The company designed simple cloud-powered software to accommodate tools such as documentation management and emailing of reports to help doctors understand the technical aspects of the platform.

How? Hospitals in India have historically been very reluctant to share the contents of medical records — even with patients themselves.

Practo Ray has had success with private doctors and smaller clinics who were more open to the concept and willing to give the product a try. They have found the service useful in their practice and are impressed by the breadth of the offering.

Being an online SaaS product, Practo Ray faced some challenges due to irregular internet connectivity and a psychological barrier to computer use among doctors. Perceiving the global trend towards internet enabled mobile computing and the doctors’ affinity to use touch based mobile systems, Practo decided to develop a tablet for healthcare professionals. Practo Tab was under development for almost 18 months. It launched in June 2014 and crossed a user base of 25 million within one month of its launch.

With the use of Practo Ray software, doctors are able to track every ticket and resolve all queries within of the framework of an internal service-level agreement and also rate each interaction. The software has been well received, with 85%-90% “happy” ratings on customer queries/ support. For Practo Ray, growth and brand awareness has primarily come from word of mouth, references and testimonials from customers.

Practo's revenue model is based on two distinct products: 1. Its healthcare provider/ doctor facing practice management software, Practo Ray, offered at two price points — Rupees 999 and 1,999 per month as a subscription-based SaaS product. A premium plan also includes a cloud telephony-based IVR system for doctors. 2. A consumer facing doctor discovery portal, Practo.com. While this is a free product for both patients and doctors, the website allows for contextual advertisements from hospitals and clinics in demarcated sections of the website, which provides for a significant revenue stream.

Who? People (patients) benefit from an application that, at no cost to themselves, allows them to not only book an appointment for a doctor consultation due to Practo's “Patient First” revenue model, but also to order medicines, find diagnostic centres in their city, view their medical records and

access credible health articles and drug information. They also have the option to download a mobile application that can give them quick access to Practo services anywhere.

Practitioners, clinics, hospitals and diagnostic labs also stand to benefit from a significant increase in people using the cloud-based software; they gain access to a fairly large customer database to advertise their hospitals or clinics and other services, making it a win-win situation. Also, because Practo Ray is cloud-based management software, practitioners need not worry about software updates, hardware requirements, data security and data backups on their computers.

The idea of integrating health care organizations is that they can take advantage of the following:

- a. Patient monitoring in real-time basis thus significantly cutting down on costs due to unnecessary visits by doctors. This can ensure health care provision is timely and treatment outcomes are improved thanks to more evidence based treatment.
- b. Better access to real-time data can be invaluable for better disease detection, appropriate intervention and treatment.

- c. Accurate collection of data, automated workflows combined with data driven decisions are an excellent way of cutting down on waste, reducing system costs and most importantly minimizing on errors.

What's next? Practo claims to have grown to become the world's largest healthcare appointment platform connecting millions of patients to more than 200,000 healthcare practitioners, 10,000 hospitals and over 5,000 diagnostic centres across 50+ cities and 15 countries across the world. Practo also claims to have 90% of the market of doctors using software to manage their practice.

The healthcare firm has plans to tie up with insurance firms, pharmaceutical companies and medical device makers to explore new revenue models as their expanded user base will help them gain market intelligence, knowledge on consumer behaviour and greater traction. Enterprise customers/ patients remain the biggest market for Practo with about 60% growth compared to other segments. It also plans to explore the idea of wearable technology as an indispensable clinical healthcare tool for the future rather than as merely a consumer device as it is currently perceived.

Practo has just rebranded itself to project its expanded business motive in the form of the tagline “Your home for health,” with plans to add more verticals towards achieving this end. Practo has also managed to raise \$179 million since its inception in 2008 from investors, including Sequoia Capital and Tencent Holdings Ltd, Google Capital, etc., making it the most well-funded healthcare start-up in India.

Media

Pothi.com, Kanpur

What? Pothi.com is India’s leading print on-demand platform where authors can get their books printed and published. InstaScribe is yet another platform built by Pothi.com team where authors can create e-books across various formats. Backed by print-on-demand technology, Pothi.com allows people to publish and sell their books in print without having to invest upfront on bulk printing copies. It also supports eBook publishing. It can be used by individual self-publishers as well as other organisations, NGOs and publishers.

Why? The idea of a print-on-demand service called Book Smith came out of the realisation that the investment required for bulk printing in traditional book publishing was too high for authors. Therefore, a blog

to book conversion tool was made available as an online tool for authors to self-publish.

How? Once the author submits the book, it is reviewed (technically, not for content) by Pothi.com's backend team. Once the book is approved, the author is sent a link within two business days to choose a book cover from existing templates on Pothi.com or create their own cover. Next, Pothi.com calculates the price at which the book will be sold; however, the author also has the option of quoting a price. The books are then printed on-demand and also made available at the Pothi.com store.

Alternatively, Book Smith — a book conversion tool takes the URL of a blog and converts it to a print ready book. The print version can be ordered on Pothi.com. It also offers a free download of the e-book for onscreen reading and circulation on the internet.

The company's business model focuses on technologically enabling and automating publishing tasks to drive down the initial investment requirement.

Who? It enables individuals and organisations to publish their books in print with little or no upfront investment. It also provides authors with the necessary tools to make their e-books available for private audiences create and add keywords, etc. The website works as a mediator between author

and readers. Contracts are non-binding and non-exclusive, and authors are free to publish anywhere and pull out at any time. Readers can also order the book online.

What's next? Pothi.com plans to establish distribution channels for self-publishers both in India and abroad. It is working on tie-ups with online retailers like Indiaplaza.com, Scholars-without-borders.com and Flipkart.com.

Transport

Ola, Mumbai

What? Ola (ANI technologies), previously known as Ola Cabs, was launched in December 2010. Its core objective is to integrate city transportation for customers and bring driver partners onto a mobile technology platform.

Why? The advent of Ola as a cab aggregator was a long overdue market response to the opportunities presented by inefficient urban transport — unreliability, mismatch of supply and demand, loosely regulated pricing, safety and security issues, etc. Ola relies on the market's supply-demand equilibrium to provide consumers with a reasonable guarantee of undertaking a trip within the confines of a comfortable, traceable vehicle of their choice without the hassle of negotiations over tariff and destination.

How? A taxi can be booked either through Ola's website or through a mobile app that is available for download on Google Play Store and The App Store. The rate card displays the approximate overall bill based on distance calculated through integrated maps.

The customer has two options for booking a cab: instant booking or booking for a later date. Ola offers taxi services ranging from the economy to the luxury level.

The option of cashless payment through the Ola Money facility and its unique referral programme are a few characteristics that have helped this company revolutionise local transport in India.

Who? Ola works on a pay-per-performance model. It does not own any cabs. Only those drivers with valid permits duly authorised and verified by transport authorities can sign up with Ola. These drivers can be either self-employed or work for an operator who owns multiple cars. The drivers get access to a driver mobile app on their smartphones once they register with Ola. They have the flexibility to choose when to log in to the Ola application and accept requests for rides from customers. Ola takes a commission of about 15% on bookings done through the application.

What's next? Ola was valued at \$5 billion as on September 2015. The company has

expanded to a network of more than 200,000 cars across 100 cities. It claims to clock an average of more than 150,000 bookings per day and commands 60% of the market share in India.

It has also managed to rope in auto rickshaws and their drivers into the mainstream with Ola Auto. Ola has also acquired Taxi-for-Sure and Geotagg.

Since its inception, Ola has raised funds from Softbank Corp and other investors during two rounds of venture capital funding. Ola has raised a total of \$1.38 billion in eight rounds from 20 investors.

Finance

What? Zaakpay is an online payment gateway in India. It is one of the easiest and most secure ways to send and receive one-time or recurring payments from individuals and businesses.

Why? The payment solution offered by Zaakpay falls between an online payment gateway and an e-wallet, which addresses the disadvantages of both modes of payments.

How? Through M-pay, its mobile payment processing solution for retailers, it enables retailers to collect payments via their mobile phones and purchase items quickly and easily. M-pay provides online retailers with a

tool to monetise their products and services on any Android mobile device or iPhone.

M-pay offers two payment solutions for the mobile medium. The first is a mobile web (browser-based) payment gateway solution that delivers on websites optimised for mobile devices with which the consumer interacts using the mobile device's web browser.

The payment gateway for websites, 'Web Pay', includes everything required to connect an online business to an internet merchant account. It is an intelligent and integrated online payment processing solution that enables organisations to accept credit cards, debit cards and also accept payments through net banking.

Zaakpay is free for senders and charges a flat fee of INR 10 per transaction to recipients. ZaakPay supports 90 banks currently and enables credit and debit card payments. Zaakpay also supports SMS/ VR payments and recurring payments as well. Money is transferred from sender's bank account to the recipient's bank account via a nodal/ escrow bank account.

For business users, there is a one-time account fee of INR 5,000. Any company with transaction volumes under INR 500,000 per month falls under this category and will have to bear a 3% card transaction rate along with an INR 500 monthly

subscription fee. There are other options, namely, 'Business' and 'Enterprise' for higher volumes.

Who? Zaakpay software enables users without an internet banking account (created online/ offline/ on mobile) to make payments. Therefore, unlike traditional card payments through NEFT, which involve multiple steps, Zaakpay reduces the complexity of transactions and enables one-click payments to improve the transaction completion rate. It also offers a multi-currency processing service for the exchange of 13 currencies.

The customer base of Zaakpay includes start-up companies, small and medium enterprises, and agencies, among others. Its services are available on all platforms including Windows, Macintosh systems, and mobile platforms, including IOS and Android.

What's next? Zaakpay has been cautiously brought to the market. Zaakpay powers four sites as of now (including itself) and has more than 100 merchants who have already signed up.

The funding that Zaakpay rose with a \$40 million investment in MobiKiwk helped the company develop UPI payments through the payment gateway of banks like ICICI which was used to sign up deals with other banks, hire talent and run Payment Card

Industry Data Security Standard (PCIDSS) certified servers.

Education

Culturealley.com, Jaipur

What? Jaipur-based Intap Labs Private Limited, which has a cloud-based online language learning platform called Culturealley.com, runs an educational application named 'English-app' that helps people learn English and other foreign languages in an interactive and contextual manner.

Why? Most existing language learning programmes do not focus on the cultural context of a language, and use outdated practices for teaching and learning, making it a time-consuming and expensive venture to learn a language. Culturealley.com was launched with the objective of meeting this gap and changing ideas and perceptions about learning.

How? It clubs interactive, mobile friendly lessons and games with engaging practice that leverages the power of daily news, Facebook and chats for learning and teaching English. There are some free lessons available for Spanish, Mandarin Chinese, Hindi and Punjabi to help users get a feel of the sessions and the online setup. Advanced classes are offered through its website or via Skype for a fee.

There are dedicated resources available for paid subscribers. These include an audio dictionary, language blog posts and other audio-visual resources such as videos on conversation, grammar, vocabulary and pronunciation, helpful tools to practise language skills, Q&A forums and live help sessions on Skype from native speakers.

Culturealley.com secured seed funding from Mumbai-based early-stage VC fund Kae Capital in 2013.

Who? It launched an English language training voice app, christened 'Hello English'. The app has several versions and is available in Hindi, Bengali, Telugu, Marathi, Tamil, Gujarati, Kannada, Urdu, Malayalam and Punjabi. It has been used by three million users since its launch.

What's next? Culturealley.com's English-App (English for Hindi speakers) is one of the most popular educational apps on the Indian Android Play Store. It hit over 200,000 installs in just 1.5 months with over nine million minutes of content being consumed by learners. Globally, Culturealley.com has over 450,000 registered learners across 200 countries. Culturealley.com seeks to penetrate deeper into the Indian market, and then scale its English offering to other Asian markets such as China, South East Asia, etc.

The start-up has managed to raise funds valued at \$6.5 million in Series-A funding from venture capital firm Tiger Global Management, Kae Capital and other investors from 500 start-ups including angel investors from India, the US and Japan.

Retail

Flipkart.com, Bangalore

What? Flipkart Online Services Private Ltd, also known as Flipkart.com, is an India-based company that operates as an online retailer. Its product portfolio includes movies, music, games, mobiles, cameras, computers, healthcare and personal products, home appliances and electronics, stationery, perfumes, toys, apparel and shoes.

Why? The idea of Flipkart came from two Amazon employees who wanted to create a price comparison platform for products. They believed their idea would prove lucrative by capturing the interest of working professionals; however, as it turned out, the idea evolved into a full-fledged e-commerce site.

How? Flipkart began its operations on a consignment model — goods were procured from suppliers on demand, based on orders received through the website. The company subsequently also adopted the warehouse model where it had its own warehouses and

maintained its own inventory. Sales projections determine the inventory maintained, and the available inventory accounts for the sale orders making it a self-feeding cycle of sorts with 60-70% of deliveries happening in their network. This model, according to the founders, provides for better control over the entire logistics management piece.

Who? Indian consumerism and the market economy coupled with internet connectivity acted as the stimuli and paved the way for the success of Flipkart. Services such as cash-on-delivery and credit card payment at doorstep were introduced to give customers ample choice and comfort.

What also made Flipkart's proposition attractive was the availability of a vast array of products online at competitive prices, ensured by striking different deals with manufacturers and wholesalers, who saved a great deal on logistics, transportation, retailing and inventory/ stocking costs and space. These benefits compounded over time, with many consumers choosing to shop online to avail of unique product/ niche offerings that were hard to find at local stores.

What's next? Flipkart has grown from a start-up with an investment of just \$8000, into a \$5.5 billion revenue enterprise (as on

November 2016), making it an online retail giant in just five years.

While operational challenges pertaining to delays in deliveries, faulty products and reverse logistics remain, the company has placed a lot of emphasis on tracking unsuccessful orders, which is an expensive affair, and keeping customers informed about their order status. The company plans to invest in its supply chain and in technology, which will enable it to have larger warehouses and increase process automation.

In its effort to become the top e-retailer in India, the company went on an acquisition spree, acquiring retailers in the same space such as Myntra, Jabong and E-Bay. If all pans out well, it may also acquire its second biggest competitor 'Snapdeal'. Flipkart is the biggest e-retailer in the country, with a commanding 43% share of the market.

Now, Flipkart is attempting to widen its reach in the digital domain through Flyte, the portal's recently launched paid music download service. Customers can buy music in MP3 format from over 700 genres in 55 languages. The files, which are digital rights management (DRM) free, can be played without any restrictions on any type of device an unlimited number of times.

Known for its innovative ideas and bold steps, the firm is now looking to consolidate,

with wider offerings in the digital retail space. Flipkart is running the marathon with ample support from private equity players such as Accel Partners and Tiger Global,

which have collectively invested \$150 million in the entity so far.

The Indian School of Business (ISB) is an educational institution with campuses in Hyderabad (Telangana) and Mohali (Punjab). It is registered as a non-profit company under section 25 of the Indian Companies Act. It evolved from the need for a world-class business school in Asia. Established in 1996, its first Post-graduate Programme in Management started in 2001. It has grown rapidly in size and stature, ranking among the top 30 business schools globally and among the best in India. The Kellogg School of Management and the Wharton Business School are its founding partners; it subsequently entered into partnerships with the Massachusetts Institute of Technology, the Fletcher School and the London Business School. These partnerships allow it to access top-class faculty for its teaching, research and learning material development needs.

ISB joined the **Institute of Emerging Market Studies (IEMS)** network in 2014. ISB has 45 faculty members, many of whom conduct research on topics related to emerging markets in areas such as Entrepreneurship and Innovation, Financing, Infrastructure, Governance, Sustainability, and Marketing.

The **Punj Lloyd Institute of Infrastructure Management** is established within the Indian School of Business, Mohali Campus as a specialist institute to support the infrastructure industry. The vision of the Institute is to create high-quality leadership and management capacity for the infrastructure sector and also create an understanding of the sustainability dimensions impacting the sector by delivering quality education, contextual research and continuous outreach.

In this pursuit, the Institute runs a one-year executive programme in 'Leadership in Infrastructure Management'; the programme is currently in its second year. In addition, the Institute carries out research in the infrastructure space, mainly in the areas of Urban Management, Energy and Climate Change, Transport & Logistics, Infrastructure Financing, and Public Private Partnership, among others. It seeks to develop tools and decision support systems to support the infrastructure practice.



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