

India Goes Digital

From local phenomenon
to global influencer





Ruben VARDANYAN,
Impact Investor and
Venture Philanthropist

«The world has never been as dynamic as it is today: technological disruptions, demographic shifts, economic turbulence, and political unrest bring challenges on an unprecedented scale. Twenty years ago nobody could have imagined that the combined GDP of the top seven emerging markets could exceed that of the G7 countries. These markets offer both a great opportunity and a major challenge for any business. By establishing IEMS we wanted to contribute our views and insights to the dialog of business with policy-makers and NGOs in all emerging markets. We believe that open multi-stakeholder dialog will eventually help businesses and politicians come up with better-informed decisions that make a positive impact and drive change for better.»



Karl JOHANSSON,
former Managing Partner,
EY Russia & CIS,
Chairman of the Analytical
Credit Agency of Russia
(ACRA)

«Studying emerging markets from within – that is the idea behind bringing together the research teams in Moscow, Hong Kong, and Hyderabad into the international and interdisciplinary research network. These are the most effective means to deal with the dynamics and complexity of the changing nature of emerging markets. Assisting international businesses better understand emerging markets and operating businesses in emerging markets expand globally – those are the strategic aims of the research initiatives at IEMS.»

FOUNDING PARTNERS



RESEARCH PARTNERS





Authors

Dr Lydia Kulik

Head of India Studies, SKOLKOVO Institute for Emerging Market Studies (IEMS)

Research Fellow, Centre for Indian Studies, Institute of Oriental Studies, Russian Academy of Sciences

Vladimir Korovkin

Associate Professor of Business Practice, Senior Research Fellow, Moscow School of Management SKOLKOVO

Supervision

Alexey Kalinin

Academic Director, SKOLKOVO Institute for Emerging Market Studies (IEMS)





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Foreword



Dear Colleagues,

I am pleased to share a further piece of thought leadership from our friends at the SKOLKOVO Institute for Emerging Market Studies (IEMS SKOLKOVO), which continues to explore the multifaceted nature of transformation of global markets.

The precursor to this report by IEMS - Meet The New Indian Consumer - examined the evolving habits of Indian consumers; the heart of the Indian domestic market and the backbone of the Indian economy. This new report - India Goes Digital - studies the phenomenon of the Indian digital revolution, unfolding at pace in recent years and transforming the country in many remarkable ways. With increased affordability and availability of high-speed internet, an enthusiasm to adopt disruptive technologies and an environment that encourages innovation and entrepreneurship, India's business ecosystem is progressing fast and has the potential to influence the global economic outlook.

This report highlights some of the distinctive characteristics of India's digital transformation and answers certain big questions which help to understand its' elaborate landscape. These

include:

- What is the role of the government, alongside Indian and international businesses in Indian digitization?
- How does digitization help address India's most pressing needs and what new challenges can be expected?
- What will change and what will remain the same in the traditional Indian society under pressure from these rapidly changing conditions?
- Where is the opportunity zone in the new digital India that businesses should focus on if they are to succeed - both in the Indian market and globally?

As we strive for a better working world, leading business schools, such as SKOLKOVO Moscow School of Management have a special role to play in discovering best practice and assisting businesses, alongside governments, to become better equipped to the fast changing environment, where digital transformation is one of the deepest, and prevailing, features.

Jay Nibbe
Global Vice Chair – Markets
EY



Dear friends!

I am pleased to present a new report by the SKOLKOVO Institute for Emerging Market Studies (IEMS) on India going Digital, which has become possible owing to the two partnerships that SKOLKOVO Moscow School of Management attributes very high importance to, these are: long-standing cooperation with EY, and our strategic partnership with the Indian School of Business.

SKOLKOVO school has a special connection with India and this country has always been high on SKOLKOVO research agenda. India is experiencing a major transformation of business and society. Its' diversity, the rate of economic growth, India's internationally recognised achievements in such areas as information technology, the automotive industry, pharmaceuticals or creative sphere, the developing human capital – all this attracts entrepreneurs from all over the world who are eager to explore India's experience, learn from India and work in India.

One of the recent and most large-scale changes taking place in India is connected with its' rapid digitisation. While digital sphere is developing fast in many countries, with the pandemic crisis intensifying this development, the same process

in India has certain distinctive features, that became subject to examination in this research we are pleased to present. The report also aims to analyse the impact of India's digitisation on the global trends and developments.

As Moscow School of Management SKOLKOVO continues to build up its' emerging markets expertise and becomes the platform for the Russian and Indian entrepreneurs and business leaders to communicate, learn about business opportunities and test-run their business ideas, this report will serve as an inspiration and help better understanding of India not just as a market, but as a valuable partner. It will also add to the portfolio of materials at SKOLKOVO India-oriented educational programmes, that the School plans to extend further.

Enjoy the reading and the thinking!.

Ruben Vardanyan
Social Investor and Entrepreneur
Founding Partner, Moscow School of
Management SKOLKOVO
Chairman of the Supervisory Board, Institute
for Emerging Market Studies (IEMS)



Dear Friends!

We are happy to present to you this new report by the Institute for Emerging Market Studies (IEMS) of the Moscow School of Management SKOLKOVO on digitisation in India, prepared in cooperation with the Indian School of Business.

The phenomenon of India's rapid digitisation and the changes it brings to the Indian economy and society has been the subject of keen interest of the academia as well as policy makers across the globe. However this report focuses on the aspects of India's going digital, that received little coverage earlier, such as the influence of digitisation on entrepreneurship in India, the potential of digitisation in helping India achieve much-needed breakthrough in areas such as education and environmental protection. Although this report is not solely aimed at the Russian audience, it provides valuable suggestions to the Russian and Indian digital entrepreneurs about business opportunities opening up in the new digital India. It also covers some of the distinctive features of digitisation in India, such as, for instance, strong partnership between the government and the Indian business as well as the changing role of the international players in the Indian market.

The Indian School of Business and Moscow School of Management SKOLKOVO share a long-lasting historical connection, where Institutes for Emerging Markets Studies of both schools, inspired by EY, continue to play a special role. Joint research is one of the key areas of cooperation where the two schools will maintain their focus, besides development of educational programmes for the Russian and Indian, as well as international, entrepreneurs. We shall look forward to continuing our efforts in building bridges between the business communities of Russia and India, and beyond.

Rajendra Srivastava
Dean
Indian School of Business



Dear Readers!

India is going through a rapid digital transformation. It is establishing itself as a major factor in the global process of digitisation. The Government of India's flagship programme 'Digital India' aims at transforming India into a digitally empowered society and knowledge-based economy by ensuring digital access, digital inclusion, digital empowerment, and bridging the digital divide throughout the country. The Ministry of Electronics and Information Technology (MeitY) of India estimates that with the implementation of this programme, India can attain 1 trillion USD of economic value from the digital economy by 2025.

India's digital consumer base is the second largest in the world as access to the internet extends to more than 700 million users across the country. The benefits of digital technology are being felt by all segments of the population of India. This presents a huge opportunity for digital businesses that are attracted to India's lucrative and exponentially increasing digital market.

Digital technology has the potential to help India overcome many of the challenges it faces. As the world struggles with the unprecedented threat posed by the COVID-19 pandemic, the global digital transformation is being significantly accelerated. India embraces the digital revolution and becomes a perfect destination for foreign direct investments in the digital services sector.

This informative report, 'India Goes Digital. From local phenomenon to global influencer', by the SKOLKOVO Institute for Emerging Market Studies (IEMS) showcases the various facets of digitisation in India and highlights the immense digital business potential between India and Russia.

Dr. Rajiv Kumar
Vice Chairman
National Institution for Transforming India
Government of India
New Delhi

Introduction

Digital transformation has been on the agenda of businesses and governments for quite some time now. Citizens have embraced it too, fuelling the gig economy with their new digital consumer habits. However, it is the current pandemic crisis that has removed the last doubts about the importance of information technology and the role it is bound to play in all spheres of human life going forward. The consensus is that the extraordinary circumstances of 2020 have accelerated the speed of global digital transformation dramatically. It is also clear that those countries that started this transformation early and had robust digital government, including healthcare, as well as a digitally savvy private sector and population when this crisis began, showed more resilience and coped better with its devastating consequences. The hopes of humanity for a smarter, safer and more sustainable world that should emerge out of the rubble caused by the virus, also place technology in the centre of everyone's attention.

Given this background, turning researchers' eyes towards India's experience with digitisation is more than justified. Even before the pandemic, India's story of rapid and large-scale digital transformation had caught the world's attention and multiple publications had been devoted to the subject. This paper takes a fresh look at this phenomenon, paying special attention to the distinctive features of India's digitisation profile, as well as India's achievements in realising some of the opportunities presented by the profound digital shift (a "tectonic shift" as they say), with particular focus on the areas that, in our view, are of present global importance. We also looked at the influence of the pandemic crisis on India's economy and the latest opportunities that it opens up for the new digital India. We analysed some of the socio-cultural aspects of the digital metamorphosis of a complex society such as India, trying to evaluate how deep are the current changes and whether the digital revolution might put some of the fundamental strengths of India at risk. We could not avoid assessing Russia's perspective on India's digital trends, as the two countries share a deep understanding and political partnership, and are now going through a similar and rather complementary realignment of

the technology sector. We call upon the Russian and Indian entrepreneurial communities as well as the governments of the two countries to coordinate their efforts in developing cutting-edge technology early, building upon each other's strengths, in order not to find the two countries on separate technological continents in the near future.

India's digitisation trajectory, in our view, has certain features that make its story unique and deserve special attention. One of them is the role of the government, that has built a tailor-made digital foundation for the country, maintaining and extending it further, as a public good. Another India-specific feature is the role of tight public-private partnerships, and of Indian business and its forward-looking captains, in making the internet accessible and affordable to all Indians in a matter of just a few years.

One more specific aspect is India's relationship with its foreign business partners, which has always involved complex manoeuvring, balancing the interests of strong indigenous players as well as the risks of disrupting socially sensitive sectors such as agriculture, for instance, with the need for help in lifting up the economy, creating jobs and technological advancement. The new digital era has highlighted these difficulties yet again, reminding those international businesses queuing for access to the lucrative Indian market that India is open for business partnerships that help the country address the challenges that it is facing.

This report also describes how digitisation has helped address India's acute need for broader financial inclusion. The success of the multidimensional campaign aimed at bringing millions of Indians into the banking system is surely one of the highlights of India's digital turnaround.

As India strives to become a global knowledge superpower, digitisation has opened up almost endless new opportunities and given reasons to hope that its challenges can be resolved. Two of the sectors of primary importance that India plans to build positive momentum in, are healthcare

and agriculture. Developments in these industries have attracted a lot of attention recently and will continue to do so. Tremendously important as they are to India, we, however, will focus on other areas in this report, ones that we find particularly impressive, thought-provoking and influential on a global scale. Given their strong multiplicative effect, we aim to study each one of them in three projections – as a phenomenon, as a lesson and as a global influencer.

One of the areas we focus on is entrepreneurship. The entrepreneurial spirit of India is remarkable. Digitisation has helped it take off to a truly unprecedented extent. The government of India supports the entrepreneurship drive, seeing it as a significant contributor to employment generation, economic growth and India going global. The nuances of building up India's robust entrepreneurial ecosystem draw our special attention as facilitating entrepreneurship is one of the key objectives of the Moscow School of Management SKOLKOVO. We believe that taking a close look at India's experience can help accelerate this process in Russia and contribute to stronger mutual ties and a better understanding between the entrepreneurial communities of Russia and India. The other area we look at is education. Some of the strongest and fastest-growing educational companies are now based in India. They help address India's massive need to educate and re-skill its population and will no doubt take on the world, addressing the global challenge of providing affordable and effective education for all. We also analyse the importance of India's drive for broader financial inclusion, the relations between India's public and private sector, as well as some of the new trends in Indian policy towards international business.

Our report also looks at the companies, the institutions and the personalities that make up the face of the new digital India. Our selection is surely not exhaustive, but it serves as a vivid illustration of the process of transformation, as well as providing additional background for those not familiar with today's India. We also believe that these stories of digital change-agents can be inspirational to our readers.

In 2020 the Digital India campaign, launched by the Indian Prime Minister Narendra Modi in 2015, marked its first five years. There is a wealth of open-source information available to those who

wish to read in more detail about various aspects of this large-scale programme. The government of India has made sure the movement to digitise the country is well-covered, reflecting its intentions as well as progress in implementation. Importantly, the government of India started the Digital India campaign by digitising itself first, so there is voluminous data available. The governmental think-tank, NITI Aayog, publishes detailed reports about Digital India and consultancy companies work hand in hand with the government analysing the achievements and the impact of digitisation on India's development. They also help the government develop roadmaps for the next stages. We have used their materials extensively, as well as reports by NASSCOM (Indian association of IT industry), TRAI (Telecom Regulatory Authority of India), the Reserve Bank of India, the Ministry of Education, the Ministry of Electronics and Information Technology of India and others. Consultancy companies and think-tanks as well as the World Bank have published earlier works on various aspects of India's digitisation. The UN Conference on Trade and Development (UNCTAD) «Digital Economy Report 2019: Value creation and capture: implications for developing countries» has helped put India's story in perspective. We were, to a large extent, influenced by Nandan Nilekani's thought leadership on Digital India, as well as his books on his vision for his country. Some of our conclusions, especially in the socio-cultural aspects of this report, are based on empirical evidence and our long experience of working in India and with India, seeing change from within.

We thank our partner school, the Indian School of Business, and personally its Dean, Professor Rajendra Srivastava, for sharing the expertise and wealth of knowledge about the Indian economy and business that has made our research possible.

We also acknowledge the helpfulness of our off-the-record interviewees in India and in Russia and thank them for the insights.

Last but not least, we appreciate the encouragement and the guidance from our colleagues at the Institute of Emerging Market Studies (IEMS), as well as their having paved the way to India studies at SKOLKOVO with the earlier report «Meet the new Indian consumer» that correlates significantly with this work on India Going Digital.



India today – a macroeconomic overview

“Whoever harnesses disruptive technologies better will influence the world more... The resulting capabilities and their deployment could without exaggeration determine the future direction of the world.”

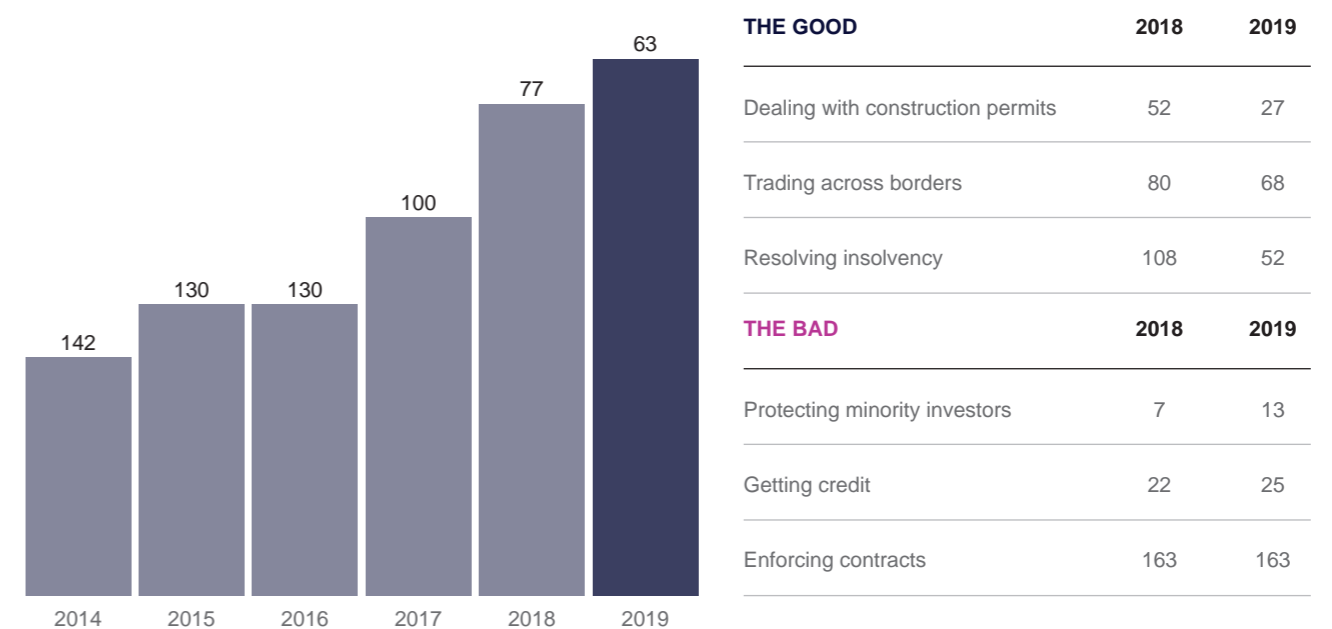
Dr S. Jaishankar: “The India Way: Strategies for an Uncertain World”

India's transformation into a dynamic emerging market started as a result of the economic reforms that began with stabilisation after painful financial crises and the “New Economic Policy” (NEP) that was introduced in 1991. The NEP implied a two-fold approach to reforms which encouraged export and import liberalisation, and improved the efficiency of Indian manufacturing industry aimed at moving India away from heavy internal regulation and protectionism towards an open market integrated with the global economy¹. Over the last few decades, the «India Development Update» reports published biannually by the World Bank noted a slow but steady growth across sectors – services, industry and agriculture

– with India's GDP growth rate averaging around 7% since 2008-09².

By 2007, India had become a 1 tln USD economy, joining the league of the leading economic powerhouses of the world. In 2019, with GDP at 2,88 tln USD, India is the fifth largest economy globally³, and aims at becoming a 5 tln USD economy by 2024⁴, while the value of its digital economy should reach 1 tln USD by 2025⁵. In terms of Purchasing Power Parity based on Actual Individual Consumption and Global Gross Capital Formation, calculated by the World Bank, India is the third largest economy in the world⁶. India's

INDIA'S EASE OF DOING BUSINESS RANKING OVER THE YEARS



Source: World Bank

GDP is led by the service sector with a Gross Value Added (GVA) of 54.3%, followed by the industry sector with a GVA of 29.6% and the agriculture sector with a GVA of 16.1%, as of 2018-2019⁷.

The trend favouring the services sector in India's GDP was influenced by the NEP that benefited the service sector the most and contributed to the advancement of banking, finance and other services-oriented business, including IT. Major companies like Tata Consultancy Services, Infosys and WIPRO created large-scale employment opportunities and added value to India's GDP. The contribution of the agricultural sector, once the backbone of the Indian economy, has, on the other hand, been declining. Yet, more than 40% of the working population are still employed in agriculture⁸, making it a very important sector not just from the point of view of food security, but social stability too.

The overall rate of unemployment in India was 3.2%, with the urban rate 3.5% and rural rate 3.1% for the year 2017-2018, and particularly high youth unemployment⁹. With an average age of 29, India will continue to have one of the world's youngest populations until 2030¹⁰. By 2025, around one-fifth of the world's working age population will be in India¹¹. This demographic dividend, distinguishing India from most of other countries, particularly from China, is also a high-risk factor adding unemployment pressure on India's society. India, a surplus labour economy, sees an estimated demand for about 12-15 million jobs per year¹², meaning that GDP growth of 7% is not sufficient to employ this dramatically increasing workforce. The majority of India's young population lives in rural parts of the country. As the economy moves further away from agriculture towards industry and a services-based structure, the country also needs to manage rapid urbanisation in a smart way, managing resources, providing employment and upgrading the skills of the new urban population.

Another challenge for India has always been the large scale of its informal (unorganised) economy. According to a 2014 report by the Indian Economic Service, 90% of Indians were employed in the informal sector¹³, meaning jobs with low wages, high uncertainty and very little social protection¹⁴. Changing this situation and bringing the economic activity of the country out of the shadows has

INDIA'S GDP GROWTH RATE (2010-2019)

Year	Rate (%)
2010	8.498
2011	5.241
2012	5.456
2013	6.386
2014	7.41
2015	7.996
2016	8.256
2017	7.044
2018	6.12
2019	5.024

Source: World Bank

been one of the priorities for India's government in recent years. To reach its ambitious economic goals, India will also have to create 90 million non-farm jobs by 2030, besides sustaining GDP growth of between 8% and 8.5%¹⁵.

Besides providing India with a nearly bottomless pool of talent, when well-employed, the young population is also driving consumption. In the previous SKOLKOVO IEMS report "Meet The New Indian Consumer"¹⁶, we were introduced to the large, young and dynamic cohort of new consumers in India. They are an amalgamation of the growing urban middle-class and a well-off rural population – people speaking more than 22 different languages, coming from different communities in each of the 28 states and eight union territories of India, each having their own distinctive culture. Nevertheless, they all strive for a better quality of life, thus presenting an opportunity for business to expand and tap into this vast potential. India is expected to become the third largest consumer economy by 2025, as its consumption may triple to 4 tln USD¹⁷. The

Reserve Bank of India aims to keep the rate of inflation in the country within the range of 2% to 6%, but at the end of 2019, it has increased to 7.44%.

One index India has been climbing up steadily is the World Bank's "Ease of Doing Business" where it ranked 63 out of 190 countries in 2019¹⁸. Starting at position 142 in 2014¹⁹, India has been gradually building up a more business-friendly environment with a wide range of measures including a renewed privatisation drive, promoting entrepreneurship and facilitating foreign direct investments and others. Digitisation of the way India functions and does business is one of the main driving forces behind these improvements. India's business climate has greatly benefited

from decreased red tape and the strengthening of e-government. Recently, India has started registering companies via online portals, trading across state borders through digitised systems, receiving computerised construction permits reducing time and cost of construction significantly, registering property online and submitting online documents and digital signatures.

These and many other changes have been the consequence of the resolute policy of the government headed by the Indian Prime Minister, Narendra Modi. To see the broad picture, one needs to look at the entire set of the reforms responsible for India's profound transformation, where digitisation is just one of the elements, albeit arguably one of the most important ones.





On the course of reform

National Democratic Alliance – a coalition led by Bharatiya Janata Party (The party of the people of India, BJP) headed by Narendra Modi, came to power in India in May 2014. The party and its leader achieved the second landslide victory in the national elections five years later, in 2019, receiving the mandate from the people of India to continue the course of reform, taken in 2014.

It was obvious that India required decisive action on the economic front before BJP came to power and some of the important changes were initiated earlier during the previous governments, led by the Indian National Congress, the party of the Nehru-Gandhi dynasty. However, India's notorious bureaucracy and soft governmental structures, as well as lack of people's support have slowed down all efforts significantly. It has taken a popular and active politician like Narendra Modi to move forward many of the changes that have been pending for years. Prior to becoming the leader of the BJP and running for the general elections, N.Modi was the Chief Minister of his native state of Gujarat for nearly 13 years, where he tested and implemented many of the business-oriented reforms, often referred to as "Modinomics".

One of the early steps of the new BJP government was the establishment of the "National Institution for Transforming India", also known as NITI Aayog²⁰. This is a think-tank responsible for the development, implementation and evaluation of progress in the reforms (for details please refer to page 26 of this report), planned by Prime Minister Modi and his team.

Not all of the reforms were welcome. One of the most heavily criticised and unpopular steps N.Modi's government undertook so far was the so-called demonetisation. In order to speed up India's progress to a transparent economy and to eliminate illegally obtained cash, in November 2016 the government unexpectedly banned from circulation India's two biggest currency notes, INR 1000 and INR 500, and restricted their exchange

and depositing. This step that had arrived without any warning for the entire population of India, removed from circulation 86% of INR banknotes²¹. Financial applications such as Paytm, MobiKwik, Airtel Money, as well as Bharat Interface for Money (BHIM)²², a mobile payment application based on the Unified Payments Interface (UPI) and promoted by the government, received an immediate boost²³, helping authorities fight corruption and move towards cashless economy. The short-term effects, however, were rather painful for the disadvantaged people, daily-wage workers and MSMEs (Micro, Small and Medium Enterprises) in the country, as they did not have the means to live through the changes and adapt fast enough.

Another important early step, undertaken by the government was the introduction, in 2017, of the Goods and Services Tax (GST), which was popularised under the slogan "One Nation, One Tax". This tax replaced 17 different taxes and varying tax regimes across the Indian states, thus reducing domestic trade barriers, transaction costs, and promoting the economy of scale. A uniform tax rate as well as a new digitised system for the online registration, payment and filing of taxes helped easier compliance and contributed to free and fast movement of goods across India²⁴. It also helped the government increase tax collection significantly²⁵.

One of the much-awaited fiscal reforms was the amendment, in 2019, of the 1961 Income-tax Act. Under this amendment any domestic company can have the option to pay income-tax at the rate of 22% (down from 30%, provided that the company does not avail of any exemption/incentive). In addition to this, to incentivise investment in manufacturing, any new domestic company incorporated on or after October 1, 2019 and making fresh investment in manufacturing, has the option to pay income-tax at the rate of 15% (down from 25%)²⁶.

There have been other steps to change India's outdated laws, some of them dating back to the days of the British rule. In 2015 the important new Insolvency and Bankruptcy Code was adopted, which consolidated all rules relating to insolvency into a single legal act. Labour Law reform is also a big step forward in stimulating business activity in the country and promoting the ease of doing business – in September 2020, the Indian Parliament passed three labour-related bills: the Industrial relations code, the Occupational safety, health and working conditions code and the Code on social security. The importance of these bills and the reason why they were much delayed, anticipated and feared at the same time lies in the difficult balance between the interests of the employees and the employers, as well as various other stakeholders, including the trade unions and the regulators. At the same time, new laws regulating agricultural sector were also adopted, coming in the place of the legislation that dates back to 1950's and 1960's. Although the new laws are vehemently protested over by the farmers of several north Indian states, who depend on state subsidies more than farmers in other parts of the country, in the longer term these laws are meant to support the government's pledge to double farmers' incomes in five years. They have the potential to help farmers access new markets and technology, end the monopoly of state-controlled wholesale markets, ease long-term contracting between farmers and customers, stimulate investments in the agricultural sector and related segments, such as agricultural infrastructure, food processing, storage and cold chain – making India's agriculture more competitive on the global scale.

One of the top priorities ahead of the Indian government is to revamp the country's urban and rural infrastructure. Large budgetary allocations are provided for massive improvements and green field development in airports, railways, highways and sea connectivity. As a result of these efforts, India was ranked second in the Agility Emerging Markets Logistics Index in 2019²⁷.

The Smart Cities Mission²⁸ was launched in India in 2015, steered by the Ministry of Housing and Urban Affairs. Under this plan, 100 cities in the country are selected to undergo transformation aimed at optimisation of resources and creation of sustainable urban infrastructure. The budget

allocated by the government for this mission stands at 27 bln USD²⁹. By 2030 these 100 cities are expected to add 250 million new urban residents and account for almost 70% of India's GDP³⁰. The core elements of the turnaround are planned to be: reliable water supply, sanitation and waste management, electric supply, urban mobility and public transportation, affordable housing, IT infrastructure and connectivity, e-governance and citizen participation, sustainable environment, safety and security of the citizens, as well as health and education, with most of these tracks requiring digital, smart data-driven solutions. Inclusivity is also an important aspect of the Smart Cities Mission, with a focus on comprehensive development for the poor and the disadvantaged³¹.

Much attention has been given to Swachh Bharat Abhiyan³² (Clean India Mission), launched in 2014. By taking a broom and swiping a street in New Delhi, Prime Minister Narendra Modi raised awareness and managed to send a signal to all people in India about the need to clean up the country. Raising awareness, propaganda and educational efforts on this front were combined with visible improvements in solid waste management, sewerage systems, hygiene and sanitation.

India has been making progress in public health too. The Ayushman Bharat – National Health Protection Mission – is the governmental programme aimed at achieving the universal health coverage, envisaged by the National Health Policy of India 2017, it is also one of the 17 UN Sustainable Development Goals³³. Ayushman Bharat programme consists of two components (i) Pradhan Mantri Jan Arogya Yojana (known as PM-JAY, this is the largest health assurance scheme in the world) and (ii) establishment of accessible health and wellness centres across India. PM-JAY was launched in 2018. It provides cashless access to healthcare services worth 6775 USD per family per year. It aims to cover over 107.4 million disadvantaged and vulnerable families (approximately 500 million beneficiaries) – 40% of the Indian population. PM-JAY is fully funded by the Government, and cost of implementation is shared between the federal centre and the states³⁴. The National Health Authority (NHA) is the body responsible for implementing Ayushman Bharat. The NHA and the Ministry of Electronic and

Information Technology are also responsible for building digital healthcare infrastructure through The National Digital Health Mission, launched in 2020³⁵. This initiative will combine existing e-governmental tools with comprehensive mobile-compatible medical records with various features, such as Health ID, Digital Doctor and online Health Facility Register³⁶. Even with the Ayushman Bharat efforts and before the 2020 pandemic, India faced an estimated shortage of 160 000 hospital beds³⁷. The Government of India planned to increase public health spending to 2.5% of the country's GDP by 2025³⁸.

Make in India³⁹ is Prime Minister Narendra Modi's flagship initiative, launched in 2014. It was recently extended to «Make in India, Make for India, Make for the world» policy efforts, reflecting India's ambition to become self-reliant as well as to fit into the diversifying global supply chains, offering a convenient manufacturing alternative to China. It is also supported with a set of Production-Linked Incentive schemes⁴⁰ – monetary compensation to businesses linked to the volume of their in-India production. Restrictions in foreign direct investments have also been gradually reducing and tangible support introduced, in order to encourage localised manufacturing and job creation in various sectors – from defence manufacturing, aviation, satellites and drones to automobiles and components, electric machinery, textiles, medical devices, consumer products, robotics, biotechnology, chemicals, construction, IT and business process management, oil, gas, pharmaceuticals, renewable energy and thermal power. Special emphasis has been made on electronics, as this industry is closely related to India's ambitious goals in digitisation⁴¹. As a result, India has become the R&D and manufacturing hub for most of the large international players, such as, for instance, GE, Rolls Royce, Daimler AG, Apple, BMW, Airbus, Mitsubishi, Hitachi, Fiat, Samsung and Rostec, to name a few. «Make in India» campaign has also supported the MSME sector by creating employment opportunities and promoting local small scale manufacturing, with the introduction of schemes like the «Zero Defect, Zero Effect» that provided subsidies to MSMEs, encouraging them to deliver top quality products using clean technology, and the ASPIRE scheme (A Scheme for Promoting Innovation, Rural Industry & Entrepreneurship) focusing on economic development at the grass root level⁴².

AVERAGE COST OF 1GB OF MOBILE DATA IN 2021 (IN USD)

Country	Cost	Rank
India	0,68	28
Israel	0,05	1
Russia	0,29	6
China	0,52	17
United States	3,33	154
South Korea	4,72	180
Switzerland	5,24	185

Source: www.cable.co.uk

The National Skills Development Mission of India, also known as Skill India⁴³, was launched by Prime Minister Narendra Modi in 2015. This programme is designed to address the challenge of educating and providing vocational training to millions of India's young people. It aims to train over 400 million persons in India by 2022 via apprenticeship training, technical internship programmes, fee-based courses and online skilling via e-Skill India Portal⁴⁴.

The Startup India⁴⁵ campaign was announced in 2015. Promotion of entrepreneurship and supporting the startup movement is seen by the government of India as an important addition to the efforts towards building up sustainable and inclusive, knowledge-based economic growth in the country and creating much-needed jobs for the economy. The three pillars of the Startup India initiative are (i) simplification and handholding to ease the administrative process of setting up a startup, (ii) funding and incentives via exemptions on Income Tax and Capital Gains Tax for eligible startups, as well as allocated funds and credit guarantee schemes, and (iii) incubation and industry-academia partnerships⁴⁶. The Start-ups Intellectual Property Protection plan, for instance, now provides an 80% rebate for patent filing and 50% rebate for trademark filing fees for startups in India⁴⁷. These highly publicised efforts in combination with young India's creativity

and upbeat spirit have led to an upsurge in entrepreneurship of truly unprecedented scale (for details please see page 57 of this report).

The backbone of many of the abovementioned and other reforms in India is the large-scale **Digital India**⁴⁸ initiative, launched in 2015. The Digital India Corporation, part of the Ministry of Electronics and Information Technology of India (MeitY) and the Ministry of Finance – are the main coordinators of this transformational flagship campaign. However today, without exaggeration, it touches upon nearly each and every branch of the Indian government, as well as all Indian people in their daily lives. Prime Minister Narendra Modi pays special attention to the implementation of Digital India. In just five years this movement has

become indispensable to India's progress, and the understanding that qualitative leap forward in India's development and achieving the country's ambitious goals is not possible without the digital solutions – is now shared throughout the Indian government, its' private sector, and the people of the country. With the success of Digital India, the country's strive to build a knowledge-based economy and turning into a global technological superpower is gradually becoming a reality.

There have been earlier efforts to advance digital adoption in India. Various programmes like the National e-Governance Plan, Jawaharlal Nehru National Urban Renewal Mission and the Mahatma Gandhi National Rural Employment Guarantee Scheme were introduced in the early

2010s. However, limited availability of internet infrastructure, high cost of access and usage, lack of awareness, low digital literacy, narrow range of applications and services and generally unfavourable conditions for digital-based business constituted insuperable barriers to large-scale progress in this field.

Digital India, on the contrary, implies a more comprehensive approach. It was developed with a view towards a close partnership between the government and the private sector as the main prerequisite to India's digitisation. The goal of Digital India was formulated as "the Power to Empower", and its' nine pillars for India's digital transformation are as follows⁴⁹:

Broadband highways. In order to provide "Broadband for All" the Government of India launched the National Broadband Mission (NBM), also known as the Rashtriya Broadband Abhiyan. By 2022, NBM plans to establish high-speed broadband connectivity, extend the optical fibre cable network to five million kms, increase density of telecom towers, strengthen the existing 4G infrastructure and facilitate the development of 5G⁵⁰. Instalment of broadband and cloud services to all governmental departments down to the level of 250000 gram panchayats (village councils)⁵¹ stimulates digital adoption at local level. Building robust digital infrastructure in collaboration with all 28 states and union territories is key to universal, quality and affordable digital access, specifically for the rural and remote areas of India, that guarantees broad digital inclusion.

Universal mobile connectivity. This point implies expansion of mobile coverage and attracting private-sector telecom companies and internet service providers, with particular focus on rural areas. Private business was crucial in improving India's digital reach. Decreased cost of mobile data and affordability of smartphones are instrumental in India's digital revolution. As a result, India is a country where access to clean water may still be a daily struggle in remote rural areas, yet those same villages now would have access to high-speed internet.

Public internet access. This track focused on providing affordable internet access at Common Services Centres and post offices across India.

A recent initiative called Prime Minister's Wi-Fi Access Network Initiative (PM WANI⁵²) will facilitate establishment of public Wi-Fi networks and improve the wireless broadband connectivity all over the country. It aims to create 1.5 mln WiFi hotspots across the country by the end of 2021 – up four times from the current 500 000 – via a private-public partnership.

E-governance. This crucial component of Digital India implies profound re-engineering of all governmental functions, aimed at improving the efficiency of the entire governmental apparatus of India and the quality of its' services. The most important element of this pillar is Aadhaar – the digital biometric ID (for details please see page 30 of this report). Today this digital identity is a vital tool of Digital India, both for the governmental as well as for private business services. Another example of successful e-Governance transformation – are electronic procurement services, now set up and functioning in India.

E-Kranti – electronic delivery of services. Translated as "e-Revolution", Digital India here envisaged 44 mission mode projects (high-priority e-governance tasks with clearly defined objectives and measurable outcomes for central, state-level and integrated implementation), aimed at digital delivery of government services efficiently, transparently and reliably.

Information for all. This track increased access to government information, starting with the open data platform www.data.gov.in, and the portal for citizen engagement with the government [www. MyGov.in](http://www.MyGov.in).

Electronics manufacturing. Digital India aims to promote electronics manufacturing in India with fiscal incentives and production subsidies.

IT for jobs. This track includes multiple initiatives, aimed at teaching young people the skills needed for IT and IT-enabled jobs.

Early harvest programmes. This track implies implementation of quick-turnaround projects to illustrate the benefits of digitisation. Examples range from switching the governmental greetings from paper cards to e-cards and launching secure

SOME OF INDIA'S GOVERNMENTAL PROGRAMMES



Source: Press Information Bureau, Government of India



Source: www.wifichoupal.in

email service for official communication – to converting schoolbooks to e-books and creating a national portal for lost and found children.

As a result of all efforts within the Digital India framework, India has made remarkable progress in the scale and quality of digital adoption⁵³. Establishing a robust digital foundation was of crucial importance on this way. In a very short time, the Indian government created open digital platforms tailored to the Indian requirements. Most significantly, unlike in other countries, these systems in India were built as public goods⁵⁴.

After successfully creating digital identities for individuals via the Aadhaar scheme, the next step was the "Pradhan Mantri Jan Dhan Yojana" (Prime Minister's People's Wealth Scheme) the national financial inclusion drive, equipping underserved Indians with access to affordable banking, provided they can supply details about their

identity, using Aadhaar authentication. Linking these Jan Dhan accounts with mobile phones constitutes JAM trinity (Jan Dhan – Aadhaar – Mobile), launched in 2015. Another mechanism, the Direct Benefit Transfer, allows the federal government to transfer various subsidies – scholarships, money for fuel, pensions, and so on – directly into the bank accounts of eligible citizens, cutting corruption and loss of funds dramatically. This way the government can also be sure that it has sent the money to a unique individual just once, thus eliminating the problem of duplication and theft.

Besides Aadhaar, the Indian government has built a set of nationwide digital platforms, known as "India Stack"⁵⁵. It allows government agencies and businesses to safely serve a billion-plus Indians in real time and at a low cost. The key elements of India Stack are: e-KYC, UPI, DigiLocker and eSign. KYC is the governmental system through which Indians can easily complete "know your customer"

(KYC) requirements that businesses such as banks and telecommunications companies use to assess potential clients and comply with regulations. The programme, called e-KYC, lets users complete the process paperlessly, substantially cutting the costs for businesses to sign up new customers. Another part of India Stack, the UPI, stands for Unified Payments Interface, launched in 2016. UPI allows Indians to seamlessly send money between various banks and financial service providers. Since the platform is a public good, any bank can make UPI a part of its' mobile application with just a few lines of code. The costs of switching between banks are dramatically lowered, so banks now compete for customers' business. The DigiLocker is the service, launched in 2015: it is a governmental platform where Indian citizens can gain access to authentic digital documents. E-Sign is an electronic signature, that also uses Aadhaar identification. The entire India Stack presents a set of publicly available APIs (Application Programming Interfaces). APIs enable easy integration of mobile applications with the data securely stored and provided by the government to authenticated applications. Businesses can build solutions over this system to be able to integrate various functions for their applications or for larger enterprises. With the success of India Stack, the Indian government plans to expand the stack technology to energy, governance, education, transportation, and agricultural sectors.

There is also a one stop platform for every Indian to access more than 300 government services, a mobile application called UMANG ("Unified Mobile Application for New-age Governance")⁵⁶, introduced by the National e-Governance Division of the Ministry of Electronics and Information Technology in 2017. Two other new service platforms developed by the Indian government are: GeM (the Government e-Marketplace) for transparent digital procurement of goods and services⁵⁷, and ODG (the Open Government Data Platform India)⁵⁸ – a single point of access for the public to datasets, documents, services, tools and applications collected by the Indian government.

By setting up this diversified backbone understructure with Digital India programme, the Indian government acted as an enabler, a customer, a platform provider and a collaborator in digitising India. It created favourable conditions for the citizens to go online and for businesses to go digital. Combined efforts of the Indian private players and the government have also made internet connectivity wide-spread and affordable. India is now in the process of updating its' legislation related to digital sphere – from e-commerce policy to regulation of information technology and debating the Personal Data Protection Bill. When cleared, these steps will help India realise the full potential of being a digitally connected nation. On the one hand, this digital empowerment transforms in the tremendous economic value to be created. It is estimated, that India's digital economy could contribute 18-23% of overall economic activity in the country by 2025⁵⁹. On the other hand, digitisation can play an important role in addressing India's challenges – from adjusting and scaling up the education system to promoting financial inclusion, entrepreneurship and ensuring sustainability of India's progress. The current pandemic crisis has contributed to heightened attention to matters around Digital India: will the new digitised India emerge from these extraordinary circumstances stronger and better prepared to move to the new level, offering its' solutions for the rest of the world to take note of and to follow?

ZOOM-IN: NITI AAYOG

The National Institution for Transforming India, also called NITI Aayog (translated from Hindi as "Policy Commission"), was established on January 1, 2015 on the basis of a resolution of the Cabinet of the Indian Government. It replaced the Planning Commission set up in 1950, which had been responsible for India's five-year development plans for over sixty years. NITI Aayog serves as the main policy institute and think-tank of the Government of India. It consists of the two main hubs: 1) Team India and 2) Knowledge & Innovation. The key areas of responsibility for Team India hub being: (i) design of policy and programme framework, (ii) fostering of cooperative federalism. Knowledge & Innovation hub serves as the state-of-the-art resource centre, it provides advice, encourages partnerships, disseminates research on good governance and best practices to stakeholders. NITI Aayog is also responsible for monitoring and evaluation of reform implementation.

The Chairperson of NITI Aayog is the Prime Minister of India. Prime Minister Narendra Modi is the Chairperson of NITI Aayog since its' establishment in 2015. NITI Aayog top management also includes Vice Chairperson (Dr Rajiv Kumar holds this position in the rank and status of a Cabinet Minister), the Chief Executive Officer (Mr Amitabh Kant, appointed in 2019), full-time members, ex-officio members (Minister of Home Affairs, Minister of Finance, Minister of Railways, Minister of Agriculture and Farmers Welfare and Minister of State), and special invitees (Minister of Road Transport and Highways, Minister of Social Justice and Empowerment and Minister of Human Resource Development). The Governing Council of NITI Aayog comprises of the Chief Ministers of each state and the Lieutenant Governor of each union territory of India, in addition to the above functionaries.

Dr Rajiv Kumar was appointed as the Vice-Chairperson of NITI Aayog on September 1, 2017. He succeeded Dr Arvind Panagariya (Professor of economics at Columbia University and the first Vice-Chairperson of NITI Aayog). Dr Kumar holds a Ph.D. in Economics from Lucknow University and a D.Phil. from Oxford University. He has Bachelor's Degree from St. Stephen's college, Delhi University.

His earlier stint in Government of India was initially with the Ministry of Industry and subsequently in the Ministry of Finance, as Economic Advisor during the reform years of 1991-1994. He also served as an independent director on the Central Boards of the Reserve Bank of India and the State Bank of India, and worked with the Asian Development Bank, Confederation of Indian Industry (CII) and the Federation of Indian Chambers of Commerce and Industry.

Mr Amitabh Kant was appointed as the CEO of NITI Aayog in June 2019. Mr Kant has worked in the Government of India as an Indian Administrative Service officer since 1980. He holds Bachelor's degree in Economics (Hons) from St. Stephen's college, Delhi University and M.A from Jawaharlal Nehru University. During his tenure with the government he launched many campaigns including "Incredible India!" and "God's Own Country" (promoting tourism in India and the state of Kerala). He was also CEO of the Delhi Mumbai Industrial Corridor Development Corporation following which he was Secretary at the Department of Industrial Policy and Promotion. Mr Kant was also the National Project Director of the Rural Tourism Project of UNDP which made a paradigm shift in spreading tourism to Indian villages which had core-competency in handicrafts, handloom and culture. He also spearheaded the "Make in India" and "Startup India" campaigns. In his capacity as Secretary (Industries) in the government of India, Mr. Kant drove the Ease of Doing Business initiative. He is the author of the book "Branding India: An Incredible Story", published in 2009.

NITI Aayog has two attached institutions: (i) the National Institute of Labour Economics Research and Development, established in 1962 with the primary objective to do research and collect data in the areas of development and education, and (ii) the Development Monitoring and Evaluation Office, established in 2015 as an efficient and independent evaluation mechanism in India.

NITI Aayog is functionally divided into 23 verticals, each looking after specific sectoral issues, such as: Agriculture, Health, Skill Development, Energy, Rural Development, Managing Urbanisation, Women and Child Development, Land and Water Resources, Data management and Analysis, Public-Private Partnerships, Sustainable Development Goals and others. The work done under each vertical includes policy analysis, research studies and publication of working papers and reports that give information on the current reforms taking place in India and include suggestions and recommendations by NITI Aayog. Over the past few years, these reports have become tools for Central and State Government practitioners as well as for the academia and business community. These reports highlight the progress of the existing campaigns including: «Make in India», «Digital India», the «Swachh Bharat» (Clean India) mission, the «Smart Cities» mission and others. They also discuss the possible introduction of new labour and employment reforms, educational, legal reforms and police reforms, to name a few. NITI Aayog's Annual Reports give an overview of the country in the past year.

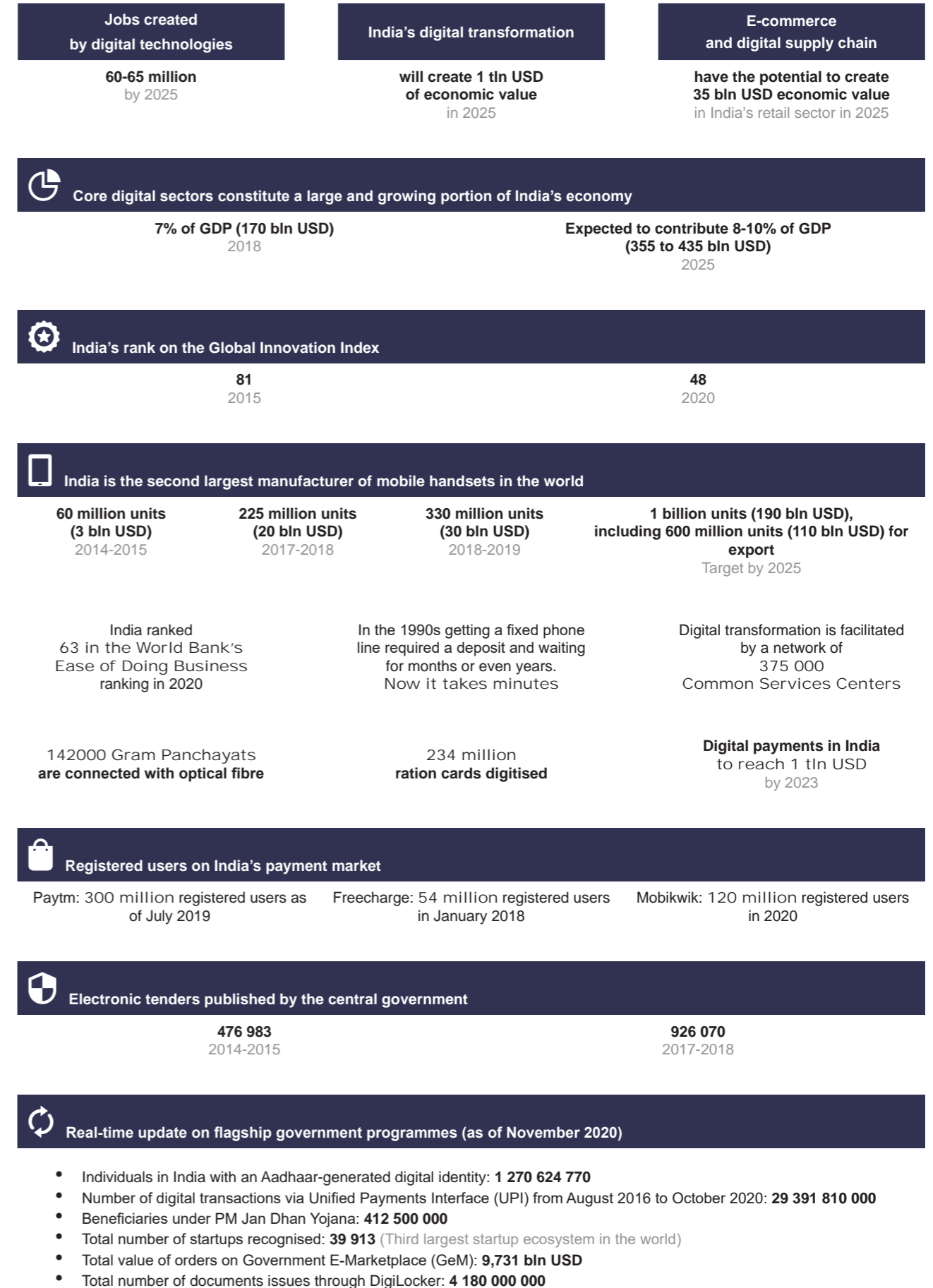
Other key reports that have been published by NITI Aayog include «3 Year Action Agenda», «Report on India's Renewable Electricity Roadmap 2030», «Health System for a New India: Building Blocks», «Export Preparedness Index 2020», «National Data and Analytics Platform Vision Document», «India Stimulus Report», «COVID-19 Trends in India and the World», and «UN SDG India Voluntary National Review 2020». NITI Aayog's «Strategy for New India @ 75» elaborates on the Prime Minister's mission of establishing a New India by 2022 (the 75th year of India's Independence).

NITI Aayog also encourages partnerships between national and international like-minded think-tanks, as well as educational and policy research institutions. Another vital objective of NITI Aayog is to focus on technology upgrades and capacity building for the implementation of the Indian government's programmes and initiatives.

Based on: www.niti.gov.in

India's digital reach in numbers: vital statistics

Various sources⁶⁰



ZOOM-IN: AADHAAR

The Indian biometric identification system is called «Aadhaar», which is translated from Hindi and other Indian languages as a base», «a foundation». It truly meant to be and now serves as one of the main cornerstones of the new, more efficient and better governed country – the first «foundational ID» issued by the government of India. A lot is already said and written about this system, some of the stories are rather anecdotal, however, the importance of Aadhaar to the transformation of India is undeniable.

The effort to create this massive database was first launched by Prime Minister of India Manmohan Singh in 2009. Prime Minister Narendra Modi, has given a new impetus to this initiative after coming to power in 2014. Today, thanks to the hard work of numerous staff of the Unique Identification Authority of India (UIDAI, the governmental body managing Aadhaar) and the visionaries and great minds such as Nandan Nilekani (for details please see page 39 of this report), who served as the Chairman of UIDAI for several years, the system covers almost the entire population of the country (1,25 billion persons are enrolled in Aadhaar as of December, 2019).

Collection of biometric data in remote areas was particularly difficult, as local residents did not quite understand why in their tiny villages, never visited by any officials earlier, there came the people with unusual devices – retinal and fingerprint scanners, laptops and cameras. Registration and scanning centers were also located in schools and close to workplaces of the common people. A special programme was extended to maternity hospitals in order to register babies immediately after birth. A lot of work was done in the cities, where registration officers went around knocking on the doors of private houses and apartments. The laborious process of collecting data took several years.

Each resident of India is now assigned with a unique identification number, a randomly generated sequence of 12 digits, to which biometric and other personal information of each citizen of a billion-plus-people country is linked. Aadhaar numbers have no defined function, and simply getting one doesn't automatically make a person eligible for any subsidy. Anyone and everyone who is a resident of India can get an Aadhaar number, and it lets a person prove just one fact: «I am me.» All data is stored on the servers of UIDAI own data centres in Bangalore and Manesar. The main task of the new identification system was to establish order in the system of distribution and delivery of social benefits to their recipients – an area where inefficiency traditionally reigned in India, causing large-scale loss of budgetary allocations.

To access any governmental service, a person in India now needs his Aadhaar identification number. Today this digital identity code is a vital tool that helps the government deliver social benefits, such as food and fertilizer subsidies, pensions and scholarships, and conduct transparent financial transactions. Using the new identification system, hundreds of millions of Indians, many of them women living in rural areas, arguably the most underprivileged part of the Indian society, were able to open their first-ever bank accounts and receive subsidies. Aadhaar is also a key component in energy subsidy reform, especially in the move from in-kind subsidies to financial transfers for household purchases of cooking gas. Various booklet records, paper cards, databases and lists with duplicate or non-existent beneficiaries no longer required. Linking an individual's Aadhaar-authenticated bank account directly to his or her mobile number, was another step forward, that significantly increased the functionality of Aadhaar, making it the foundation of India's cashless society. Many open application programme interfaces are already linked to Aadhaar, making it possible to settle payments between businesses, individuals and governmental agencies quickly, securely and inexpensively. A tremendous achievement, given the scale of informal cash-based economy in India just five years ago, and its' various cultural challenges – it may be difficult for an illiterate person accustomed to identifying banknotes by colour and size to adapt to digital money.

Aadhaar proved its' crucial importance at the time of crisis, when during the peak of the COVID-19 pandemic, the Indian government efficiently distributed financial aid through Aadhaar-linked Direct Benefit Transfer mechanism to the most vulnerable citizens of India, many of whom, like migrant workers, were on the move. Aadhaar also becomes instrumental in mass-scale vaccination campaign in India, as the vaccination

enrollment and tracking application Co-WIN, developed in India, runs on Aadhaar-based identification.

Initially Aadhaar system knows only four data points about each holder: name, date of birth, address, and gender, besides the biometrics. It only verifies a match of biometric parameters, it does not store or share the reason for the verification request or details of any transaction. Potentially this system can be used to collect and aggregate personal information such as credit histories, medical records, electronic signatures, and other data – and the regulation of access to this data is subject to extensive debate in India.

Aadhaar system has unique digital architecture, which is characterised by low operating costs, high speed of introduction and processing of new data, and easy add-ons. Building Aadhaar digital infrastructure cost only about 1 USD per citizen – that much to give almost everyone in India an Aadhaar number.

Simplicity of Aadhaar and the functionality of Aadhaar-based India Stack are of major interest to other countries, such as Afghanistan, Bangladesh, Morocco, the Philippines, Ethiopia, Guinea, Sri Lanka, Ivory Coast, Togo, Rwanda, Tunisia, as well as Singapore and others (around 20 so far), as well as groups of countries, that have expressed intention to learn from India's experience. The success of the architecture of Aadhaar led to the development Modular Open Source Identity Platform (MOSIP, www.mosip.io), which is now promoted and being made available for free by the International Institute of Information Technology in Bangalore (IIIT-B), supported by a number of high-profile sponsors, including Omidyar Network, the Bill and Melinda Gates Foundation and Sir Ratan Tata Trust.

Based on: www.uidai.gov.in, www.thehindu.com, www.indiatoday.in, www.economist.com, www.foreignaffairs.com, N.Nilekani "Rebooting India: Realizing a Billion Aspirations", 2015.



The COVID-19 crisis – the danger or the opportunity?

The current situation with the COVID-19 pandemic in India, although putting unprecedented pressure on the people, the businesses and the government of the country, at the same time presents certain opportunities, being analogous to natural selection and the long-expected market correction. India has the chance to recover from the pandemic faster than other countries, and on a qualitatively new level.

On March 24, 2020, this vibrant and perpetually moving country came to a standstill with minimal economic activity, after Prime Minister Narendra Modi addressed the nation and announced the introduction of a complete national lockdown, which turned out to be one of the strictest quarantines in the world. It was a much-needed measure in the face of the epidemiological threat. On the surface, it hurt the vulnerable Indian economy, which has been showing signs of slowing growth even before the pandemic. In April 2020, the IMF lowered its forecast for India's GDP growth for the 2020/2021 fiscal year from 5.8% to 1.9% (with the prospect of recovery to 7.4% in the next fiscal year)⁶¹. The contraction in April-June 2020 at the peak of the pandemic was estimated at 23.9%⁶². In November 2020, it was announced that the economy was in technical recession for the first time in India's history⁶³. However, at the time of writing of this report, India, although ranking second in the total number of identified COVID-19 cases after the US⁶⁴, is almost entirely back to work, with several macroeconomic and industry indicators showing noticeable growth while many others are on the path of recovery, which, according to economists, could gather pace and yield a possible GDP upgrade. This would mean a smaller contraction in the financial year 2021 than forecast⁶⁵.

As unprecedented in scale and unexpectedness as the current COVID-19 crisis is, India is accustomed to calamities of global dimensions, as was seen

for instance, during the world financial crash of 2008. Some of the factors contributing to this relative immunity to stormy economic weather outside the Indian subcontinent, include:

- 1) the size of the domestic market and high level of diversification of the Indian economy;
- 2) comparatively low involvement of Indian business in international supply chains;
- 3) since over 80% of energy in India is imported, sharp reductions in the cost of oil and gas, as well as other commodities such as iron ore and coal;
- 4) a young and capable population;
- 5) the savings of millions of Indian households are in gold, not just in stocks or bank deposits, echoing centuries-old traditions;
- 6) and, not least important, the business culture in India has always been built upon long-term personal relationships and close social ties, sometimes spanning several generations.

The interconnectedness and interdependence of all elements of the Indian society are key to the stability of the Indian economy and its ability to adapt to external stress. This time, one could add a political factor – the daring leadership of Prime Minister Narendra Modi and his team, whose mandate for large-scale reform was reiterated in the national elections of 2019.

Many reforms, already implemented by the Modi government, are of particular importance in present conditions. These include the creation of a system of compulsory medical insurance for the poor, and direct payments of social benefits, which, thanks to the current system of digital biometric identification of citizens, now reaches addressees more effectively. The fact that India is a globally-recognised powerhouse in pharma and vaccine production adds to the country's confidence.

Prime Minister Modi continues to press ahead with various reforms, some of them, like changes to the labour laws and legislation related to agriculture, for instance, are very painful and have been pending for decades. His personal dedication and conviction about the importance of Digital India set of programmes were even further strengthened by the COVID-19 crisis and are now shared by the entire Indian government as well as business, where the understanding of the importance and the benefits of digitisation for a country like India has increased many-fold. Like elsewhere in the world, industries such as transport, construction, HoReCa and other types of services, which employ up to half of India's working-age population, have been particularly hard hit. On the other hand, many high-tech, digitally enabled businesses received a major boost, both in terms of consumer demand and politically, owing to the crisis, which also helped many companies digitise faster.

The pandemic has undoubtedly led to an acceleration of India's digitisation. Like anywhere else, besides the obvious increase of reliance on the internet in people's everyday lives during lockdown and afterwards, technology has become a vital tool for an increased number of businesses and governmental institutions. The crisis has spurred broader adoption of digital solutions and provided an opportunity to identify and fast-track innovations related to healthcare. It has also helped relax unnecessary bureaucratic barriers that might have slowed down the endorsement of technology prior to the crisis. One of the sectors receiving an unexpected boost was telemedicine, where practice guidelines were established, at last, after several years of regulatory uncertainty. Government electronic procurement of products and services related to COVID-19 was expedited through easier registration for sellers and manufacturers on the government's e-marketplace. The contact tracing and information solution, Aarogya Setu, has become the world's most downloaded COVID-19 tracking application⁶⁶. India's National Informatics Centre, an office under the Ministry of Electronics and Information Technology, is in charge of the COVID-19 Sample Collection Management System. Under the Digital India initiative, local branches of NIC have developed programmes such as the «Nurses Registration and Tracking System», «COVID Warriors Portal» and others, helping medical personnel in their

daily work and assisting state governments and hospitals in managing and coordinating demand and supplies of medical equipment and personal protection items.

Earlier the government had launched Ayushman Bharat, a programme aimed at providing affordable healthcare and medical insurance for India's deprived households. With these and other steps, India has made confident strides towards creation of National Health Stack, a shared digital infrastructure including digital health records for all citizens, usable by public and private sectors across the country, which is scheduled to be completed by 2022. It will be essential to successful running of Ayushman Bharat and other health programmes in India. The use of drones, robotics and artificial intelligence has increased significantly. As the lockdown came into force, there was a surge of demand for online grocery sales and delivery, with companies working in this sector struggling to process all the orders. However, overall online spending did not increase as online purchases shifted towards essential products and away from other consumer goods, on weak consumer confidence.

Cash distributed by the government as part of financial relief packages amounted to over 5 bln USD, transferred to citizens via Direct Benefit Transfer (DBT), the government's digital system for distribution of various subsidies. A robust digital payment system and financial inclusion of the poor have become crucial, especially in the pandemic. According to the Reserve Bank of India, by August 2020, there were around 100 million digital transactions per day in India, five times the number in 2016⁶⁷. The crisis has also expedited the next phase of implementation of India Stack, the previously mentioned Aadhaar-based government platform with the world's largest open application programme interface (API) system which aims to provide contactless, cash-less and paper-less services to Indian citizens⁶⁸. With pandemic-imposed changes in education, the need for digital literacy to reduce the digital divide between the well off and the poor has become even more obvious and important. Among multiple educational resources promoted by the government, DIKSHA, a platform for school education that has seen a spectacular growth in usage since the pandemic, introduced training in coding at middle school level. National

examinations moving online has helped the entire educational sector adjust much faster. Private educational platforms received a major impetus, with Byju's, a unicorn and world's best-funded educational application, seeing a dramatic increase of over 20 million new users⁶⁹ (for more details please see page 74).

In the meantime, geopolitics continues to play a role in India's economic outlook. Following the violent clashes on the Indian-Chinese border (Line of Control) in May 2020, various forces are calling upon Indian business to refrain from doing business with China, decrease reliance on imports from that country and, most importantly, to offer an alternative location for international manufacturers wishing to relocate out of China. While carefully avoiding any criticism of China for handling the pandemic, the Indian government has taken preventive measures against an increase in the share of Chinese capital in the Indian economy (for details see page 52 of this report), and is offering further incentives for businesses planning to set up production in India. Self-reliance and the scaling up of indigenous production is the prevailing theme of post-pandemic India: in August 2020 Prime Minister Modi launched the «AatmaNirbhar Bharat Abhiyan» campaign (Self-reliant India)⁷⁰, with the catchphrase «Vocal for Local». Diversification of Indian exports towards more technologically sophisticated and higher value-added products is also high on the agenda of the Indian government.

At the same time, as the ad hoc stimulus measures undertaken by the government in order to support the economy are ending, there is growing pressure on India's decision makers to stimulate demand to push consumer spending and capital expenditure. The aim is to increase government spending in order to break the long-lasting cycle of weak consumer-business sentiment which has crippled the Indian economy, to resume large-scale infrastructural projects and to invest in public healthcare.

Another major challenge faced by India and further aggravated by the pandemic is the deepening inequality between the country's rich and poor. It is reported⁷¹ that during the lockdown Indian billionaires increased their wealth by 35%. It is estimated that a wealth tax on the nation's 954 richest families could raise the equivalent of 1% of India's GDP. At the same time, Indian business suggests that the country's overall competitiveness will depend on improving the cost of doing business in India in terms of energy, land, logistics etc. That is besides the general ease of doing business issue. With the cost of capital, oil, gas and commodities declining sharply, it is believed that India has extra advantages and should make the most of the current situation, turning this crisis into a range of opportunities, though this time more equitably than before.



Digitisation the Indian way

Digitisation in India has many distinctive features that make the case of India stand out from other countries undergoing similar type of change.

A private – public endeavour

Factors contributing to the unique profile of the digitisation process in India include, but are not limited to, the size and scale of India's domestic market, the low average income of the Indian population, the traditional complexity of economic ties and a strong culture of intermediaries in all spheres of life and business activities in India. Added to that are various types of affirmative measures aimed at safeguarding the rights of underprivileged minorities, a federative system of governance with complicated politics at state level, and cultural diversity that includes the long list of languages spoken in the country that require businesses to always think local. These are just some of the obvious features, that make the case of digitisation in India unique. There are many more, as multifaceted as India itself. One of the fundamental distinctions, however, is not so obvious and comes as a product of recent developments.

It has always been common to describe India as a country with a rather soft state, as having rather inefficient government full of inertia and a burdensome bureaucracy which is able to defeat any ambitious initiative. However, things are changing, and the role of the central government in the process of digitisation of India is the best proof of these tectonic shifts. Another remarkable feature of the digital transformation in India is that it is taking place with the very active participation of the private sector, and the efforts on behalf of business and the government are well-coordinated, making this work a true private-public partnership.

The understanding of the fact that governance in

India needs to become more efficient was shared by competing political forces and it would be fair to mention the biometric digital identification system, Aadhaar, as well as a few other important initiatives were launched several years before Narendra Modi became national leader in 2014. However, starting from 2015, the year of the introduction of the large-scale Digital India programme by Prime Minister Modi, the central government as sent a clear signal to all segments of the Indian society, including the bureaucracy itself, that the future of India is digital. Most importantly, the government took decisive action in digitising itself first.

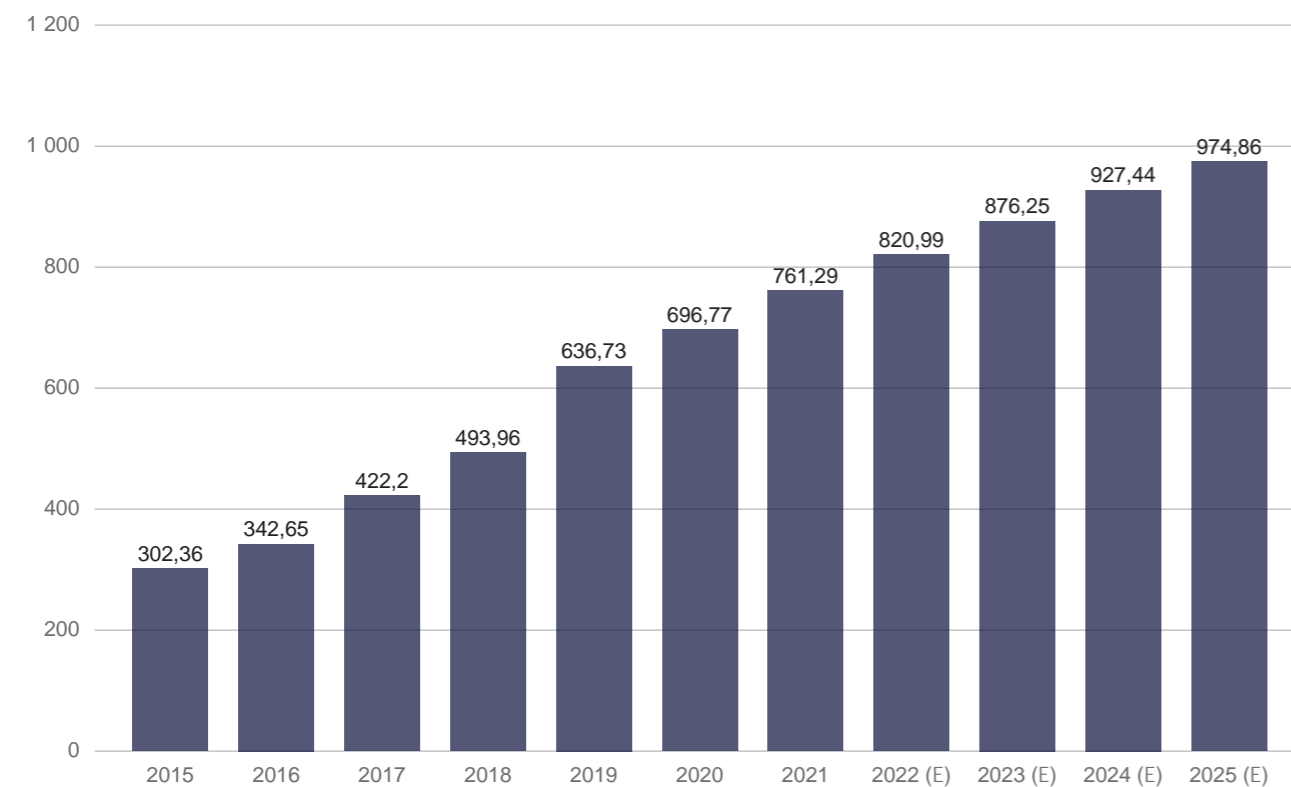
The earlier mentioned JAM trinity, the foundation of large-scale digital governance reform, includes the Pradhan Mantri Jan Dhan Yojana programme (the governmental initiative aimed at financial inclusion and facilitation of access to banking services), the Aadhaar system and mobile coverage. Additionally to the JAM trinity, the introduction of Goods and Services Tax throughout the country instead of separate tax regimes in each state, and the digital network behind it, as well as the digitisation of records at the Ministry of Corporate Affairs, have significantly advanced business transparency in India. Demonetisation, initiated by the government in 2016, contributed to fast growth in digital payments. These and other actions have provided a strong impetus for citizens to go online. The first two pillars of the JAM trinity would not be so well-established if not for the third one: mobile coverage. The public-sector programmes that, in combination with the private-sector efforts to make mobile internet affordable to all Indians, have led to India's rapid

digital transition, are often referred to as a digital leap.

Interestingly though, the two important governmental pillar-tracks of action in digitising India would not have been possible without the vision and active participation of the two Indian business leaders, who this report is going to speak about in detail. It is important to mention that the list of distinguished entrepreneurs who have been actively participating in building their country and whose vision contributed significantly to shaping today's India is very long. It includes many world-renowned names such as the Tatas, the Birlas, the Godrejes, the Mistrys, the Murugappas, the Kirloskars, the Oberois and others, whose business history spans over a century and started even before India became independent from British rule, as well as some new names that emerged fairly recently, for instance, Vijay Shekhar Sharma, the founder of Paytm, the quick payment application, and Bhavish Aggarwal, the founder of Ola, India's favourite taxi hailing application, to name just a few. However, it is the role of the two businessmen, Nandan Nilekani and Mukesh Ambani, that deserves special attention.

The unusual career path of Nandan Nilekani, a well-known Indian entrepreneur and public figure (for details see page 39 of this report), includes setting up and co-chairing one of India's leading software development, IT and business consultancy companies, Infosys, and, most importantly, after resigning from Infosys, heading two governmental bodies, instrumental in changing the way India functions today and in transforming the lives of millions of Indians. In 2009 Nilekani became Chairman of the Unique Identification Authority of India, responsible for developing and implementing the Aadhaar programme. He was later was appointed head of the high-level committee on deepening digital payments, set up by the Reserve Bank of India. By June 2019 this Committee came up with detailed recommendations to the government, that, building upon the Aadhaar system and existing inter-bank instant payment services, would, if implemented, allow for a 10-fold growth in the volume of digital transactions, and trebling the number of digital payment users in just three years⁷².

NUMBER OF INTERNET USERS IN INDIA (IN MILLIONS)



Source: www.statista.com

ZOOM-IN: NANDAN NILEKANI

Today India is channeling most of its' aspirations in the direction of major technological changes. They become possible through brave and empathetic implementation of forward thinking of many talented entrepreneurs. Nandan Nilekani holds a special place among them. Being actively involved in working with the government for almost a decade, he proved to be able to steer change and bring technologically sophisticated solutions of unprecedented scale to reality, successfully navigating many bureaucratic and logistical hurdles with his managerial expertise.

N.Nilekani graduated from the Indian Institute of Technology Bombay in 1978, majoring in electrical engineering. He started his career at the Mumbai-based Patni Computer Systems. In 1981, N.Nilekani together with Narayana Murthy, another prominent business leader and visionary, and a five other like-minded entrepreneurs co-founded Infosys. Infosys is arguably one of India's most famous software companies, worldwide. It became part of the global outsourcing and consulting shift in the 1990s and one of the leaders in IT and business consulting today. N.Nilekani headed the company's marketing efforts in the US before returning to India to become its' CEO. Infosys' topline grew to 3 bln USD during N.Nilekani's five-year tenure as the company's CEO from March 2002 to April 2007. It contributed significantly to India's growth in export revenues in IT and IT-enabled services from less than half a billion to 40.4 bln USD between 1994 and 2008. From 2017 N.Nilekani is Non-Executive Chairman of the company.

N.Nilekani is one of the founders of NASSCOM, National association of software and service companies, the business association of the Indian information technology, business process outsourcing and other technology-based industries, an important trade body on the frontline of many technological changes in today's India (for details about NASSCOM see page 63 of this report). N.Nilekani is also member of the board of governors of the Indian Council for Research on International Economic Relations (ICRIER) and the president of New Delhi-based National Council of Applied Economic Research (NCAER). In 2008 he also set up the Indian Institute for Human Settlements to help solve the challenges related to India's rapid urbanisation, and served as Chairman of Government of India's IT Task Force for the Power Sector.

In July 2009, upon the invitation of Prime Minister Dr. Manmohan Singh, N.Nilekani became Chairman of the Unique Identification Authority of India in the rank of a Cabinet Minister, that developed and implemented Aadhaar biometric ID system (for details see page 30 of this report), one of the main pillar's of India's speedy digitisation, referred to as the biggest social project on the planet, and many other groundbreaking changes. Currently, N.Nilekani is leading the high-level committee on deepening of digital payments at the Reserve Bank of India, that developed a road map for the government towards expanding the use of digital payments and various financial technologies in the country. He serves at Advisor (Innovations and Public Policy) to the National Payments Corporation of India, an umbrella organisation for operating retail payments and settlement systems in India, an initiative of Reserve Bank of India and Indian Banks' Association.

N.Nilekani and his wife Rohini participate in many philanthropic initiatives, one of them is EkStep Foundation, a not-for-profit effort to create a learner centric, technology based platform to improve basic literacy and numeracy for millions of children in India and beyond, where N.Nilekani is the Chairman and Co-founder (along with Shankar Maruwada, who is also the CEO). EkStep was instrumental in developing DIKSHA, India's main government-owned and operated public educational technology platform and application, that hit 10 mln downloads by 2021.

N.Nilekani is the recipient of multiple awards in recognition of his contribution to business as well as social cause. Fortune magazine conferred him with «Asia's Businessman of the Year» title in 2003. In 2005, he received the prestigious Joseph Schumpeter prize for innovative services in economy, economic sciences and politics. He was also named Businessman of the Year by Forbes Asia in 2007. Time magazine listed him as one of the 100 most influential people in the world in 2006 and 2009. He received the «Legend in Leadership» award from Yale University in 2009. Foreign Policy magazine named him as one of the Top 100

Global Thinkers in 2010. He won The Economist Social & Economic Innovation Award for his leadership of India's Unique Identification initiative (Aadhaar) in 2014 and received the Lifetime Achievement Award from EY in 2017. In the same year N.Nilekani received CNBC-TV 18 India Business leader award for outstanding contribution to the Indian economy the 22nd Nikkei Asia Prize for Economic & Business Innovation.

N.Nilekani was awarded with one of India's highest civilian awards, The Padma Bhushan, in 2006, which was presented to N.Nilekani by President of India Dr A.P.J.Abdul Kalam.

N.Nilekani is the author of two books: «Imagining India» (published in 2010, translated and published in Russia with participation of the Moscow School of Management SKOLKOVO) and «Rebooting India: Realizing a Billion Aspirations» co-authored with Viral Shah, published in 2016. In 2018 N.Nilekani wrote an article for «Foreign Affairs» journal titled «Data to the People» describing India's case of building the digital infrastructure as a public good and calling for other countries to follow its' example.

Based on: www.forbes.com, www.infosys.com, www.rohininilekani.org, www.nandannilekani.in, www.foreignaffairs.com, etc.

Nandan Nilekani wrote two books, which are widely read in India. The first one, titled "Imagining India: the Idea of a Renewed Nation", published in 2009, was his inspirational manifesto about India's development, the way he sees its future and about the means of solving India's most pressing problems. The second one, released in 2015, "Rebooting India: Realizing a Billion Aspirations" contains a detailed insider's account about the planning and implementation of Aadhaar and the challenges faced by his team. More importantly, it is an action plan for the social and economic transformation of India by means of technology. It touches upon a broad range of areas from politics to healthcare and education and reads as a "to do" list for the Indian decision makers. It would not be an exaggeration to say, that although Nilekani's political sympathy is with the Indian National Congress (the party currently in opposition in India), political divisions have been put aside for the benefit of the country. Nilekani's experience and vision have helped facilitate technological reform under several governments in India.

When Prime Minister Modi announced the launch of the Digital India campaign in 2015, it looked like wishful thinking to hope that its key components, such as increasing people's digital literacy, developing infrastructure and creating e-government, could ever reach beyond the big cities into remote rural areas of a country

lacking not just roads, electricity, telephones and computers but basic sanitation and clean water.

Yet, in just a few years this became possible, when government initiatives received well-coordinated backing through the ambitions and strategic approach of another Indian entrepreneur, Mukesh Ambani, the richest man in India. It would be fair to say that among those private companies changing the face of modern India thanks to their innovative solutions, Ambani's Reliance Industries plays a very special role. It was Reliance Industries that swiftly provided Indians with inexpensive high-speed internet and affordable smartphones, implementing this complex telecommunications project upon the foundation of Ambani's long-standing and successful petrochemical business (see page 42 of this report for details). With a gigantic investment of 32 bln USD, Ambani's Jio, a telecommunications company that entered the Indian market in 2016, quickly squeezed out competitors by distributing free mobile phones with free internet access and later charging just a small fee for traffic, thus creating a revolution.

As a consequence, data costs no longer constrain India's ability to apply digital channels and utilise increasingly data-intensive services. In less than five years, the entire country made a qualitative leap forward on the path of digitisation while avoiding many intermediary stages that other

countries spent years on. Today only Indonesia outstrips India in its speed of digitisation. In 2018, only China exceeded India's number of digital consumers (560 million). A survey conducted in 2019 showed that the pace of data consumption per user in India grew twice as fast as in the US and China, increasing by 152% annually. Various estimates put an Indian user's average data consumption at up to 9,8 GB of mobile internet a month (this indicator is 5,5 GB in China, 8-8,5 GB in South Korea, and the 2019 figure in Russia was about the same). The number of internet users in India was expected to grow by about 40% by 2023, to 750-800 million people, and the number of smartphones is expected to double, reaching 650-700 million (as of 2018, India had 1,2 billion mobile subscribers)⁷³. No doubt, the current pandemic crisis would speed up these trends significantly.

A lot has already been done through combined efforts of India's business and government in areas such as digital finance, cloud technology, e-commerce and others, so the next important sphere of partnership could be extending the use of big data, particularly the information available to government. Due to the important role of government, historically, in building India's digital architecture, it will remain instrumental in stimulating the next steps towards building large-scale big data and artificial intelligence capabilities in India, a place which is currently vacant and coveted by indigenous and international players. Private business alone will not be able to create India-born artificial intelligence champions.

India is currently debating how exactly the big data of the government, as well as the data of Indian consumers, should be accessed and used by business, and what regulations should be in place in order to protect the privacy of the citizens. Indian business has already expressed concerns about data from India serving the needs of foreign actors rather than India itself (for details see page 52 of this report) – a sentiment shared by the ruling party and government. Hence it is likely that this area too will see well-coordinated action by the government and India's leading entrepreneurs.

Another area where private-public partnership is already playing a vital role in India and where the importance of concerted effort on behalf of

business and government will increase significantly going forward, is education. State-run universities, such as the network of 23 Institutes of Technology across the country, set up by the Government of India in 1956, as well as other prestigious public schools, have played an important role in the Indian IT and Engineering miracle. Today India's digital economy, including its commercial segment, relies heavily on the traditionally strong stratum of Indian IT specialists. However if the Indian government is to succeed in converting India into a knowledge-based economy as it aims too, it will need the participation of the private sector in revamping the Indian education sector in order to make it relevant to population pressures and the demands of economic development, where the labour market is bound to be disrupted by digital technology. The role of the private sector is already increasing dramatically both in online and off-line formats. Good examples of this are Byju's educational platform (for details see page 74 of this report) and Mahindra University, the recently established private educational institution, focused on engineering, where special emphasis is given to computer science and building expertise in areas such as artificial intelligence.

THE PHENOMENON

India has its' own story of digitisation and unique digitisation profile. A close private-public partnership is one of its' most distinctive features.

THE LESSON

Governmental initiatives require support from the business community and best results can be achieved, if government and business coordinate their efforts.

THE GLOBAL INFLUENCER

India's example of private-public partnership in digitisation is inspiring the governments of other countries to develop digital platforms as a public good and work in close cooperation with national businesses towards digital transformation.

STARTUPS LEVERAGING INDIA STACK

1	Background Verification	  
2	Payments	  
3	Lending	  
4	Paperless Consent	  
5	Tax Compliance	  

Source: NASSCOM, Zinnov Consulting

At the moment, India is at the stage of shaping a regulatory environment suitable to further technological advances. This involves not just the government and business, but civil society too. It will have to continue in order to build upon past achievements and move forward. The successes of recent years, as well as accelerating

challenges, have brought decision makers in India to the understanding that a country of the scale, complexity as well as the opportunity of India needs technology for government as well as for business. The partnership between the Indian government and business will continue to grow, supporting the digitisation drive further.

ZOOM-IN: MUKESH AMBANI AND THE JIO REVOLUTION

Dhirubhai Ambani, the father of Mukesh Ambani and Anil Ambani, launched his business empire in 1957 with a small Bombay-based company importing synthetic fibres and exporting spices. In 1977, following its' successful IPO, Dhirubhai Ambani's Reliance Group became synonymous with business success and guaranteed investment returns for many Indians. The company did not confine itself to the textile business and became a diversified holding that also worked in exploring and developing hydrocarbons, in oil processing, petrochemicals, as well as energy, finance, trade and other areas. In less than 30 years, Reliance Group became a fixture of Fortune Global 500 and India's biggest private company, competing with such famous family holdings of India as Tata, Birla, Godrej, Mahindra. Dhirubhai Ambani passed away in 2002, leaving his sons a multibillion fortune. The brothers Anil and Mukesh engaged in a series of high-profile and unrestrained quarrels that resulted in Reliance Group's assets being split in 2006. The telecommunication company Mukesh Ambani formed in 2002 had to be transferred, among others, to Anil, but Mukesh had the profitable oil processing business left under his control. His company was now called Reliance Industries. Its' assets included the famous high-tech refinery in Jamnagar (Gujarat) processing up to 1.4 million barrels of oil a day. 2010 marked an important stage in this story, when the brothers agreed on revising the terms and timeframe for the non-compete agreements, and subsequently, Mukesh had a chance to announce openly his intentions to embark on a qualitatively new approach to the telecommunication business.

It took Mukesh Ambani about six years to create a new company named Jio (Hindi for "Live on!"). It was officially launched in September 2016. M.Ambani's goals of swiftly spreading accessible internet coincided with the course towards digitisation steered by the government, while his statements that Indians' data must be kept in India were very appealing to India's political leadership. The infrastructure and entire digital ecosystem of Reliance Jio was built and put into operation in under 2-3 years. The estimated costs of creating Reliance Jio vary between 20 and 45 bln USD, which is approximately the amount of Reliance Industries' debt increase over the period of Jio build-up. At the time of the company's IPO in 2016, two-thirds of India's population of over 1.3 bln had no access to internet. The company set the goals of deploying an efficient 4G network throughout India, including its' remotest areas, while securing space for future technological improvements, including 5G and 6G capabilities, and providing its' clients with cheap smartphones and access to various content and services through its' own applications. In the first few months of its' operations, while the equipment and all systems were still being checked, cheap mobile devices under Jio's own brand were literally handed out to customers free of charge. Later, minimal tariffs were introduced that immediately made India the leader in mobile operator accessibility for both voice services (phone calls were essentially free) and high-speed data transfer. As a result of Jio's market entry, the cost of 1 GB of data in India fell by 95% between 2013 and 2017. Once sales took off, the company endeavoured to achieve 100 million new clients in the first 100 days, and did not slow down later: in the first two years, Jio had 250 million subscribers, and today it has 388 million. The company plans to reach 500 million users by 2021.

Today, Reliance Jio is part of the Jio Platforms holding company formed in 2019 as part of Reliance Industries. Mukesh Ambani's two elder children hold top managerial positions in the family business. His son Akash, a graduate of Brown University, is in charge of strategy in Reliance Jio, while his daughter Isha, who graduated from Yale University, is on the board of directors in Reliance Jio and Reliance Retail.

Jio has a large number of applications and services that have quickly become household brands in the lives of Indians. They include JioTV, JioCinema, JioHealthHub, JioSaavn (a music service), JioMoney, JioCloud, JioFiber (broadband internet access service) and others. Jio rather efficiently provided digital avenues to the conglomerate's vast retail empire, Reliance Retail, which is also the leader in its' segment in India. JioMeet, a video call service, is the latest addition to this extensive range of services. Reliance Jio's contribution to increasing India's per capita GDP was estimated at 5.65% as of 2018.

To compensate for the high costs of creating Jio, M.Ambani planned to part with stakes in his petrochemical business, making Reliance Industries debt free by 2021. However the earlier announced deal to sell 20% in Reliance Industries' petrochemical business to Saudi Aramco for 15 bln USD, was reportedly called off in March 2020 after oil prices fell to record lows. Subsequently followed a stream of deals selling stakes in Jio Platforms to a range of international investors, including the big names like Facebook, Google, KKR, Mubadala, Abu Dhabi Investment Authority and others bringing the overall level of foreign investment in Jio Platforms to 32.97%.

Could this substitution of oil business deals with the sale of stakes in Jio be proof not just to the notion that data, is, in fact, the new oil, but also that the name "Jio" was also meant to mirror the spelling of the word "Oil" right from the moment of the company inception, as some observers believe to be? In any case, transactions around Jio Platforms confirm that, instead of demand for oil, contemporary world is demonstrating a growing demand for innovations.

Based on: www.forbes.com, www.issuu.com, www.jio.com, www.ril.com, www.ft.com, etc.

Digitisation for financial inclusion

In mid-2010s it became a common knowledge among the consumer finance professionals across the world: if you want to see something truly innovative, go to emerging markets. Indeed countries like Bangladesh, the birthplace of Grameen, one of the first banks in the world that successfully offered microlending at scale, or Kenya with its' M-Pesa mobile money system that became the backbone of small business and personal finance, became synonymous with financial innovations "at the bottom of the pyramid". India is definitely one of such high-profile locations; few reports – if any – on global consumer finance will ignore this market.

Indian financial system has effectively adjusted itself to the peculiarities of the country's economy. Out of the world top-10 economies by the size of GDP, it has by far the lowest GDP per capita (in the middle of the second hundred of the global ranking). It is also the only major economy with predominantly rural population: 65.5%⁷⁴. As a result, its' financial system is underdeveloped vs. the economy size: in 2019 it ranked only 15th by the size of financial assets⁷⁵. The country's financial system was for a long time dominated by the state (after two waves of bank nationalisation in 1969 and 1980 state-owned banks controlled over 90% of assets), however the past two decades witnessed the quick growth of modern private banks and non-bank financial institutions.

Financial inclusion was long in the focus of the government's policies in banking, pursued directly through state-owned banks and indirectly through providing various stimuli to private organisations. Currently India has a developed competitive multi-tiered ecosystem of consumer finance which includes large and small banks (state-owned and private), microfinance organisations and a vast network of agents. This system is in complex interaction with the legacy financial practices (many of them are centuries-old), at times replacing them at times incorporating into modern business processes.

The digitisation of Indian banking started in mid-1980s, when the so-called Rangarajan committee⁷⁶ submitted two major reports (in 1984 and 1989) calling for eight main public sector banks to be fully computerised. Part of recommendations was installing a system of teller-operated on-line terminals for back office work that would be linked with IBM-compatible mainframes at central locations. The immediate response to the report was installing special Advanced Ledger Posting Machines (ALPMs) at some bank branches⁷⁷.

At this time the Indian banking industry was almost completely under governmental control after two waves of bank nationalisation. Several remaining private banks⁷⁸ had a combined market share of ca. 5%⁷⁹. The inability of private banks to provide financially inclusive services and their focus on urban up-class customers was among the key reasons for nationalisation⁸⁰. New branch licensing policies required a bank to open 4 branches in unbanked locations, before being able to obtain a license to open a branch in a location already containing a bank; lower lending interest rates and higher deposit rates for rural areas were also encouraged⁸¹. The drive towards inclusion was expanded through initiatives like establishing Co-operative & Regional Rural Banks (RRBs) in 1976, creation of National Bank for Agriculture and Rural Development in 1982 (the bank launched an important programme to support semi-formal village self-help groups in 1992), and introduction in 1989 of Service Area Approach, assigning each branch in rural or semi-urban area to serve 15-25 villages⁸². As a result, the combined share of branches in rural and semi-urban areas increased from 63% in 1969 to 70% in 1979 and 77% in 1989 (the share of branches in metropolitan areas dropped from 18% in 1969 to 10% in 1989)⁸³.

Yet the goal of financial inclusion proved to be harder to achieve than expected, even through the state-controlled institutions. Though the state-owned banks were officially operating as commercial banks, their priorities were in the development of large industrial enterprises⁸⁴.

Their branch networks still tended to concentrate in urban centers. The figures of access to formal credit sources in rural areas jumped from 22.3% in 1971 to 56.6% in 1981 yet decreased to 47.5% by 1991⁸⁵. Within these figures large part of growth happened due to institutionalisation of traditional self-help groups (like xonchois in Assam⁸⁶, chita in South India⁸⁷, etc.) as credit and savings cooperatives. The majority of the population still did not have a bank account.

Low technical level was part of the problem: high costs of operating branches in rural areas with relatively few customers led to practices like establishing relatively high requirements for minimum account balance; those proved prohibitive for large part of rural population. In 1991 there were approximately 3300 deposit accounts per average rural branch compared to 11200 per average metropolitan branch. An average account in rural areas was just INR 28,5 compared to INR 117,3 in metropolitan areas, the

ratio of rural/metropolitan deposit size decreased since 1981⁸⁸.

New banking channels were developing slowly. The first ATM in India was installed only in 1988; it was not until 1997 that interbank Shared Payment Network System (SPNs) or Swadhan was installed to connect ATMs of different banks⁸⁹. Even in 1999, a decade after the introduction of ATMs in the country there were just 800 of them⁹⁰.

Nor was the system sound financially, with mounting Non-performing assets (NPA): the ratio of Gross NPA to gross advances in public banks 1992 was almost 25%. At the same time, the lending rates were high: State Bank of India prime rate stood at 19% in 1991-1992⁹¹. With the rate of credit to real GDP of 17.3% it was quite clear that the system was not supporting economic activity effectively enough. The economic crisis of 1991 clearly indicated that the country's financial system requires significant reform.



A committee led by the Head of Reserve Bank of India M. Narasimham came with a list of recommendations to the government that included, among other things: establishment of 4 tier system with 3 to 4 large banks (including State Bank of India) at the top with rural banks engaged in agricultural activities at the bottom; abolition of branch licensing policy; deregulation of interest rates both for deposits and loans⁹².

This resulted in more competitive and market-oriented system with a new generation of national private banks (like HDFC, ICICI, Axis, IDFC First, etc.) entering the market together with some international players⁹³. Gradually the market share of state-owned banks decreased from ca. 95% to the current 75%. Those new banks launched their operations on the modern IT platforms, immediately raising the bar in competition in terms of quality of services and efficiency of business processes, thus prompting the incumbent players – including the market leader, State Bank of India – to quickly upgrade their technological platforms.

The increasing technologisation of Indian banking allowed for more modern solutions to the problems of financial inclusion. Thus, Kisan Credit Card (KCC) scheme was introduced in August 1998 by the National Bank for Agriculture and Rural Development (NABARD) to provide term loans for agricultural needs. With time the participating institutions included all commercial banks, Regional Rural Banks, and state co-operative banks. The scheme has short term credit limits for crops, and term loans. Importantly credit holders are covered under personal accident insurance death, permanent disability, and other risks; this decreases the chance that the unpaid loan will become a permanent burden for the family⁹⁴. By 2010 almost 95 million Kisan cards were issued⁹⁵; mostly by commercial banks (45%) and small cooperative banks (40%)⁹⁶.

In 2019 fishermen and dairy farmers were added to the scheme; in 2020 Kisan became one of the core instruments of disbursing the government help of 2 Tn INR intended to relieve the consequences of COVID-19 lockdown⁹⁷.

Another important development was the introduction in 2006 of the institute of bank business correspondents (BC, Mitras in Hindu), essentially

retail agents who performed basic client services (opening of current accounts, cash deposits, cash withdrawals, transfer of funds, balance enquiries, mini statements, etc.) especially in rural locations. This capitalised on the long tradition of having reputable villagers as providers of informal financial services to neighbours. The institution quickly took off: by 2010 there were over 34 000 BCs in villages, three years later the figure stood at over 221 000⁹⁸; currently BCs represent over 90% of all retail banking outlets in India⁹⁹. Business correspondents came as effective solution of the "last mile" problem in retail banking, largely solving the problem financial inclusion of rural population. Since mid-2010s they were quickly building up their technological capabilities embracing modern digital channels of customer services.

In 2012 the national payment card RuPay was launched by National Payments Corporation of India, initially with debit cards (credit cards added in June 2017 and prepaid cards in 2019). Currently the system features contactless payment technology and seeks international expansion through partnerships with Discover (the owner of Diners Club) and JCB.

In 2010s the increasing importance of peer-to-peer payments with the help of mobile phones called for introduction of a new tier in banking system, the Payment Banks. These banks are limited in their operations: they can accept deposits less than INR 100 000 and cannot issue loans or credit cards, their main function is to provide payment services from current accounts through mobile or online channels as well as through debit cards. The aim was to bring non-traditional players – telecoms companies, fintechs, industrialists and the postal service – into the formal banking sector to leverage their existing networks to further digital financial inclusion through payments and small savings. Services were to be targeted at under-served groups such as low-income households, migrant workers and micro and small businesses. The limitations of the business model proved to be more challenging than was initially expected, 11 licenses for payment banks were issued, however only 6 banks are currently in operations. It took almost three years to launch the first payment bank in 2017, by a leading mobile operator Airtel. Paytm Bank, launched by popular e-money system became the leader in the

segment. In September 2018, Paytm Payments Bank processed more than a quarter of all mobile banking transactions in the country (124 million transactions per month, 47% more than SBI, the next largest bank by mobile banking transaction volumes)¹⁰⁰.

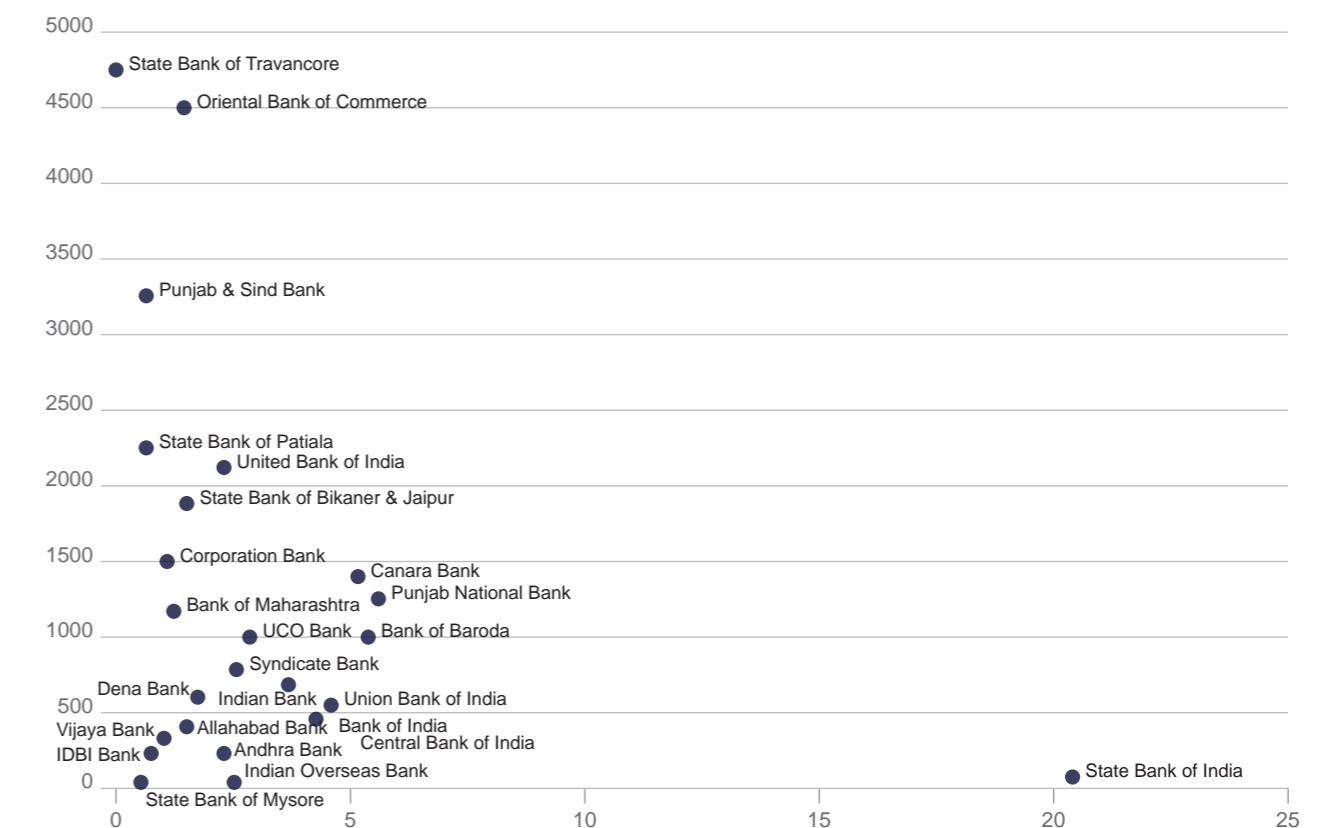
This success reflects the overall growth of the so-called fintech sector in India in the past decade. These include payment companies that facilitate P2P and retail payments through mobile wallets or UPI, such as Paytm, PhonePe, PayU, MobiKwik and FreeCharge, as well as technology companies like Pine Labs and Mswipe who provide hardware and POS devices for digital payments. Pre-paid wallets provided by many of these payment fintechs were some of the major beneficiaries of demonetisation that took place in November 2016 (for details please see page 19 of this report). The event triggered the usage by customers who had "dormant" digital accounts, not using them in everyday life. Between October 2016 and January 2017, the number of transactions through pre-paid instruments (PPIs) more than doubled (from 127 million to 296 million per month)¹⁰¹. Yet the growth

of the segment was challenged by new regulation introduced in the end of 2019 which blocked digital-payments providers from collecting fees from merchants who use their services. The public payments system launched by the government that competes with private providers is another game-changing development¹⁰².

A key innovation that linked together the worlds of fintech and traditional banking in the ultimate push for financial inclusion was the introduction of Pradhan Mantri Jan Dhan Yojana (PMJDY, Prime Minister's People's Wealth Scheme) in August 2014, intended to provide bank account to every citizen of India. Together with Aadhaar national identification system and the modern mobile banking channels, the PMJDY initiative forms the so-called JAM trinity, already mentioned in the previous chapters of this report, which is designed to achieve the goal of universal access to modern financial services across the country.

The PMJDY campaign was announced by Prime Minister N.Modi in his first Independence Day

PUBLIC SECTOR BANKS' AVERAGE PMJDY ACCOUNT BALANCE (INDIAN RUPEES, VERTICAL AXIS) VS TOTAL NUMBER OF PMJDY ACCOUNTS (MILLIONS, HORIZONTAL AXIS)¹¹⁷



speech on August 15, 2014 that declared that "Economic resources of the country should be utilised for the well-being of the poor. The change will commence from this point"¹⁰³. The official start came on August 28th the same year. That day 15 million new bank accounts were opened, an achievement noted by the Guinness Book of Records¹⁰⁴. Yet the scope of the programme was much broader than just mass opening of banking accounts; the programme combined organisational, financial, technological and educational push. Here is the vision of the Government at the introduction of PMJDY: "... universal access to banking facilities with at least one basic banking account for every household, financial literacy, access to credit, insurance and pension facility. In addition, the beneficiaries would get RuPay Debit card having inbuilt accident insurance cover of 1 lakh. ... channeling all Government benefits to the beneficiaries accounts and pushing the Direct Benefits Transfer (DBT) scheme of the Union Government. The technological issues like poor connectivity, on-line transactions will be addressed. Mobile transactions through telecom operators and their established centres as Cash Out Points are also planned to be used for Financial Inclusion under the Scheme".

By the time of the launch of the program over 40% of households in the country (and over 45% in rural areas) did not have access to banking services. The share of rural areas in the number of banking branches dropped from 57% in 1989 to 38.2%, as the new private banks focused more on the metropolitan and urban areas (though the army of bank business correspondents, concentrated mostly in villages, largely solved the problem of insufficiency of branch network for basic operations).

The plan came after careful analysis of the previous efforts to achieve financial inclusion, and had some important new features. It was focused on households, not villages; it targeted low income population both in rural and urban areas, it relied on the established network of bank BCs who were assigned territories comprising 1000-1500 households (3 to 4 villages on an average); account opening was integrated with direct benefit transfer from the government (minimising the number of "dormant" accounts with no movement of funds); the programme

used multiple modern channels like RuPay Debit Card, mobile wallet and USSD¹⁰⁵ based mobile banking; the programme took holistic approach to consumer finance integrating payments, credit¹⁰⁶, insurance and pension. Heavy focus was put on education (rural branches of banks participating in the programme were obliged to create a dedicated Financial Literacy Cell), promotion (with national brand awareness campaign and branding for local BCs) and supervision and monitoring of results on the Federal, State and District levels.

An important feature of the system was its' openness to all banks willing to participate. The public sector banks took the lead with market share of PMJDY accounts of almost 80%, regional and rural banks took ca. 15% of the market, the remaining 5% was captured by private banks¹⁰⁷. The latter were cautious in entering the scheme, due to typically low account balances (with many zero-balance accounts). The country's biggest bank, SBI, opened 25.8% of accounts, other important public sector players were Punjab National Bank (7.2%), Bank of Baroda (6.7%), and Canara Bank (6%). Within the 12 participating private banks three banks accounted for almost 3/4 of opened accounts: ICICI (39.5%), HDFC (18%), and Jammu and Kashmir Bank (17.4%)¹⁰⁸.

Low account balances indeed were the key challenge for the programme. In the beginning of 2015, six months after the launch of PMJDY, the share of zero-balance accounts was as high as 67%, two years later it decreased to 23.2%, still this amounted to 60 million dormant accounts. Much more accounts had the turnover that did not justify the cost of handling them. Some estimations suggested that majority of public sector banks (17 out of 26) involved in the programme were losing money on PMJDY accounts¹⁰⁹. State Bank of India, the leader by number of accounts, had especially low average account balance. Generally, the banks which were more active in bringing in customers under the programme had to accept high share of low-balance accounts (see Chart 1). The banks tried to cope with the problem through education of customers, e. g. Canara Bank reported that its' financial literacy programme allowed to keep the share of zero-balance accounts two times lower than the industry average¹¹⁰.

The link with Aadhaar identification program allowed to simplify the know-your-customer

(KYC) procedures, obtaining certain personal data required by bank in digital form. This brought in better risk management for the sake of lending and insurance with quick growth in both segments in the first years after introduction of PMJDY. As a result, the consumer lending business was expanding at the rate of 45% per year in 2016 – 2017¹¹¹. However, the Supreme Court decision of 2017, which banned mandatory Aadhaar identification of customers for the private companies on the grounds of privacy protection, slowed down the development. Under the new Aadhaar regulation issued in 2018 the companies can obtain the ID number of the customers only on voluntary basis and cannot store the Aadhaar data¹¹². Some replacement solutions were introduced, like Aadhaar Virtual ID and UID Token, identifying the customer, but leaving his/her personal data non-transparent to a supplier¹¹³.

In 2018 the PMJDY programme was prolonged and expanded. By that time ca. 324 mln PMJDY accounts have been opened with more than 812 bln INR of deposits collected¹¹⁴ and ca. 244 RuPay cards issued. One of the important achievements of the program was its' gender balance, 53% of account holders were women. Most of the accounts were linked to Aadhaar, over 75 million accounts were used to receive direct benefit transfers. The number of monthly transactions within Aadhaar Enabled Payment System (AePS) exceeded 1,3 bln in July 2018. Over 11 million people have subscribed for Atal Pension Yojana (APY) (the pension scheme targeting unorganised sector of the economy)¹¹⁵. Overall, between 2014 and 2017, the proportion of the adult Indian population with an account at a financial institution increased from 52.8% to 79.8%¹¹⁶.

There is hardly any other example in the world of such a pervasive, decades-long, strategic push towards universal financial inclusion. Since the late 1960s the government was pursuing a string of important initiatives that sought to provide access to modern formalised financial services to the underprivileged strata of society. Since 1990s these efforts involve full scale private-public partnership, with government-supported programmes (like Kisan card or PMJDY accounts) that are open for participation of various types of actors. This resulted in a vast multi-tired financial system that includes both large and small banks, their agents (business correspondents), payment

organisations, micro-finance institutions and innovative fintech companies.

However, the quest is far from being over. Some 190 million Indians are still unbanked, the number is second only to China. Many of the customers, especially in rural areas, still rely on traditional informal or semi-formal financial institutions like self-help groups¹¹⁸; now this reliance comes more often out of habit than out of absence of viable alternatives. Reaching this financially excluded segment with effective formal financial services will require finding a difficult balance of economic incentives on both the demand and supply side, as well as boosting financial literacy and establishing trust in the new institutions.

THE PHENOMENON

India has a vast multi-tired financial system that includes both large and small banks, their agents (business correspondents), payment organisations, micro-finance institutions and innovative fintech companies.

THE LESSON

There is hardly any other case in the world of such a pervasive, decades-long, strategic push towards universal financial inclusion on behalf of India's government and business.

THE GLOBAL INFLUENCER

India sets an example of a strategic government policy towards financial sector which combines regulatory measures that make the market increasingly open to a large number of players with targeted direct interventions (state-owned banks, PMJDY scheme) and with infrastructural support (Aadhaar ecosystem).

ZOOM-IN: THE TRANSFORMATION OF THE STATE BANK OF INDIA

In 1990s – 2000s several major emerging economies, like Russia, Brazil or India, have passed through a period of transition from mostly state-controlled to competitive market bank system. In all those cases the government retained control in the biggest national bank, yet the organisation had to be largely reinvented to meet the challenges of competition from the new private players: motivated, technology-savvy, and customer-oriented. Thus, the transformation of the State Bank of India has many parallels with the stories of the Russian Sberbank or Banco do Brasil.

By mid-2000s the State Bank of India, the country's oldest (chartered in 1808) and biggest financial institution found itself in an awkward position. It was losing market share for more than two decades: from over 35% in early 1970s to 15% in 2000s. The process accelerated with the arrival of the new breed of private banks, like ICICI, which took the position of India's biggest by market capitalisation. SBI had problems with financial management, with high share of non-performing assets. Its' labour force of over 200 000 was not too motivated; some of the best people left the bank to work for private competitors who could offer higher salaries and quicker careers. Corporate clients were leaving due to the lack of modern services like international financial management, and the requirements of young and affluent retail customers for products like loans for personal consumption were not met.

The first effort to transform the bank was led by Om Prakash Bhatt who was appointed the SBI Chairman in 2006. His approach focused on reinvigorating the corporate morale – he felt that competition with aggressive private competitors is impossible without the same level of employee's personal energy. Being a veteran of the company, he understood well the scale of challenge at hand. In his words, "Before liberalisation, most bankers in India were administrators with little discretion around decision making. The Reserve Bank would decide whom to lend to, how much, and at what rate. Everything was predetermined. The public-sector banks were not really equipped to predict the future, much less to plan for it". The bank had to create competencies and technologies to compete in the new environment.

Om Prakash Bhatt has launched an initiative called Parivartan, "transformation". He assembled a team of 20 executives to develop a roadmap of 14 points with the goal to modernise both product offering and internal processes. Such a collective effort was new for the bank's corporate culture. Then the new vision was communicated to the field managers – who numbered over 10 000 – not through traditional memorandums and directives, but in a series of seminars and trainings conducted all across the country by Prakash Bhatt's deputies. This created a new atmosphere of co-participation in the company, bringing in the much-needed enthusiasm of rank and file personnel.

The transformation was continued by the next Chairman of the bank, Arundhati Bhattacharya, who took the office on October 7, 2013, the first woman ever to hold the position. While Om Prakash Bhatt did a lot to strengthen the bank's competitive position – and returned it to the number one spot in market capitalisation among the Indian banks – more had to be done, especially on the technology side. The digital era was coming to global banking, with new level of internal effectiveness and customer services, bringing in new competition. SBI had to quickly rebuild itself.

Ms. Bhattacharya explained: "India is a country where (transaction) volumes are very large, though the amounts are very small. So, in order to have a viable proposition, it (delivery) has to be a very low-cost model. And the low-cost model cannot be managed unless there is enough technology behind it. Only with technology can volumes be managed".

One of the high-profile moves into digital channels was the launch of sbiINTOUCH, fully digitised branches which have a cash-in-out ATMs, cheque deposit machines, passbook printers, and a multifunction kiosk that enables a customer to do most things they would do at a branch: order a cheque book, block a cheque/card, and have a remote expert consultation on personal finance issues.

In 2017 SBI undertook a radical expansion into cyberspace launching a platform YONO (You only need one), that integrated financial product offering from the bank (absorbing over 10 previously separate digital applications) and products and services from over 100 independent e-commerce providers (like Amazon, Ola, Flipkart, Yatra, Swiggy and Byju's). Through the YONO web-site or mobile app a customer can call taxi, buy air or rail tickets, purchase various goods or even receive certain medical services. In the words of Rajnish Kumar, the SBI Chairman who succeeded Ms. Bhattacharya in 2017, «We have spent almost ₹4 000 crore (40 bln INR) alone on digital initiatives this year and this is going to go up every year». SBI hold a 30 per cent market share in the Indian digital banking. By 2020 only 20% of transactions performed by bank customers were initiated at physical locations, the figure went further down to 7% during the COVID-19 pandemic in spring that year.

Over the 2010s the bank demonstrated steady growth in assets, operating income, profit, and market capitalisation. Yet its' scope of operations¹⁹ and commitment to financial inclusion had its' price: its' cost-to-income ratio stood at almost 53%, much higher than international benchmarks. The level of non-performing assets remains higher than in Indian private banks. The year 2017 (the year after demonetisation) was especially challenging, the bank had negative financial result, largely due to non-performing loans.

Thus, the transformation drive launched in mid-2000s is far from being over. The bank now eyes the booming Indian fintech scene in order to find a mode of effective cooperation with its' key players. «Selectively, we intend to invest in some of the fintechs. Some of the solutions they bring are cost-effective and beneficial to the bank. We provide them the scale and they provide the technology and the solutions at a fraction of the cost that we would otherwise have to incur, so it is a win-win situation», said Rajnish Kumar in a speech on «The Future of Banking».

COMPARISON OF KEY BUSINESS INDICATORS FOR SBI AND SOME BENCHMARK BANKS

	SBI (India)	HDFC (India)	ICBC (China)	Sberbank (Russia)	Banco do Brasil	Qatar National Bank
Operating income, CAGR % 2010 – 2019	10,40%	17,42%	7,38%	12,00%	4,65%	12,20%
Net profit, CAGR % 2010 - 2019	5,77%	20,93%	6,56%	16,62%	4,49%	9,75%
Total assets, CAGR % 2010 - 2019	12,44%	18,63%	8,38%	13,25%	6,21%	15,51%
NPL, average 2017 - 2019, %	3,66	1,31	1,50	4,20	3,21	1,80
RoAA, average 2017 - 2019, %	0,07	2,0	1,11	3,00	1,00	
CIR, average 2017 - 2019, %	52,78	39,15	25,98	35,23	37,40	25,90
Market capitalisation, CAGR % 2010 – 2019	5,25%	13,90%	1,82%	1,58%	-0,71%	5,94%

Calculated by authors based on official financial reports

Based on: www.thehindubusinessline.com, www.knowledge.wharton.upenn.edu, www.crowdfundinsider.com, www.thehindu.com, Roger Malone, Remaking a government-owned giant: An interview with the chairman of the State Bank of India, McKinsey, April 1, 2009.

The new anti-colonialism

Despite the complexities of navigating the way to the hearts (and resources) of the Indian consumers, the vast opportunities presented by the Indian market have long been attracting international players in various fields, particularly in consumer and e-commerce segments. This race for India has intensified significantly as soon as India started to digitise. Nearly all international majors have declared India as their top priority market, announcing massive investments into Indian operations – but not all of them have succeeded so far and the way forward looks equally testing, though for reasons of a different kind – with new type of challenges adding to the traditional set.

One of the most depicting stories is that of Walmart, the US retail giant. After several unsuccessful attempts to enter the Indian market in its' conventional offline format in the early 2000's, and seeing the unfolding trend towards online retail, the company finally made a full-fledged arrival in India by striking a deal that still inspires many young entrepreneurs in India: two founders of the Indian online retailer Flipkart, former software developers at Amazon, sold 77% stake in their company (founded in 2007 and now registered in Singapore) to Walmart for 16 bln USD, in 2018. Prior to this sale Flipkart was one of India's favourite companies with the international investors, including Tiger Global, Naspers, Accel Partners, Morgan Stanley Investment Management, DST Global and others. Currently a loss-making company, it plans to go for an IPO, which still could become the largest IPO any Indian company has seen.

After making a very fast and successful entry into the Indian market in 2013, Amazon, the American online retail giant, is now the main rival of all other e-commerce players in India and placing extremely high bets on this market. Jeff Bezos, Amazon CEO, made several trips to India, each one coinciding with announcements of large investments into the Indian business. On his India trip in January 2020, Jeff Bezos visited swanky newly-build Amazon India office, located in Hyderabad, which happens to be the company's largest facility worldwide, spread over 3,8 hectares

and capable of seating 15000 employees.

India is the largest market for Facebook Inc., with 300 million users, WhatsApp has even greater subscription base of 400 million users, both applications supporting many regional Indian languages. Netflix is extending investment in made-in-India content pledging to spend 420 mln USD in 2019-2020, and expects the company's next 100 million subscribers to come from India¹²⁰. Apple Inc., the late new-comer to the Indian market, has opened its' first online store in India in 2020, aiming to increase direct sales and manufacturing capacity in the country, making use of the Indian government's incentives. Apple is happy with the results of the India market entry so far¹²¹.

Alphabet Inc., the parent company of Google, as well as Microsoft Corporation, both headed by CEO's of Indian origin (Sundar Pichai and Satya Nadella respectively) already have deep connection with India and plan to extend their India operations significantly. Besides tapping into Indian pool of IT talent and running multiple data centres in India, Microsoft brought its' venture fund, M12 to Bangalore in 2020 and plans to focus on investing in Indian startups. The zenith of Google's work in India till now, which started in 2004 with the opening of Google offices in Hyderabad and Bangalore, was the announcement by Sundar Pichai. in 2020, about setting of 10 bln USD Google India Digitisation Fund, aimed at helping India accelerate its' digital economy¹²².

Tech giants from China actively joined the rush for the Indian market too, particularly for its' digital segment. The deepening of trade and investment ties between the two countries was assisted by improving bilateral political relations in 2014-2020. Although India abstained from participation in China's Belt & Road Initiative, it found itself deeply engaged in China's large-scale Digital Silk Road. Despite India's efforts, its' trade deficit with China has been growing in most of the recent years, which has been a major concern for New Delhi. At the same time India started losing most of its' positions in technological sphere to China in its'

immediate neighbourhood, the geographical and political area of strategic importance to India¹²³. According to official information, the volume of Chinese investment in the Indian economy stood at 2.3 bln USD as of 2019¹²⁴, but the real figures could be much higher. As per estimates, the total current and planned Chinese investment in India has crossed 26 bln USD by 2020¹²⁵. Chinese companies emerged as prominent players and investors in areas ranging from infrastructure and energy to technology and real estate. Most of the Indian unicorns¹²⁶ already had Chinese investments by 2020. Alibaba Group, for instance, is one of the investors in India's most widespread fintech service Paytm – the Chinese company owns 40% in Paytm, Tencent acquired stakes in Flipkart and Ola – to name just a few big players, but there are many more smaller ones.

The pandemic crisis has made Indian business more attractive to international investors, including those from China. Interest in companies in spheres such as e-commerce, pharmaceuticals, digital entertainment, telemedicine, fintech and digital payments, artificial intelligence, distance learning is increasing due to their successes amid the crisis, while the attractiveness of high-tech companies in tourism and transport industry has grown due to their precarious position. Foreign direct investment flow into India increased by 13% in the first five months of 2020¹²⁷. Realising how difficult the position of many Indian companies may turn out to be amidst pandemic, and to avoid hostile takeovers, the Indian government hastily tightened the rules for regulating direct investment from neighbouring countries. This step was obviously designed to curb the appetites of India's northern neighbour. The relations between the two countries dramatically deteriorated further after 20 Indian soldiers were killed in a clash with the Chinese forces in a disputed Himalayan border area in June 2020. Although political leadership of the two countries is taking steps to restore normalcy and defuse the crisis, the anti-China sentiment now runs deeper than ever in India's civil and business circles and the Indian private sector, constituting up to 80% of the Indian economy, as well as the country's public segment, is currently in the process of decreasing its' dependence from China. In a highly publicised step, the Indian government banned more than 100 Chinese mobile applications¹²⁸. This quickly led to an influx of hundreds of new apps bearing

the proud «Made in India» tag. In another recent anti-China step, the Indian regulator prohibited the Chinese technology major Huawei from 5G networks testing in India.

While the continuous India-China standoff is not likely to be among the main factors accelerating digitisation in India, it nevertheless gives additional momentum to India's new course towards self-reliance and supports India's aspirations about becoming the new manufacturing stronghold of the world, if not replacing – then at least offering an attractive and reliable alternative to China in the global supply chains. India is declaring that it is open for business, guarantees resilience and is willing to build the world's new investment and production hub. The announcement by Prime Minister Narendra Modi about the launch of AatmaNirbhar Bharat Abhiyan (Self-reliant India campaign) and the first package of related incentives came at the peak of the pandemic crisis and following the India-China clashes in May 2020. The announcement of the initiative is supported by N.Modi's call to his countrymen to buy local.

While most of the multiple industries covered by AatmaNirbhar Bharat, such as autocomponents, pharma, food processing, steel, furniture, home appliances, toys, leather goods, solar panels manufacturing and many others – may not appear to have a direct connection with digital India, importantly, the mission also provides incentives for telecommunications and electronics (including microelectronics and components¹²⁹) industries, including smartphones manufacturing. Currently the second largest manufacturer of smartphones in the world, India aims to overtake China at number 1 and become the world's leader in production of electronics by 2025. This will further propel India's digital transformation, particularly in its' consumer segment. International players like Samsung, components manufacturers including Wistron, Pegatron and others have announced their investment plans, making use of AatmaNirbhar Bharat stimulating measures. The US-China confrontation, though it may take a more latent form with the recent change of administration in Washington, is adding to this push of China out and pull of India into the international digital and electronics market. The US technological giants such as Intel and Apple are making use of India's proposition.

These developments also play in the interest of the Indian entrepreneurs like Mukesh Ambani, and their strategy correlates with the Indian government's objectives. M.Ambani has created the Jio revolution drawing the attention of the Indian government and the society to the dangers of the new type of colonialism. As he advanced his digital business initiatives, M.Ambani called upon N.Modi's government to achieve maximum localisation of the Indian data in India and spoke about the need to fight a new type of colonialism, the country's informational enslavement by global corporations, calling this «data colonization»¹³⁰.

Following the sectoral liberalisation at the turn of the 20th-21st century, India created a telecommunication services market characterised by high competition among players, both Indian and international companies, that came to the promising area via partnerships with national bodies holding the requisite licences. By around 2010, most companies working in India saw that their revenues coming from traditional

services might potentially drop, so they planned to transition to selling data. None of the many telecommunication companies on India's market have, however, succeeded in the attempt. The failure stems from several factors, including the policies of the regulator (which decided to change the rules of the game and check the terms and conditions of previously issued licences at a crucial time for the sector) and appearance of a new player with the requisite resources, who was willing to spend them on achieving his large-scale goals. That player was M.Ambani and his company called Jio. The history of Ambani's family business is an integral and characteristic part of India's economy, and the development track of his companies, including Jio, is regularly discussed in business media and is the subject of several business cases in the world's leading schools (for details please see page 42 of this report).

When M.Ambani launched Jio in 2016, the company's telecommunication rivals realised that their already difficult situation would become far

worse following the emergence of this powerful new player, but hardly anyone could imagine the scale of cardinal and radical changes in store for the sector. India's normally very active anti-monopoly agency, as well as other supervisory bodies, were prepared to close their eyes to some controversial points, since M.Ambani's goals of swiftly spreading accessible internet coincided with the course for digitisation steered by the government, while his statements that Indians' data must be kept in India were very appealing to the country's political leadership. As of today, there are only two big players left in India's telecommunication sector besides Jio, and these two are in a deep financial crisis. India's government had to bail out both these companies by allowing large-scale foreign investment and by permitting all players to raise the prices for their services slightly, which have, over the last few years, fallen to unprecedented lows.

It is a commonplace, that data is bound to become as important to the 21st century as oil was to the 20th century. And smart data is seen as the new fuel for India's economy. Now that India has become data-rich, thanks to its' large population and active digital consumers, the government is paying increasing attention to regulating and managing big data, since the quality of analytical materials, development of artificial intelligence (AI) technologies and efficiency of modelling depends significantly on the volume and quality of data. It can be used, among other things, to manage processes and resources in smart homes and smart cities efficiently - this being the purpose of Smart Cities, one of India's top-priority governmental programmes. By late 2020, Jio planned to present commercial solutions for the internet of things. The company's technical capabilities make this possible. While the Indian government is only preparing to make the decision on deploying 5G, M.Ambani says that Jio has already built the new infrastructure capable of working with 5G, as well as 6G later on, and he is now striving to help make India a knowledge-based economy and one of the principal beneficiaries of the 4th industrial revolution. Jio has no rivals in India in its' capacity for collecting up-to-date data of Indian consumers. M.Ambani plans to improve Jio's technologies capabilities for the most prompt and precise processing and further use of this data, while simultaneously developing cloud computing, smart devices, blockchain, augmented reality and more.

In the first half of 2020 international investors flocked to invest in M.Ambani's Jio Platforms bringing over 20 bln USD in total to his table and taking nearly 33% of the fast-growing company (for details and the complete list see page 54 of this report). Most importantly, many of these companies possess the algorithms, the expertise and the know-how of working with big data, crucial for the development of Jio into what M.Ambani want it to be – the indigenous Indian data powerhouse. While the expectations about Jio's future following these investments are extremely high, it is also presumed that the new international participants in Jio, although being minority investors, might influence the company towards greater transparency and openness about its' numbers and strategy. M.Ambani is frequently criticised over excessive obscurity of his business.

JIO PLATFORMS INVESTORS

Investor	Share (%)	Amount paid (USD bln)	Date of announcement
Facebook Inc.	9,99	5,7	22 April 2020
Vista Equity Partners	2,32	1,5	8 May 2020
General Atlantic	1,34	0,87	17 May 2020
KKR	2,32	1,5	22 May 2020
Silver Lake Partners	2,08	1,35	5 June 2020
Mubadala Investment Company	1,85	1,2	5 June 2020
Abu Dhabi Investment Authority (ADIA)	1,16	0,75	16 June 2020
TPG	0,93	0,60	13 June 2020
L.Catterton	0,39	0,25	13 June 2020
The Public Investment Fund of Saudi Arabia	2,32	1,5	18 June 2020
Intel Capital	0,39	0,25	2 July 2020
Qualcomm	0,15	0,097	12 July 2020
Google	7,73	4,5	15 July 2020

Based on: www.thehindu.com, www.techcrunch.com, www.reuters.com, www.cnbc.com etc.

THE PHENOMENON

International businesses are queuing for access to India's markets despite plentitude of challenges associated with working in the country. Today, your company is not global if it is not in India.

THE LESSON

Having a strong domestic market and diversified national business helps pursue the country's interests. The Indian government wants international players to work hand in hand with the Indian business in moving the country forward to knowledge-based economy.

THE GLOBAL INFLUENCER

International businesses need to adapt their strategy to serving the needs and solving the problems faced by India, clearly stating this mission in their communication with the Indian society and decision makers. By adapting to India's requirements, international businesses are making their solutions more relevant on the global scale.

In their official statements concerning the deals around Jio, all the participants emphasised their confidence in the promising Indian market and in Jio Platforms' potential. Most importantly, in full accord with the expectations of the Indian government and ordinary Indian citizens, they pointed out that the new collaboration does not entail data exchange between partner companies, stressing that they intend to use their technologies for the benefit of India's small and medium-sized businesses by connecting such entrepreneurs more actively to e-commerce platforms. This implies street trade and the so-called kiranas, typical Indian "neighbourhood" grocery stores – the Indian small and micro businesses, hit most by the arrival of the e-commerce behemoths, such as Amazon. Reliance and Facebook, for instance, planned to engage WhatsApp to assist small businesses find a more efficient digital way to meet their customers' needs and the application proved very helpful in connecting Indians under COVID-19 quarantine lock-down – with food supplies. In February 2020, after a two-year struggle, tentative approval was granted for WhatsApp to handle payments in India. Once the decision goes through the bureaucratic formalities, WhatsApp is expected to become one of the largest digital payment-processors in the country, with all the data that comes with it. By pooling efforts with JioMart, the company will be able to expand both sellers and buyers' capabilities significantly and compete with Paytm, India's leading digital payment application.

International players have plenty to worry about when working in India's booming digital space. Not only they have to navigate the complexities of working in a diverse environment and adapt to changing regulation, this concerns for instance, the requirement to store and process the Indian data in India, tightening taxation and debated restrictions over use of personal data of their customers. Most importantly, they have to adapt their strategy to serving the needs and resolving the challenges faced by India, clearly stating this

mission in their communication with the Indian society and decision makers. On his recent trip to India Jeff Bezos received a somewhat chilly reception – reportedly he did not meet the officials he wished to see and the representatives of small businesses staged loud protests in every city he visited on that trip. The message was clear – there are many Indians who do not wish to welcome a multinational that ruthlessly disrupts traditional Indian businesses through unfair trading practices – despite this being exactly the opposite to what Amazon officially proclaims¹³¹.

Before announcing the large-scale India-focused investment plan this year, Google CEO Sundar Pichai spoke to Prime Minister N.Modi over a videoconference call. The conversation revolved around the trends in digital sphere, that have particular importance for India. All of them later found their reflection in S.Pichai's announcement about Google's strategy in India and the company's efforts to help accelerate India's digital economy¹³². These include technological initiatives aimed at making healthcare accessible, at transforming the lives of India's farmers, applying artificial intelligence in agriculture, reskilling and creation of new jobs, digitising small businesses.

In return for access to vast Indian market and bottomless Indian data, the government of N.Modi wants the international players to work hand-in-hand with the Indian business, demonstrating strategy and action aimed at overcoming India's challenges and moving the country forward to knowledge-based society, keeping in mind the broader global picture as well. When pitching India opportunities to international investors, Prime Minister Narendra Modi calls for better alignment of their plans with the Indian government's vision, stressing its' decisiveness in making India the engine of global growth resurgence: "Any achievements by India will have a multiplier effect on the world's development and welfare. A strong and vibrant India can contribute to the stabilisation of the world economic order".

Entrepreneurship

Traditions of entrepreneurship run very deep in the Indian society. They withstood the tests of time, not uprooted neither by the British colonial rule, nor by the socialist inclinations of post-independence era. With the liberalisation reforms of the early 1990's and most importantly with the recent digitisation drive, combined with highly-qualified engineering, IT and managerial force – yet another tradition for India – entrepreneurship in India received the impetus for development and flourishing of truly unprecedented magnitude, resulting in multi-billion-dollar valuations and investments, and India becoming the third largest startup ecosystem in the world after US and China¹³³, in just a few years.

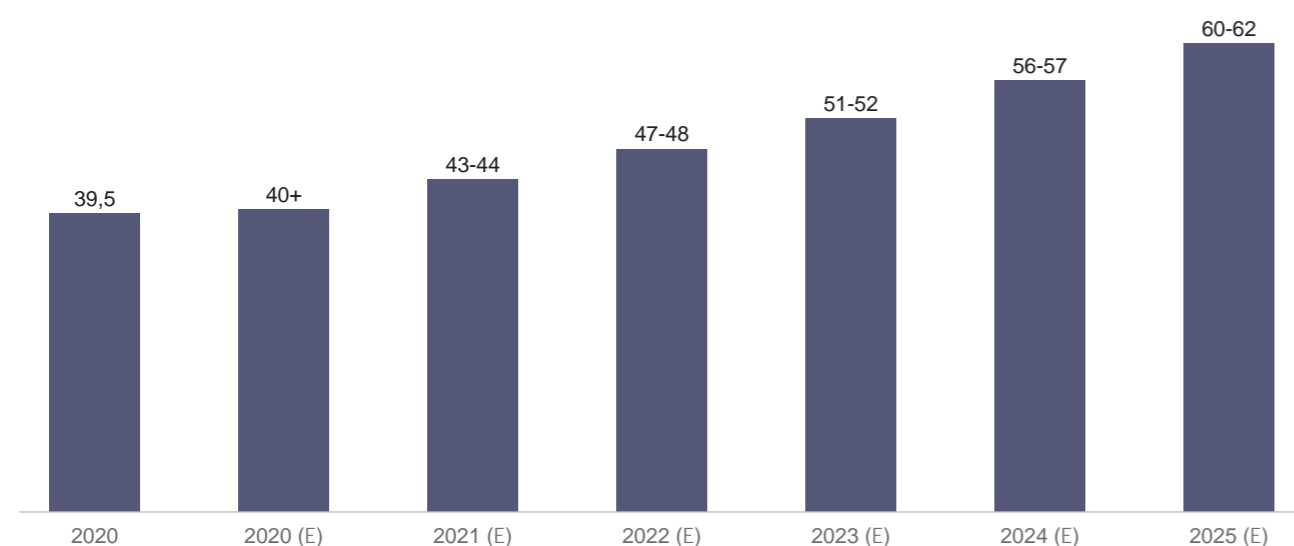
With over 1200 startups added in India during 2018, and over 1300 startups added during 2019¹³⁴, the sector has been growing at 12-15% year-on-year in terms of number of startups. Cumulative valuation of Indian startups crossed 55 bln USD in 2019¹³⁵. Most of the new companies have digital technology at the core of their businesses, 18% of them working in the areas of deep-tech¹³⁶, which includes artificial intelligence, machine learning, augmented reality and virtual reality, internet of things, blockchain, cryptology, robotics, 3D printing, big data and analytics. 21% of Indian startups are primarily focusing on global markets and the number of startups with India as initial market going global – is also increasing. These include not just B2B enterprise software startups, but B2C companies, too. 66% of Indian startup founders said their focus is both Indian and global markets. 31% of startups are serving small and medium businesses, being vital for their digitisation. India is home to approximately 75 million such businesses that employ over 180 million people. 47% of startups work primarily with low and middle income groups of clients¹³⁷.

Entrepreneurship is overtaking the entire country, moving beyond the big metros into smaller cities and even rural areas. Not just the youngsters who make the majority of the population, but all Indians, are naturally very curious and enthusiastic. Unpredictability is the norm in emerging markets. Disruptive changes have become common in India in recent years and Indians are not afraid of

trying new products and services, because the country's vast problems need bold revolutionary solutions. It is very fashionable and about to become mainstream to be an entrepreneur – not just among Indians living in India but among those living, working or studying abroad, with the Indian diaspora serving as an additional reservoir of talent, expertise and financing. Despite the testing times for many startups due to pandemic, Indians are becoming serial entrepreneurs, not deterred by failures. The Indian startup ecosystem is also characterised by high speed of investments and exits. Between 2011 and 2020 it saw not only second-time but third-time entrepreneurs launch new businesses. Entrepreneurs are the new heroes of India's middle class. It certainly helps to have come back with some fortune, not just experience, earned when working abroad, or to have a large supportive family, ready to pitch in as the first investors. Sometimes youngsters are drastically changing the occupational traditions of their families, leaving behind their family businesses and trying something new – daring steps, that would not have been easily acceptable in the Indian society just awhile ago, but now more common. Large fortunes made by some Indian entrepreneurs in recent years, as well as orientation towards doing good for their country and for the world – adding strengths to aspiring entrepreneurs.

Particularly mesmerising are the stories of the Indian unicorns. When Aileen Lee, the founder of Cowboy Ventures, an investment fund, gave the word "unicorn" its' current connotation in 2013, she saw the term as betokening something both wonderful and rare. In 2013 A.Lee found just 38 unicorns in the United States¹³⁸, a unicorn being a startup with over 1 bln USD valuation. By the year 2020 there are 233 unicorn companies in the US out of 586 globally, the US succeeded by China (227). India holds the third position with 21 such company¹³⁹, unicorns having found their steady footing in the Indian landscape. 10 were found in India in 2017, 18 in 2018 and 24-26 in 2019. Another report estimates the total number of unicorns in India as of October 2020 at 33, with 4 companies added to this list at the peak of pandemic¹⁴⁰. Estimations may vary, depending on who is

ESTIMATED NUMBER OF STARTUPS IN INDIA (IN THOUSANDS)



Source: TIE Delhi NCR, Zinnov Consulting

doing the counting and when¹⁴¹, hence it is more important that the list of runner-up companies or soon-to-be-unicorns in India is rather long – between 80-150 companies are expected to reach this status in the near future and this pipeline is greater than ever before. Another depicting fact is that entrepreneurs of Indian origin founded further 40 unicorn companies outside India in 2020 (while Chinese founded further 16 outside China)¹⁴².

It has been a subject of long and thought-provoking debate, whether massive valuations at all matter. It is not a secret that data that these companies accumulate lies at the core of these high valuation numbers. Customer acquisition has been more important for many of these companies than profitability, because data, as expected, would be soon converted into high-quality decision making and forecasting. So data collection and efficient processing of this data become the main priorities at this point, both for businesses and their investors, as well as the government. India is not the only country that reached this level in its' digitisation process, but stakes in India are certainly much higher than anywhere else, for the reasons of scale of the challenges and opportunities faced by this country and their potential to influence the entire world in general – be it in matters of economy, environment, or politics. Although, after several years of exuberance and excessive funding in

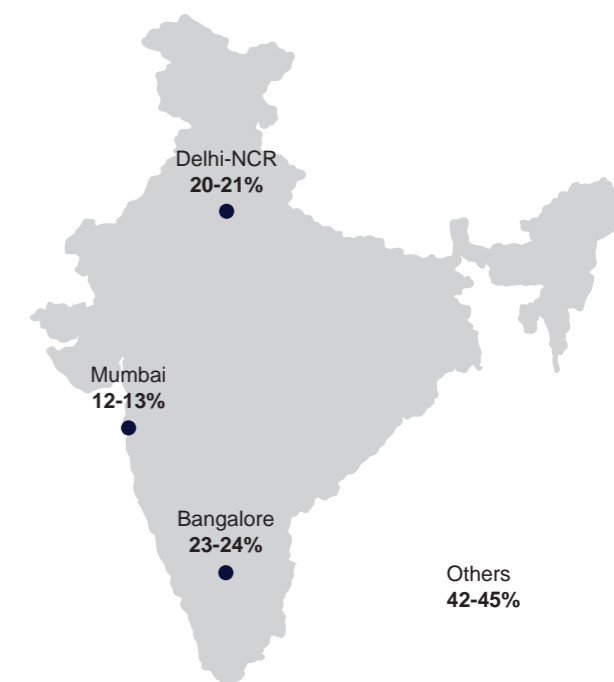
2013-2015, there have been visible improvements in financial discipline and unit economics in recent years, further strengthened by the pandemic. Indian unicorns still face valid criticism: they burn too much capital, while not creating enough jobs and leaving rural India outside their business models, not supporting agrarian livelihoods¹⁴³. Capital too is becoming smarter and more patient. Another important question is whether prosperity of India's nearly half a billion online users grows fast and considerably enough to make India the next big prize for digital dominance after China?¹⁴⁴ There is no doubt, however, that growth trajectory of the Indian unicorns, both in terms of their count and valuation, has been one of the strongest inspirations for thousands, if not millions, of aspiring Indian entrepreneurs, and it is digitisation that played its' crucial role in this companies' inception and development.

Despite recent losses due to change in regulation, Paytm, a financial technology company set up in 2010, is still India's highest valued unicorn, at 16 bln USD (it is run by One97 Communications Ltd, the mobile internet company). Top 10 Indian unicorns make up 78% of the total value of all 21 unicorns, while Paytm alone claims nearly 22% of the total valuation share of these enterprises. Most of the companies on the list, 7 of them (33.3% of total valuation), belong to e-commerce segment. 3 companies (14.3% of valuation) are in financial technology, 2 in logistics, 2 provide on-demand

delivery, 1 company is in the area of new energy, 1 in education technology, 1 works in the area of big data, 1 is a communication platform and 1 company is an interactive gaming application with focus on cricket and football. The average age of Indian unicorns is seven years, of which two are less than four years old. Ola Electric, a collaborative platform for electric vehicles, is the youngest unicorn on the list, being founded in 2017.

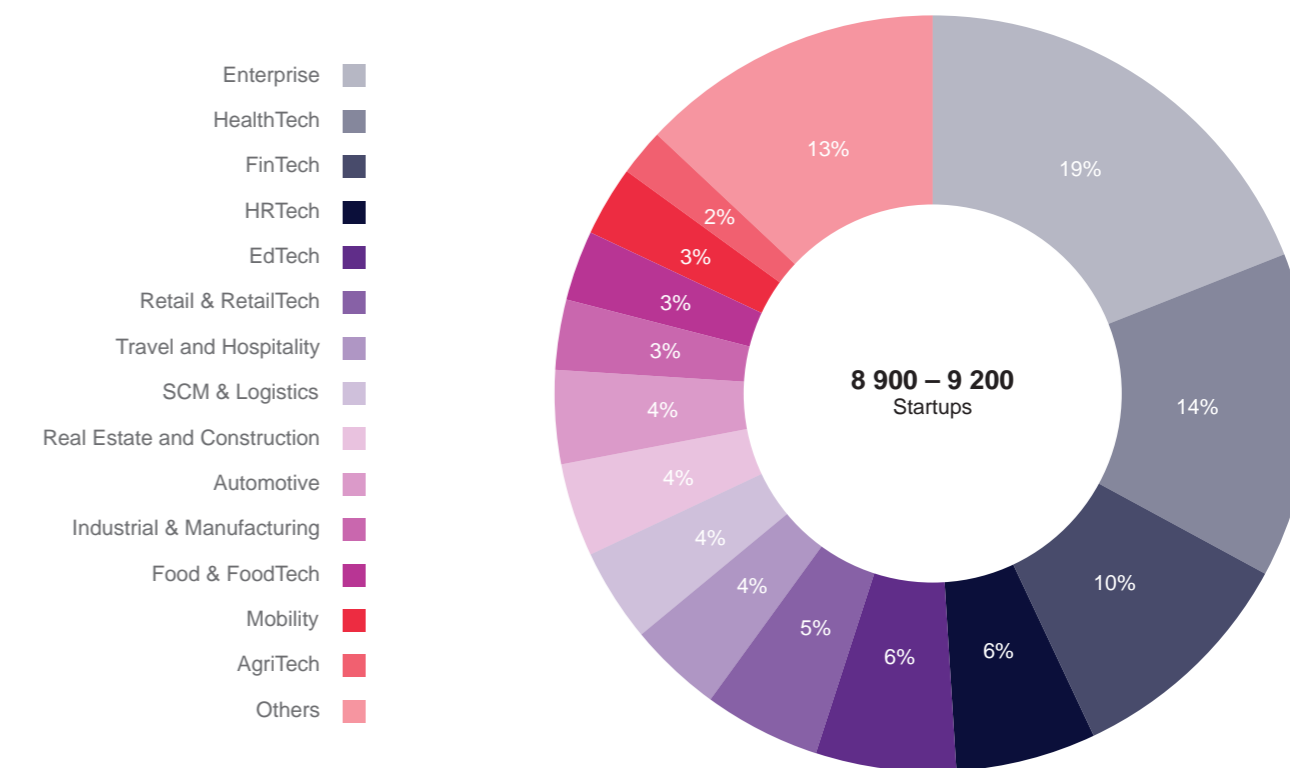
SoftBank of Japan takes the lead in investing into Indian unicorns, having invested in nearly 50% of all of them. Sequoia Capital (USA), Accel (USA), Tiger Global Management (USA), Blume Ventures (India) and Chiratae Ventures (India) are other leading investors into Indian unicorns. Globally, Sequoia is world's most successful venture capital fund, being a key investor in one in five of the world's unicorns. Other large-scale investors in the wonderful and not-so-rare-anymore creatures globally include Alibaba Group (China), DST Global (Hong Kong), Tencent (China), General Atlantic (USA) and Temasek Holdings (Singapore).

INDIA'S ESTABLISHED STARTUP HUBS



Source: TIE Delhi NCR, Zinnov Consulting

SECTOR-WISE SPLIT OF STARTUPS



Source: NASSCOM, Zinnov Consulting






India's venture capital industry may have been incepted in the Silicon Valley, but it has evolved, matured and diversified, with over 390 active institutional investors¹⁴⁵, but also with investors turning into entrepreneurs and successful entrepreneurs becoming investors. Indian offices of Western investment powerhouses usually have a very high degree of autonomy about their investment decisions. All giant Indian conglomerates now have venture capital arms too. Still the market is rather open and communicative, not making much difference between local and international players, since there is enough work for everyone – according to reports, a venture capital company in India may receive as many as 5000 pitches in a year¹⁴⁶.

















There are many reasons to call India the startup nation, flourishing unicorn flock being just one of them. More importantly, there is a whole ecosystem of entrepreneurship existent in the country, that is fast developing and maturing. The year 2019 was considered the best so far for the Indian technological startups, when total funding raised by startups reached 14.5 bln USD (the mark stood at 10.6 bln USD in 2018). Overall, it has been an impressive decade for this industry, that showed 25X growth in funding from just 550 mln USD in 2010¹⁴⁷ and 80000 technological companies built during these years¹⁴⁸ – expansion and deepening being accelerated both through the governmental as well as private capital efforts.

Interestingly, back in 2018, according to one survey of Indian entrepreneurs¹⁴⁹, 24% of the startup founders felt that bureaucratic hurdles hamper their work and only 16% said the government's policies had made a difference. Also, about 66% of the respondents said a level playing field did not exist in India for local and global companies, though they expected companies founded by Indian entrepreneurs to triumph over foreign giants. Earlier in 2016 this issue was raised by the founders of two of India's most prominent startups: by Ola's Bhavish Aggarwal and Flipkart's Sachin Bansal, who sought government's help in battling their overseas rivals, Uber and Amazon¹⁵⁰, who's capacity to burn capital leads to price wars and hurts local players.

Although sentiment over the efficiency of the governmental support may be mixed, an array of measures on behalf of the Indian government increased significantly in the last two years and surely helps improve perceptions about the Indian startup community, both domestically and abroad, and encourages people to try something new. These measures also demonstrate that the government hears the Indian entrepreneurs and has made supporting startup movement in India one of its' top priorities, seeing it as an important helping hand in creating employment and new jobs in the economy. This support now goes beyond high-publicity steps like a governmental initiative aimed at helping startups and introduced

INDIA'S HIGHEST-VALUED STARTUPS, AS OF AUGUST 2020 (VALUATIONS MAY VARY)

Name	Logo	Valuation (bln USD)	Headquarters	Sector	Website
Paytm		16	Noida	FinTech	paytm.com
OYO Rooms		8	Gurgaon	E-commerce	oyorooms.com
Byju's		8	Bengaluru	EdTech	byjus.com
Ola Cabs		6	Bengaluru	Shared Economy	olacabs.com
Swiggy		3.5	Bengaluru	On-Demand Delivery	swiggy.com

Zomato		3.5	Gurgaon	On-Demand Delivery	zomato.com
Paytm Mall		3	Noida	E-commerce	paytmall.com
ReNew Power		3	Gurgaon	New Energy	renewpower.in
Zerodha		3	Bengaluru	FinTech	zerodha.com
BigBasket		2.5	Bengaluru	E-commerce	bigbasket.com
Udaan		2.5	Bengaluru	E-commerce	udaan.com
BillDesk		2	Ahmedabad	FinTech	billdesk.com
Delhivery		2	Gurgaon	On-Demand Delivery	delhivery.com
Mu Sigma		2	Bengaluru	Big Data	mu-sigma.com
Lenskart		1.5	Faridabad	E-commerce	lenskart.com
PolicyBazaar		1.5	Gurgaon	FinTech	policybazaar.com
FirstCry		1.2	Pune	E-commerce	firstcry.com
Dream11		1	Mumbai	Gaming	dream11.com
Hike		1	New Delhi	Social Media	hike.in
Ola Electric		1	Bengaluru	Shared Economy	olaelectric.com
Rivigo		1	Gurgaon	Transportation	rivigo.com

Source: Hurun Research Institute

	5 year CAGR (Number of Startups)	Key Application Areas
Artificial Intelligence	65-67%	Enterprise / FinTech / HealthTech
Internet of Things	45-46%	Industrial / Real Estate / HealthTech
Big Data & Analytics	38-40%	Enterprise / FinTech / Retail & Retail Tech
Blockchain	88-90%	FinTech / Enterprise / AgriTech
AR/VR	55-60%	EdTech / Retail & Retail Tech / Real Estate

Source: NASSCOM, Zinnov Consulting

personally by Prime Minister N.Modi, his personal meetings with young entrepreneurs and creating a portal for startups¹⁵¹ as well as having a special weekly programme devoted to startups on state television¹⁵². There have been more substantial steps, too, aimed at strengthening confidence among Indian entrepreneurs and increasing ease of starting new ventures in India.

The central government's budget of 2019 had a particularly strong component, focused on startups. It relaxed rules of foreign direct investment into industries such as grocery, e-commerce and food delivery, introduced incentives for use of electric vehicles, giving a significant boost to this segment, announced changes in labour laws and rules regulating house renting, allowed up to 100% in foreign direct investments in insurance intermediaries (this helps digital insurance startups), 100% foreign direct investments were also allowed in single-brand retail (this benefitted not just international giants like Apple Inc, but also local e-commerce players operating offline stores). Most importantly, angel investments in startups received a tax break and a set of enhancements to the governmental digital payment systems was introduced, designed to help fintech startups. Earlier reforms, like setting up governmental e-marketplace¹⁵³ and the introduction of a unified GST (Goods and Services), including its' digital component, was an important step forward for all business in India, including startups, enhancing transparency and openness of all entrepreneurial activities in the country. Data localisation requirements introduced by

the government also help Indian companies. The government facilitates entrepreneurship through continuous improvement of digital infrastructure and expanding e-government. This provides a market for digital solutions, a major opportunity zone for startups, and gives people more reasons to go online. India Stack is playing an important role in this process, with open APIs allowing for 3rd party disruption (for details please see page 24 of this report). It also helps align business with social goals. As of 2019, India accounted for 12% of the global internet user base¹⁵⁴ with this share bound to increase, extending the market for digital technology-based startups even further. The renewed efforts by the Indian government aimed at increasing electronics manufacturing in India, making devices even more affordable to Indians and hence increasing the internet penetration and usage in the country significantly. The government as well as academia, both at the federal and state levels, plan to continue their efforts in setting up accelerators and incubators for startups, innovation centres, knowledge exchange hubs and research parks, with many new such facilities now appearing in Kochi, Jaipur, Ahmedabad, Trivandrum – reaching places outside the traditional list of India's largest metros and well-recognised startup hubs, such as Delhi, Bangalore, Chennai and Mumbai. A set of measures aimed at helping startups was introduced by the government during the worst of COVID-19 crisis. MSME (Micro Small and Medium Enterprises) Ideas Portal was launched, to facilitate venture capital investors to connect with businesses¹⁵⁵. Insolvency threshold for companies

ZOOM-IN: NATIONAL ASSOCIATION OF SOFTWARE AND SERVICE COMPANIES (NASSCOM)

National association of software and service companies (NASSCOM) is a non-profit organisation established in 1988. It is a business association of the Indian Information Technology, Business Process Outsourcing and other technology-based industries. It comprises over 2800-member companies including both Indian and multinational organisations that have a presence in India. NASSCOM membership spans across the entire spectrum of the industry from start-ups to multinationals and from products to services, Global Service Centers to Engineering firms. Guided by India's vision to become a leading digital economy globally, NASSCOM focuses on accelerating the pace of transformation of the industry to emerge as the preferred enablers for global digital transformation. The association's strategic imperatives are to reskill and upskill India's IT workforce to ensure that talent is future-ready in terms of new-age skills, strengthen the innovation quotient across industry verticals, create new market opportunities – both international and domestic, drive policy advocacy to advance innovation and ease of doing business. NASSCOM has played a key role in not just the growth of the IT sector to become a 180 bln USD industry it is today, but helped establish the Tech industry in India as a globally recognised and trusted partner. NASSCOM continues to make significant efforts in contributing towards India's GDP, exports, employment, infrastructure development and global visibility.

NASSCOM membership base constitutes over 95% of the industry revenues in India and employs over 4 million professionals, and as technology blends into every aspect of the economy, it expects the industry to become key driver of growth, development and inclusion for the country – to make India a global hub for Innovation and Talent so when the world thinks Digital, the world will think India, as stated in NASSCOM mission. The association is an active promoter of technology-based entrepreneurship in India. In 2013 NASSCOM initiated a programme called "10000 Startups". The purpose of this programme is to support and impact 10,000 startups in India by 2023. NASSCOM carries out a number of events annually, targeting startups in the Indian ecosystem so as to nurture them and help them develop into bigger organisations. The Chairman of NASSCOM is currently Mr UB Pravin Rao, and Ms Debjani Ghosh is the President.

NASSCOM reports annually on the status of Indian tech sector, with a particular focus on Indian tech startup ecosystem.

Based on: www.nasscom.in, "Indian Tech Start-up Ecosystem. Edition 2019". Report by NASSCOM and Zinnov Consulting, etc.

in this category was increased significantly, and tax refunds expedited. State Bank of India (SBI) introduced a special funding scheme for small and medium businesses under its' COVID-19 Emergency Credit Line.

Critics note, though, that doing business in India while being headquartered elsewhere, preferably in Singapore or Silicon Valley, is much more convenient for startups, as Indian corporate laws and accompanying bureaucracy are still unbearable. Regulatory uncertainty or frequently

changing regulations are also among the reasons for entrepreneurs' disappointment.

It is obvious that that the Indian government is doing a careful balancing act between contradicting interests in its' policies towards business. It aims to support startups that create jobs in India, to channel more financial transactions through governmental digital mechanisms, to make sure traditional businesses have time to adapt to changing circumstances and to engage rural livelihoods into the new digital business

models. It also helps foreign investors that set up manufacturing in India, bring in capital, expertise and technology into Indian companies, rather than bringing over their own companies, and create jobs without competing with local players. Spurring patriotic sentiment among Indian business even further, Prime Minister N.Modi is often referred¹⁵⁶ to as having said that he sees entrepreneurs as India's freedom fighters of today, and he certainly has a special affinity for those who are trying themselves at starting a business.

Year 2020 has been difficult for many startups in India. 15% of startups stopped working, 44% of startups reported cash runway sufficient for less than 6 months¹⁵⁷. Not all of the ventures survived the pandemic, but those who did surely became stronger, more resilient and agile. At the times of crisis, unicorns are overshadowed by alligators and camels. Many companies had to make pivotal steps, reduce burn of capital and improve their unit economics very rapidly. Others, particularly in areas such as automation and the digital sector, had to learn to handle even faster growth overnight, turning crisis into opportunity. The very diverse digital sector recovered quickly, with many businesses exceeding the pre-pandemic growth levels. These include: online life insurance, OTT (over-the-top) media services, electronics e-commerce, online gaming, direct to consumer brands, digital payments, online stock brokerages, online grocery, educational technology, online health insurance, online fitness, online teleconsultations (telemedicine)¹⁵⁸. While venture capital investment fell to just 1.5 bln USD in the second quarter of 2020 (the lowest quarterly since 2016), third quarter was a rebound, with 3.6 bln USD invested into Indian startups during this three-month period. There is vast space for further progress of this sector in India, recovery is already underway, and experts believe that within a decade India's startups will help triple the country's GDP¹⁵⁹.

THE PHENOMENON

Digitisation is adding tremendously to India's deep-rooted entrepreneurial traditions, having taken the prestige and excitement about starting a business in India to the new level.

THE LESSON

By building the digital foundations for the Indian economy that are open to business, supporting indigenous players focused on digitisation and introducing a set of measures supporting young entrepreneurs, the Indian government has created conditions for rapid acceleration of startup movement in the country.

THE GLOBAL INFLUENCER

India's startup ecosystem is the third largest in the world. India is achieving visible progress in Ease of Doing Business rankings, making this one of its' top strategic priorities. India plans to become the engine of global growth resurgence, confident that its' own achievements will have a multiplier effect contributing to the stabilisation of the world economic order.

ZOOM-IN: LEONID BOGUSLAVSKY, RTP GLOBAL

RTP Global is founded by the Russian serial tech entrepreneur and investor Leonid Boguslavsky.

L.Boguslavsky started his career as a scientific researcher in performance evaluation and modeling of computer systems and networks at the USSR Academy of Sciences where he obtained a PhD and Doctorate Degree in the field. L.Boguslavsky holds a MS degree in Applied Mathematics. In the early 1990s, L.Boguslavsky established and successfully developed one of Russia's largest IT solutions companies, LVS, with preferred distribution agreements and partnerships including Oracle, Compaq, Sun, Cisco, and many others. He earned his first major capital when he sold LVS to PricewaterhouseCoopers and became partner in PwC in 1996. Prior to his involvement in venture capital, in 1997-2001 L.Boguslavsky was the Managing Partner of Management Consulting Services and IT Consulting at PwC Russia, later combined with dual role of the Head e-Business in Central and Eastern Europe. In 2000 L.Boguslavsky created ru-Net Holdings, joined by a pool of co-investors such as Baring Vostok, UFG and Rex Capital. He was one of the early investors in Yandex (Russian analogue of Google, multinational technology corporation, IPO'd in 2011), Ozon (e-commerce platform), Biglion (discount coupon website) and IVI (online cinema). Other successful investments of the fund include Delivery Hero (one of the world's largest online food delivery services, IPO'd in 2017). Along with Yandex it is one of Europe's major tech companies), Tradeshift (cloud-based business network), Ring Central (leading provider of global enterprise cloud communications and collaboration solutions, IPO'd in 2013), SumUp (mobile payments company), DataDog (cloud monitoring service, IPO'd in 2019), The Urban Sports Club (pan-European platform for sports activities), to name a few. Overall, the fund participated in eight companies who's valuation exceeded 1 bln USD (out of them five public and three private companies) making it a successful serial unicorn-growing investor. In his interviews L.Boguslavsky often says that he truly enjoys his work as investor, mainly because he gets to meet young entrepreneurs and share his own entrepreneurial and management experience with their companies. He is also passionate about sports, with strong interest in triathlon: he founded Super League Triathlon, a new format in the global sportainment market, in 2017.

In 2018 ru-Net Holdings was renamed as RTP Global, reflecting the company's evolution to a globally focused venture capital firm. RTP Global is headquartered in Moscow, with offices in New York and Bangalore, and about to open one more, in Singapore. Besides Russia, the company has investments in India, Germany, Cyprus, Finland, Israel, Luxembourg, Singapore, UK, USA, Vietnam.

RTP Global started working in India in 2011. L.Boguslavsky travelled in India once before and saw the potential for India to become the next China. It was his own political decision to start working with India. In 2012 RTP Global (ru-Net) invested about 17 mln USD in two e-commerce startups, that were not very successful, eventually. These investments, however, have brought in valuable experience and served some lessons, which RTP Global follows still. The Indian venture capital and startup community was not very familiar with ru-Net and its' success in Russia and elsewhere, so these deals have introduced the fund into the Indian scene.

RTP Global now looks very carefully at the founders of the companies, and would only invest, if it is the founder who is running the company, not a hired CEO. The founders have to be very well-motivated to bring the company to success, their ownership should not be low (preferably, no less than 15%). Another important preference for RTP Global – is investing along with partners, rather than alone.

In 2012 L.Boguslavsky invested 170 mln USD in Snapdeal, Indian e-commerce platform set up in 2010 and mainly promoting coupon sales at that time. L.Boguslavsky experience in Russia, US and Vietnam with similar business models helped Snapdeal with smart money, rather than just an investment. After reaching a peak of 6.5 bln USD in 2016, the company's valuation currently stands below 1 bln USD, as it is facing tough competition from Indian and international players such as Flipkart and Amazon.

RTP Global's subsequent investment in India was made jointly with Sequoia Capital, one of the most prominent international VC investors in India, and one of the early comers into the Indian market. Although India brunch of this investment fund is rather independent in its' decisions, it helped to know Sequoia

through Kirill Sheynkman, managing partner at RTP Global US office in New York, who earlier worked in Sequoia, as well as Oracle. Their first joint investment in FreeCharge, a platform allowing to top up mobile phone balance without commission and with benefits for the customer, turned to be a success. FreeCharge, valued at 500 mln USD, was bought out by Snapdeal in 2015, having received cash for his reported 15%. L.Boguslavsky bought more shares of Snapdeal.

Over the years L.Boguslavsky invested in Indian companies such as AppsDaily (offline distribution of mobile applications), Faasos (local kitchen and food delivery, now owned by Rebel Foods and still in the portfolio of RTP Global), PepperTap, an online grocery seller, and others.

RTP Global is currently running its' third global fund, launched in March 2020, worth 650 mln USD, after exhausting the second fund of 200 mln USD in 34 companies across US, Europe, India and Southeast Asia.

After initial strong inclination towards e-commerce in India, RTP Global now prefers to focus on educational technology and the future of work, healthcare, agriculture – all sectors of high importance for India, where digitisation was somewhat delayed, and just starting to change the way they operate. RTP Global is also an experienced investor in financial technology, artificial intelligence and SaaS. In India RTP Global prefers to invest in early-stage startups that have their product out in the market with some customers and active users, looking for late-seed, Series A, and early Series B funding. However, there may be exceptions, in case there is an exceptional founder. The earliest seed-stage deal RTP Global invested so far was a credit card payment app Cred. The fund committed to invest in Cred even before a team was formed and it was just at the idea stage, because they knew the founder (Kunal Shah, founder of Freecharge).

RTP Global's first investment in education tech was Classplus, announced in May 2020. The fund started to look at this sector before the pandemic, but became more confident about its' prospects in the current circumstances. The platform helps tutors and coaches, who traditionally run their classes at coaching centres in neighbourhoods across India, to start teaching online. The company's user base has quadrupled between November 2019 and May 2020 (for more details see page 67 of this report).

RTP Global's other investments this year include an agricultural B2B Platform Bijak, a buyer/seller rating system, that enables traders, wholesalers and food processors to discover new and reliable trade partners, making agricultural market more transparent. In January 2020 RTP Global invested in MoneyTap, a fintech application providing credit at interest rates starting 13% per annum. RTP Global closed three deals in India in 2020 (as of November 2020), with at least one more planned for this year.

Out of RTP Global's 10 active investments in India, arguably the most impactful one so far has been the investment in Practo, a telemedicine service. The company was founded in 2008 in Bangalore. In 2013 it opened business in Singapore, and later launched in Indonesia, Philippines and Brazil. Other investors in Practo include Tencent, Sequoia Capital, Altimeter Capital, RSI Fund, Thrive Capital and other. Practo has become a household brand and widely popular service not just in India but in other countries too, aiming to broaden its' international footprint further. In India online medical consultations have grown 500% during lockdown, with 50 mln people accessing healthcare services and content online, 44% of clients from smaller non-metro cities of India.

In some cases RTP Global helps its' portfolio companies from other geographies to come to Russia and India. This happened with California-based startup GridGain, for instance, as well as Berlin-based Plantix (parent company – Peat). Plantix is an artificial intelligence and machine learning-based application that helps farmers and gardeners diagnose pest damage, plant disease and nutrient deficiencies affecting crops, and offers corresponding treatment measures. After considering various international expansion strategies, the company decided to focus on India on priority, opening their second office in Hyderabad. As of April 2020 Plantix has 25 million downloads in India.

Based on www.forbes.ru, www.rtp-global.com, www.vedomosti.ru, NASSCOM-Zinnov reports, TIE-Delhi-NCR reports, etc.

Education

Indians are a people amongst whom the importance of education needs no additional emphasis. The understanding that education is the most powerful social lift is shared by all segments of society, and even people with very limited resources strive to give the best schooling to their children. For those in dire need, who would rather have their children earn a living than spend time in classes, the government has designed incentives like free meals, to make sure parents keep their children at school instead of making them work. The aspiration of India's youngsters and their hunger for learning is a very powerful engine for the entire country, and one of the keys to its economic progress.

The 2002 86th Amendment Act to the Indian Constitution made the right to education fundamental. As of the 2011 census, the average literacy rate in India was 74% with significantly varying results between different states¹⁶⁰. India has one of the largest education systems in the world, including over 260 million students in around 15 million schools, which have 87 million teachers. There are over 990 universities (38.7% of them – private), 41,000 colleges and about 30 million students in higher education¹⁶¹. The number of university-level institutions has grown by about 37% and the number of colleges by about 9% over the last five years¹⁶². For decades India worked on improving the level of access to education and today elementary education has become nearly universal, while secondary and higher secondary levels show strong improvements in enrolment.

At the same time, India's education system is facing a growing shortage of teachers, estimated at 500,000 in 2015¹⁶³ and 1 million as of 2020¹⁶⁴. With a few exceptions, government schools are losing out in competition for the best teaching talent due to the exponentially growing number of private schools, but they too are not able to provide the adequate quality of education in far too many cases. Concerns about the quality of teaching pertain to higher education institutions too, while their numbers have been growing steadily in recent years. Hence the enormous demand for educational professionals and for high quality educational content in India, making the Indian

education system even more competitive. At the same time, while being one of the top countries globally in terms of respect for teachers, India is also among the lowest countries for teachers' pay¹⁶⁵. So competent Indian teachers are also interested in solutions that help them increase student reach and monetise their expertise.

Digital transformation has brought hopes that new digital content and delivery channels will further facilitate access to education and most importantly, will improve its quality. As a result, in just a few years India's educational technology space has flourished and will continue to expand. By 2022, this market is estimated to be worth 3.5 bln USD¹⁶⁶. The most impressive story in the Indian educational technology sector is that of Byju's (for details please see page 74 of this report). With a valuation of 10.5 bln USD, this company is the highest-rated educational technology unicorn globally, as of 2020¹⁶⁷. Byju's became a unicorn in 2018 and now it is the third biggest one in India. Remarkably, the company is profitable, because its educational videos, explaining a wide range of notions focusing on mathematics and science, do not need to be re-filmed very often. In September 2020, the company raised 500 mln USD in a new round of funding, signalling the recovery of India's venture capital ecosystem and reflecting the confident 200% growth¹⁶⁸ of the Indian educational technology sector during the pandemic. Acquisitions by Byju's in 2020 included two companies – WhiteHat Jr (teaching children how to code via live online sessions) and LabInApp (enabling students and teachers to perform science activities and experiments on various devices).

Another captivating story is that of Unacademy. The company, founded in 2015, is headquartered in Bangalore. It started by offering online preparation for professional and educational examinations focusing on the UK market, and recently entered the education market in India, with acquisitions of PrepLadder (online preparation for medical entrance exams) and Mastree (an online platform for mastering science, technology, engineering, arts and mathematical (STEAM) skills for kids), becoming one of the latest additions to India's

unicorn list. The general trends for the sector include personalisation of content, gamification, increasing content in regional languages and reaching out to customers beyond the major magapolises (Tier 1 cities), as well as mixed payment models – subscription, freemium, free trials. Business models used by the technology companies in India in this sector, too, are very diverse and they serve a wide range of customers' needs related to education, in B2C, B2B and B2G segments.

Some of the noteworthy educational technology companies in India include:

- Buddy4Study, a platform to connect scholarship promoters with scholarship seekers
- Doubtnut, a doubt-solving interactive online tutoring application
- CollegeDekho, CollegeDunia, which are university discovery and admission platforms
- iDream Educations, solutions for government schools, with a focus on content in different vernacular languages
- Toppr, preparation for school exams
- Zaya Learning Labs, custom-made software and systems for learning
- UpGrad, a platform for colleges and universities to replicate their offline classes online, Vedantu, a live tutoring website for India's exams, personalised learning network
- Krishworks, an activity centre for learning English
- InterviewBit, preparation for coding interviews
- OnlineTyari, online mock tests for government exams
- Playablo, a gamified learning application
- Tactopus, personalised teaching for 3-12 year olds with developmental delays and disabilities, Smartivity, an online store selling made in India do-it-yourself screen-free STEAM-focused educational construction toys, with exports to over 20 countries, including Russia
- Classplus, a solution for local neighbourhood tutoring centres widespread in India, helping them switch to online distance teaching, which is one of the recent investments of RTP Global, the Russian venture capital fund (for details please see page 65 of this report).

Many of these companies had tens and hundreds of million dollar valuations before the pandemic. However with the crisis the entire sector received a major boost. There was 3.6 times growth in total funding raised by educational platforms in 2020 as compared to last year (0.3 bln USD between January-August 2019 and 1.1 bln between January-August 2020). 2.2 times growth in number of free and paid users registered on education platforms (from 45 million in 2019 to 100 million in 2020). 1.5 times more users are now willing to pay for online courses on educational platforms. The average time spent on education sessions doubled between 2019 and April 2020¹⁶⁹. This corresponds with the global trends in educational technology, exceeding the average worldwide numbers. In 2019 the volume of the global educational technology market was over 160 bln USD (2.7% of the global overall educational market) and is expected to reach 241 bln USD by 2025 (with annual growth of 13.1%). Influenced by the pandemic, the global educational technology market is expected to grow 2.5 times (annual growth 16.3%) and reach 404 bln USD by 2025¹⁷⁰.

Adapting the Indian traditional school system, particularly its government segment, to the changes related to digitisation, accelerated by the pandemic, is, however, more difficult. Studying in these crisis circumstances was a challenge for children in many families too, highlighting the wide digital divide in India. A survey of villages conducted by the Ministry of Rural Development in 2017-2018, showed that 16% of India's households received one to eight hours of electricity daily, 33% received 9-12 hours, and only 47% received more than 12 hours a day. All villages are electrified, but the problem of power shortages remains. While a computer would be preferable for online classes, a smartphone could also serve the purpose. However, the phone might be convenient for applications, but not for carrying out lengthy assignments or research. While 24% of Indians own a smartphone, only 11% of households possess any type of computer, which could include desktop computers, laptops, notebooks or tablets¹⁷¹. At the same time only 27.3% percent of the country's schools have computers, let alone internet access¹⁷². Bringing broadband internet to all schools, as well as universities and other educational institutions has been made a part several nationwide programmes, such as the National Knowledge Network and the National Broadband Mission.

EDUCATIONAL DOMAINS WITH MOST EMPLOYABLE TALENT

	2014	2015	2016	2017	2018	2019	2020
B.E/B.Tech	51,74%	54,00%	52,58%	50,69%	51,52%	57,09%	49%
MBA	41,02%	43,99%	44,56%	42,28%	39,4%	36,44%	54%
B.Arts	19,10%	29,82%	27,11%	35,66%	37,93%	29,3%	48%
B.Com	26,99%	26,45%	20,58%	37,98%	33,93%	30,06%	47%
B.Sc	41,92%	38,41%	35,24%	31,76%	33,62	47,34%	34%
MCA	43,62%	45,00%	39,81%	31,36%	43,85%	43,19%	25%
ITI	46,92%	44,00%	40,90%	42,22%	29,46%	NA	NA
Polytechnic	11,53%	10,14%	15,89%	25,77%	32,67%	18,05%	32%
B.Pharma	54,65%	56,00%	40,62%	42,30%	47,78%	36,29%	45%

Source: India Skills Report 2020, www.wheebox.com

In 2017 the Indian government launched DIKSHA¹⁷³ (translated from Sanskrit as "preparation"), a nation-wide portal, the main element of the new digital infrastructure for India's teachers and teacher education. It can be used both by public and private educational institutions. It is also available to students who want to connect to the teacher's community. DIKSHA contains a full stack of resources, services, assessment tools, and learning videos for pedagogues, enabling them to create teaching materials, all free of cost. Content including e-books is available in various languages and the platform runs as a mobile application too.

Another digital platform promoted by the government of India is SWAYAM¹⁷⁴ (Study Webs of Active learning for Young Aspiring Minds), launched in 2017. Today SWAYAM is a massive open repository of free educational resources. There are other government-supported e-learning platforms and repositories too, including e-Pathshala¹⁷⁵, the National Digital Library of India¹⁷⁶, the National Programme on Technology Enhanced Learning¹⁷⁷ and others.

To assist school students with connectivity problems during the lockdown, states devised their own solutions, from launching educational TV and radio channels, to distributing tablet

computers, DVDs and pendrives.

There is also an understanding that providing children with smartphones does not imply that they will start using them for learning. Children and teachers alike need digital literacy, not just devices and internet. Increasing the level of digital literacy among children and adults in India, with particular focus on rural and remote areas, is also crucial to bridging the digital divide in the country and implementing the goals set out by the Digital India campaign. The programme titled "Pradhan Mantri Gramin Digital Sakshatra Abhiyan"¹⁷⁸ (translated as Prime Minister's Rural Digital Literacy Campaign), which provides 20 hours of free training in basic computer and internet skills to rural households, is aimed at making a noticeable difference in this field, although the demand exceeds supply so, according to the government, more comprehensive measures to promote digital literacy in the country are necessary¹⁷⁹.

India is also facing the very acute challenge of building up a system of vocational training adequate to the demands of the XXI century. The country's aspiration to becoming a global knowledge superpower and the opportunity to provide qualified services to an aging population, thus extending employment for its youth, also

requires tremendous efforts in bringing the skills and competences of India's working population up to speed. India's workforce, currently 460 million people, grows by 16 million every year¹⁸⁰.

Ensuring jobs for all job seekers is a pressing national priority. At the moment the lack of jobs in the Indian economy goes hand in hand with the low level of employability of its available workforce and the poor level of trainers and mentors available. Though the rate has been growing steadily in recent years, as of 2019, only 46.21% of India's graduates were employable¹⁸¹. The proportion of formally skilled workers in India is extremely low compared to countries like China, South Korea, Germany and others¹⁸². At the same time, it was estimated that 109.73 million additional skilled workers would be required across 24 sectors in India by 2020¹⁸³. It is not only casual workers, constituting about 90% of the labour force in India, who are poorly skilled. Even in the strong Indian IT industry, there is a shortage of skilled professionals in fast-growing segments such as big data, artificial intelligence, virtual reality, the internet of things, machine learning – estimated at 780,000 vacancies by 2021¹⁸⁴. NASSCOM (for details please see page 63 of this report) is already working with India's IT industry, academia and government stakeholders to re-skill millions of employees in the sector through its Future Skills platform (an industry-driven learning ecosystem)¹⁸⁵ launched in February 2018.

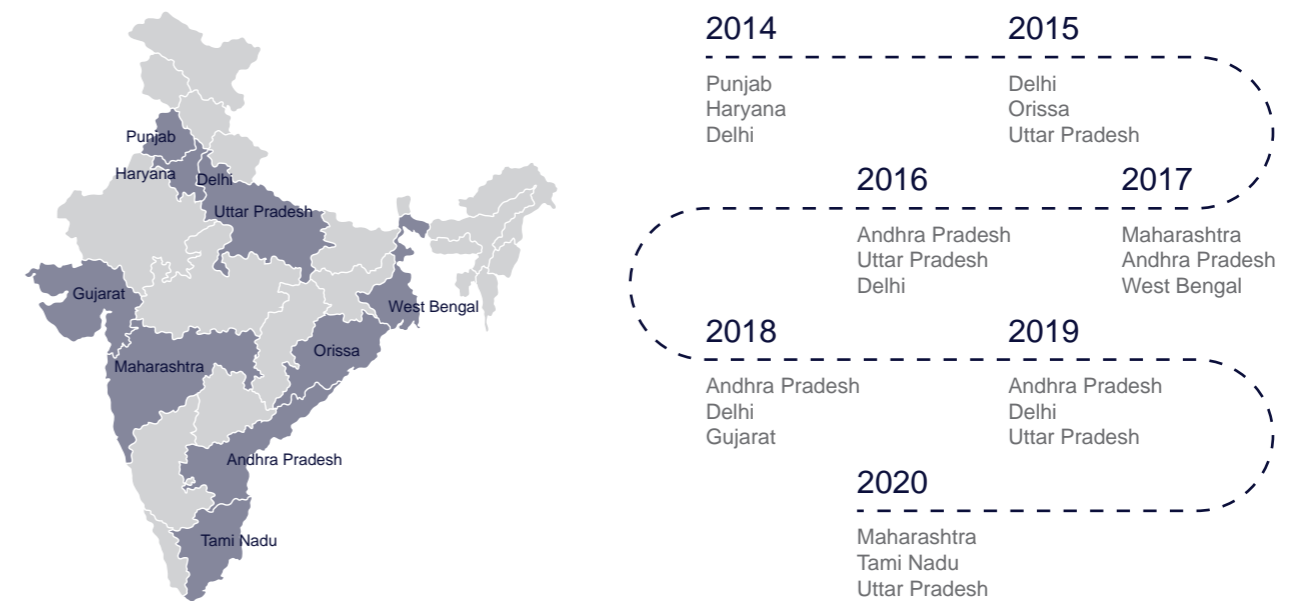
Inadequate certification and standardisation of skills, competences and qualifications across various sectors has also been an obstacle to much-needed improvements in the efficiency of India's labour markets. The National Skill Development Corporation of India aims at developing a standardised ecosystem of skills training, recognised by the industries across the globe. Cumbersome and outdated labour legislation has been slowing the transformation too. However, with the labour law reforms initiated by the government recently, changes are expected that would facilitate skills development. Another difficulty is that all digitally delivered learning in India, even if it incorporates live student-teacher interaction via video-conferencing, has been related to distance learning, which has not been considered on a par with classroom learning. At the same time 40-60% of the people who are expected to enter India's labour force by 2025

will be taught using digitally-assisted means. The regulation of online learning is changing too¹⁸⁶.

Though technological changes present new opportunities, they are a big challenge to the labour force as employees, regardless of their current level of qualification, have to upgrade their skills constantly if they are to remain relevant in the jobs market. It is estimated that the digital revolution will require retraining and redeployment of the workforce across industries as some 40-45 million workers will be directly affected by disruptive digital technology¹⁸⁷. At the same time, new digital platforms, innovative digital business practices and other economic avenues could create up to 65 million new jobs in India by 2025¹⁸⁸. Moreover, digitisation could create new and improved income opportunities for job seekers in remote and rural areas, provided they receive the right training. India has been the leader in organised business process outsourcing, but its individual freelancers are catching up fast. As of 2019, India accounted for 21.5% of the workers signed up to online outsourcing sites worldwide, second only to the United States¹⁸⁹. India is among the fastest growing freelance markets in the world and the pandemic crisis has accelerated this trend¹⁹⁰.

A large-scale government programme called Skill India, launched in 2015, was developed to address the multiple challenges of India's labour market¹⁹¹. It covers many initiatives aimed at improving productivity and empowering Indian youth with adequate skills for employment. The mission of Skill India is to provide training in market-relevant skills to more than 400 million young people in the country by 2022. The training delivered by this programme ranges from traditional skills such as weaving, cobbling, carpentry, welding, masonry, nursing, jewellery design, to transportation, construction, textiles, banking, tourism, language skills, management and positive thinking skills. Special attention is given to Rural India Skills. Students receive assistance with placements when they graduate. The apprenticeship movement is enhanced with initiatives like Apprenticeship Protsahan Yojana (Apprenticeship Encouragement Programme), the National Apprenticeship Promotion Scheme¹⁹² and Skill Strengthening for Industrial Value Enhancement (STRIVE) scheme. Training provided is to international standards, aiming to create a globally competitive and employable workforce.

STATES OF INDIA WITH MAXIMUM SUPPLY OF EMPLOYABLE TALENT



Source: India Skills Report 2020, www.wheelbox.com

Pradhan Mantri Kaushal Vikas Yojana (Prime Minister's Skill Development Scheme, PMKVY¹⁹³) is a large-scale certification programme enabling young people to take up industry-relevant skills training. This programme also assesses and certifies individuals with prior learning experience or skills. Skill India also has programmes in its portfolio, focused on entrepreneurship skills, such as the Pradhan Mantri Yuva Udyamita Vikas Abhiyan (Prime Minister's Youth Entrepreneurship Development Programme), delivering training via online courses and eLearning systems. Private-public partnerships play a significant role in most of these programmes and was of particular importance in setting up eSkill India¹⁹⁴, which is an online aggregator of e-learning opportunities, under the Skill India auspices, with special focus on digital skills. eSkill India now has over 60 industry, government and non-government partnerships that help keep this programme relevant to market needs.

Important next steps in raising the efficiency of India's labour markets will be the development of comprehensive e-marketplaces, matching jobs with job seekers, aggregating real-time data about vacancies and work opportunities across locations, sectors and professions. Though private-public partnership is important, the government

may have to take the lead in establishing such a platform. Building upon the success of India Stack (for details please see page 24 of this report), the government plans to create Skilling Stack on the same principles of open APIs, with India Stack at its foundation. It would include a comprehensive skills registry that would connect employers, academic institutions, upskilling companies and job portals through trusted credentials about personal identity, certification and standardised qualification.

As of 2018, 26.3% of students graduating from high school in India go on to pursue higher education. The Indian government wants that figure to reach 50% by 2035¹⁹⁵, doubling the country's college and university enrolment from its current base of around 35 million students.

India's universities also participate in the movement towards improving the quality of educational services they provide, aiming to attract international faculty to their campuses for short-term and long-term teaching assignments, as well as research and development projects. India's programme called Global Initiative of Academic Networks, GIAN¹⁹⁶ (translated as «knowledge», «wisdom») is aimed at encouraging talented international scientists and

entrepreneurs to engage with higher education in India, so as to «augment the country's existing academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence... garner the best international experience into India's systems of education, enable interaction of students and faculty with the best academic and industry experts from all over the world and also share their experiences and expertise to motivate people to work on Indian problems»¹⁹⁷. It covers a wide range of areas, including architecture, design, earth and environment sciences, electronics, electrical, information and communication technology, mathematical and computer sciences, physical and social sciences, to name but a few.

In July 2020 the new National Education Policy¹⁹⁸ was introduced in India, replacing the 34-year-old policy which was framed in 1986. It is the third education policy brought out in India since independence. It was developed with the participation of leading Indian experts in education. The policy is based on the pillars of «Access, Equity, Quality, Affordability, Accountability» and contains a complete and far-reaching set of measures aimed at improving the effectiveness of the Indian education system, making it more adequate to the demands of XXI century India and addressing many of the issues slowing its transformational development. Although no specific timeframe is set for the increase, the funding of the Indian educational sector is planned to grow from the current 1.7% to 6% of GDP.

Renewed attention will be given to channelling systematic investment in research and innovation. Particular emphasis is placed on early vocational education and training, and the development of the entrepreneurship skills and youth initiatives, all aiming at boosting employment and creating new jobs for the Indian economy. The top 100 international universities will be allowed to set up campuses in India. The new policy promotes a multidisciplinary approach to education, replacing the rigid and inflexible separation of disciplines in the existing Indian education system. Like many other initiatives of the government headed by Prime Minister Narendra Modi, the New Education Policy combines modernisation of the sector with strengthening its civilisational foundations, seeing them very relevant to the present-day requirements. For instance, while giving special attention to eLearning, improving digital literacy, bridging the digital divide and promoting technological skills at the Indian schools (the policy allows students to choose coding from class 6th onwards), the new policy also promotes the learning of Sanskrit: it will be offered at all levels of school and higher education. The New Education Policy is a very detailed document covering nearly all organisational and qualitative aspects of India's educational system and laying the base for large-scale reform of the sector.

they flow into the world economy. The economic merits of such adjustable sources trump their social and political aspects. Making itself more relevant to the global knowledge economy clearly holds the key to India's future relationships".

INDIA'S EDUCATION SECTOR AT A GLANCE



Source: www.ibef.org

Highlighting the importance of education to India's progress, foreign minister of India Dr S. Jaishankar wrote in his book "The India Way", published in 2020: "All said and done, talent will remain the prerequisite for technology leads. And this is what can make India's position very different. It is the only viable reservoir that prepares skills before

THE GLOBAL INFLUENCER

The world's leading and most highly-valued educational technology companies are born in India. They all have global ambitions and will expand rapidly. Today when businesses build for India, they build for the world.

INDIA'S EDTECH AMONG SECTORS OF CONSISTENTLY HIGH GROWTH



Source: NASSCOM, Zinnov Consulting

ZOOM-IN: BYJU'S

The story of Byju's, India's largest and most famous educational application, started in 2003 when founder Byju Raveendran, who grew up in a small village in the southern part of India, coached his friends for India's Common Admissions Test (CAT), a tough entrance exam required for admissions in graduate management programmes in India, including the prestigious Indian Institutes of Management. B.Raveendran's own result in the test, when he tried to take it, was close to 100%.

According to B.Raveendran, his parents, both of them teachers, never pressurised him to study for examinations. He spent a lot of time playing outdoors and learned English by listening to sports commentary on the radio. However, he was naturally interested in mathematics and science, showed very good results and became a mechanical engineer. After helping more friends prepare to exams successfully, B.Raveendran quit his engineering job and started offering CAT coaching classes. Within a very short period of time and just by word of mouth, B.Raveendran's student following grew to 1000. After expanding his coaching classes to more than 25000 students and taking advantage of the digital revolution that was gaining momentum in India, B.Raveendran and his team of 30 organised the "Think and Learn Pvt. Ltd." in 2011. Along with lessons preparing students to college tests, the company also offered support to school education for classes 1-12, focusing on mathematics and science.

B.Raveendran launched «Byju's: The Learning App» in 2015 in Bangalore. It was presented as a comprehensive platform providing self-learning opportunities for students who wish to learn from «rockstar» teachers having more than 15 years of teaching experience. The application covered the entire curriculum for classes 1-12 and prepared students for competitive exams such as CAT, JEE (Joint Entrance Examination, entrance assessment conducted for admission to various engineering colleges in India) and CSE (Civil Service Exam). Today it also covers some of the international examinations, like GMAT. Excellent graphics and visuals are one of the characteristic features of the application ever since. The students note, that Byju's always helps break complex problems down to very simple notions, just like B.Raveendran's own personal classes did in the beginning of Byju's story.

Today Byju's aims to become one of the largest and preferred education platforms in the world. It plans to go beyond maths (both basic and advanced), trigonometry, chemistry and physics – and offer online courses in social science and English. In 2016 Byju's became the first Asian company to receive investment from Chan-Zuckerberg Initiative. Other early investors included Sequoia Capital, Tancent, Naspers and Canada Pension Plan Investment Board. In 2017 Harvard Business School published a case on Byju's, and in 2018 the company became a unicorn. Its' current valuation exceeds 10 bln USD. It is now referred to as «decacorn» instead of «unicorn» and it is the most valuable educational technology company in the world. Byju's is India's second most valuable unicorn, after Paytm, the digital payment firm. As of October 2020, Byju's has more than 64 million downloads in more than 1700 cities worldwide. In 2020 the number of paid subscriptions of Byju's crossed 4,5 million (between August and September 2020 it jumped by one million). Byju's follows freemium B2C model, wherein the first several classes are free and students then decide whether to enrol into the paid subscription or not. With an average cost of subscription at 170 USD per year, about 85% of subscribers renew each year, and the average user is active for 71 minutes a day on the application. Byju's is profitable. For the financial year 2018-2019, Byju's made a profit of 2.8 mln USD on revenues of 210 mln USD. In financial year 2020-2021 revenues are set to come in at about 422 mln USD. B.Raveendran estimates that by 2024 Byju's will have between 14-15 million subscribers, generating at least 3 bln USD in revenues with profits of 1-1.2 bln USD.

In 2020 Byju's new investment round attracted capital from its' existing as well as new investors, including: Tiger Global (invested 200 mln USD in January 2020), General Atlantic (200 mln USD in February 2020), BOND (23 mln USD in June 2020), DST Global (122 mln USD in August 2020), Silver Lake along with BlackRock, Sands Capital and Alkeon Capital (500 mln USD invested in September 2020).

Despite many other EdTech startups entering the online education market in India, with Byju's having

given a tremendous boost to the sector, Byju's continues to lead the educational technology space. Sustaining its' leadership position in this market, Byju's uses a three pillar strategy to provide students with an immersive learning experience: (i) personalised learning journeys, where the programme determines a student-based personalised education package complete with carefully crafted short videos, quizzes and flashcards and creates individual student profiles analysing strengths and areas for improvements, (ii) technology enabled learning and (iii) best teachers and engaging content. Quality of teaching content is the key to Byju's appeal and profitability. The company spends a lot of efforts on creating its' short educational videos explaining various concepts. Once filmed, these videos do not change very often, which makes it possible to generate profit.

Just a quarter of students availing the resources offered by Byju's are located in Mumbai, Delhi, Bangalore, Chennai, Kolkata and Hyderabad; while nearly 30% live outside India's 100 biggest cities. Many access the content from rural areas and on smartphones that cost less than 150 USD. Although the company plans to launch in UK, Australia, New Zealand, Singapore and Germany, it also sees plenty of scope to expand in India. At present, all of its' content is in English, but Byju's hopes to make its' maths and science content available in the Indian regional languages too.

Bollywood all-time hero and arguably India's favourite actor Shah Rukh Khan (known as SRK) is Byju's brand Ambassador. In some of the advertisements and educational videos for Byju's he is appearing with his children, making his message about Byju's even more appealing to students and their parents.

Based in: www.byjus.com, www.ft.com, www.businessinsider.com, www.store.hbr.org, www.pitchbook.com etc.

How deep is the change?

On a trip to India just some 10-15 years ago, one could not have helped but notice how many bright smiles were around, how much curiosity was in the eyes of everyone one met on the streets. If one travelled to Rajasthan, there would have been elders in magnificent bright turbans, watching traffic beside rural roads, chatting casually over a cup of masala chai. India today looks and feels different, resembling Hong Kong or Seoul – people holding as many mobile phones, typing messages, watching videos or talking on the go.

It is commonly said that India is now undergoing massive changes, the term "tectonic" is applied often, implying the profound and fundamental nature of the transformation of this country, digitisation being one of its key drivers. But how deep is this change, actually? How is digitisation going to affect the way India lives and does business in the long run? How successful is its

adaptation to the evolving environment and what might be the eventual results of these changes?

In response to the prevailing globalism of the last decade of the 20th century and early 2000s, as well as due to the country's strengthening economy, Indians have not only acquired a new self-awareness and self-confidence, but also a fresh interest in their own history, culture and religious traditions. The success of the BJP under the leadership of Narendra Modi in 2014 was at the same time a manifestation of this process, its natural continuation and served its further development. The party was re-elected with a landslide victory in the elections of 2019, which proved Modi's mandate to continue reforms.

This context is important not only because digitisation and programmes like the Digital

India stand very high on the list of priorities of Modi's government. Prime Minister Modi aims to modernise the country, steering it through the 4th industrial revolution, while at the same time believing that it should go back to its roots and respond with its own civilisational vision not just to the drawbacks of globalisation but to challenges presented by rapid technological transformation, digitisation included. Prime Minister Modi's critics see this policy as an attempt at imposing a Hindu supremacy over multi-confessional India, while his followers focus on the positive sides of this philosophy in its moderate version, which is open to interpretation, including its syncretism and tolerance, seeing India's potential to provide the world with a healing touch (in Jawaharlal Nehru's words) – be it with sustainability, education, innovation, politics or taking the world economy out of the red zone – if the country returns to its historical and cultural foundations. The Indian leader has strong political instincts that keep him connected to the mainstream. Despite the

apparent split among Indian elites over the forms and methods of strengthening the Hindu aspect of Indian statehood, a vast number of Indians are impressed by this course. In moderate Hinduism they see a force for cohesion in Indian society, despite its endless diversity and contradictions. Despite the current crisis, the Prime Minister's approval rates are still above 70% (as of September 2020)¹⁹⁹, cutting across geographical and social divides and being proof of the approval of his course. Thus he managed to unite India not just through introduction of a unified tax regime and comprehensive identity system, but through ideas.

Technology constitutes a significant part of the idea of India in the XXI century. It is possible that its disruptive aspects are taken well by Indians because their perception of the world is very holistic. In their view of the universe, change is the only constant, with destruction and creation being essential elements of nature. It is obvious

that India is embracing technology because fundamentally it is very confident about its cultural foundations, seeing them as a means to solve India's problems, and not as a challenge to its underlying values. Could this also be the reason why Indians encourage their children to study abroad?

There are certain areas where technology conflicts with the realities of the Indian society and the interests of its people. In these situations, the role of civil society and the regulators becomes vital, and the Indian government is taking decisive steps in order to manage this change. There are also many cases when technology and India's traditions make a perfect match.

A good example is the phenomenal increase in data consumption in India in recent years (for numbers please refer to page 28 of this report). Most of this has been social traffic. Indians enjoy keeping in touch with their friends and family, rather extensive, needless to say. It is normal for a taxi driver to be on the phone, via speaker chatting with his wife and kids all day long as he takes passengers here and there. Another significant share of traffic is films and music videos. Escapism into the dreamland of the Indian cinema has become much more accessible. Watching cricket is still immensely popular too, now at your fingertips. Facebook and WhatsApp have huge followings in India and for many Indians the average friend count on Facebook exceeds several thousands. Still, unlike in the US, Facebook has not been making money on advertising in India. That is why it is betting high on payments via WhatsApp once it is properly linked to Jio Platforms (for details please refer to page 42 of this report).

E-commerce was the first sector in India's digital economy that experienced a tremendous upsurge. It will continue to grow, as nearly 1 billion Indians are expected to be online by 2030²⁰⁰. It seemed to be the perfect fit for the country. Even in remote areas, Indians can order and receive items that could not be bought otherwise, as there were no western-style malls in these places. Although the popularity of malls in cities where they exist is still very high – people enjoy going there with their families for a stroll over the weekend – a growing share of sales now happens online, particularly so in the conditions

of a pandemic. At the same time, the spread of e-commerce endangered micro and small vendors. It was hit further with the lockdown. As of 2019, just one third of all small businesses had an online presence. Both business and government had to take measures to save this segment that is providing a livelihood to tens of millions of people. Business is making efforts to connect it to digital payments and retail platforms, while the government is providing free loans. By July 2020, 26 million small and medium businesses were discoverable online, and an increasing number of small merchants across India are equipped to accept digital payments. This has made it possible for more small businesses to become part of the formal economy as it improves their access to credit²⁰¹.

Every second, three Indians discover the internet²⁰². They do so by means of a smartphone. Most people in India leaped over the era of internet via modems and computers and went straight into mobile 4G. They also leaped over the credit card boom, settling all payments through their handsets. Smartphones helped create a new type of economy: the so-called "gig economy", in which millions of Indians work as couriers, delivery personnel, or taxi drivers.

There are many positive sides to this process. However there are negatives too. One of them is a sharp increase in traffic on the busy streets of India. Before technology is applied to make cities smart, taxis electric, and resources better managed generally India is bound to go through further environmental degradation. The country's traditions of resource saving and being in-sync with nature give hope that progress will be achieved in time.

It is also challenging for India's culture to adapt to the digital economy which is removing intermediaries in various spheres of life and business. Traditionally India is the culture and the economy of intermediaries. This is not just about exploiting informational disbalances, sharing margins and providing earnings to many people in the supply chain, it also has to do with communication and people-to-people contacts. These are very important for the culture where business is closely connected to personal, family-like relations.



With very high competition at all levels of India's society, jobs have always been a valuable and scarce commodity. People in disadvantaged communities, everyone having a hard-earned place and working intensely to earn their living, will face multiple new challenges. Re-education and re-skilling are becoming crucial for all. Raising the level of digital literacy is an important component of educational policy, requiring the special attention of the Indian authorities. People often get a smartphone with internet connection before they learn to read and write, and before they get well-off – a unique situation, comparable to few other countries, perhaps mainly African. Bharatiya Janata Party was the first of India's major political forces to take advantage of the social networks that played a strong role in the party's electoral results in 2014 as well as 2019 and continue to play a role in the party's communication with its electorate. In recent years, however, it has become obvious that social networks and messengers can be a double-edged sword when they become a source of fake news, disinformation, and deep fake videos leading to communal clashes and lynching. This is a very dangerous aspect of digitisation for India, and steps are being taken to address these new threats.

After initial years of copying Western business models, digital entrepreneurs are developing India-focused services. In the business culture where the customer is king, every rupee saved is a rupee earned, and the market is totally cost-conscious. People feel that with technology-enabled solutions they are getting good value for money. There was a time when Indians had to wait for technology to come to their country from somewhere else. But now a whole new generation of technology is happening in India first. It is fashionable to be a geek-type, nerdy entrepreneur. Indian youngsters feel much more up-beat and confident about starting a business than their peers in most other countries. India's macro-economic parameters helping financially, as does previous generations' family wealth. That said, the average age of the founder of a startup in India is now 35 years. This is explained by the fact that it is not their first entrepreneurial endeavour (for further details about entrepreneurship in India please refer to page 57 of this report). Youngsters in India feel that the future is theirs. Despite making up an absolute majority of the population, people below 25 years old were brought up in a country where respect for elders and hierarchical

relations have always been very important. The average age of India's members of parliament has never been less than 50 years, while India is one of the countries with the youngest population²⁰³. Although politicians always speak about giving way to youth, and this time around, it seems, youngsters in India are determined to play a decisive role in their country's future. That said, respect for elders is one of the fundamental traditions of India, and it is bound to remain.

Economic development, including access to affordable technology, is a great equaliser. Although India remains a country with extreme income inequality, social divisions (let alone issues of caste, always considerably exaggerated by outsiders, starting with the British) are reducing. Another factor contributing to this trend is India's fast urbanisation²⁰⁴.

Technology is changing India, certainly, but India is changing technology too. One of the manifestations of this trend is the spread of applications and digital services in India's regional languages – vernacular languages, as they are often referred to. The Constitution mentions 22 languages on India's official languages list²⁰⁵, but there are dozens of local tongues besides these 22. The Census conducted in 2011 showed English to be the primary language – mother tongue – of just 256,000 people in India. It was stated as the second language of 83 million people, and the third language of another 46 million people, making it the second-most widely spoken language after Hindi²⁰⁶. Prime Minister Modi prefers to speak Hindi on official occasions. Most of the official documents in today's India, although written in English, contain many terms from intensely Sanskritised Hindi. While English is still the preferred language of communication between the representatives of various regions of India, technology companies have adapted to India's regional requirements. Act global – think local, is the mantra for global giants from Amazon, to Facebook and Google, and their vernacular-based user interfaces, voice and visual search. The vernacular-language internet user base in India is expected to exceed India's English-speaking internet user base by 2021²⁰⁷.

Although, like any other country, India is very self-centred, it feels more global about itself than, arguably, any other country of the world. This

THE PHENOMENON

Technology is constituting a significant part of the idea of India of the XXI century. At the same time, the Indian leadership aims to modernise the country steering it through the 4th industrial revolution, while believing that India should go back to its' roots and respond with its' own civilisational vision to challenges presented by fast technological transformation, digitisation included.

THE LESSON

It is possible that disruptive aspects of digitisation are taken well by Indians because their perception of the world is very holistic, in their view of the Universe change is the only constant, with destruction and creation being essential elements of nature. India is embracing technology because fundamentally it is very confident about its' cultural foundations, seeing digitisation as a means to improving the quality of life in India, and not as a challenge to India's underlying values.

THE GLOBAL INFLUENCER

Although, like any other country, India is very self-centred, it feels more global about itself than, arguably, any other country of the world. This feeling of global connection derives from India's history. Technology is adding to this perception of being the world's centre of gravity, also adapting under India's influence. India has ambitious goals about applying its' own experience towards addressing global challenges and providing the world with a healing touch.

feeling of connection to the world derives from its history, when India was closely linked by trade and religious links with vast areas of Eurasia. This remained so during the colonial era, when the movement of people, sailors and army personnel throughout the British Empire was continuous and the influence of India over all British colonies, as well as Britain itself, was profound. This feeling of global connection is today supported by the huge Indian diaspora, number one in the world in terms of numbers, and the unprecedented success of its members in all spheres – from management and engineering to academia and politics²⁰⁸. The massive interest of all international companies in doing business with India (with their politicians doing tireless work on the ground in India's corridors of power), adds to this perception of being the world's centre of gravity. Today when businesses build for India, they build for the world. Sundar Pichai, the CEO of Alphabet and Google, wrote in his blog: «Google's efforts in India have deepened our understanding of how technology can be helpful to all different types of people. Building products for India first has helped us build better products for users everywhere»²⁰⁹.

Hence it is now quite correct to say that India is changing with the technology. It certainly is, but India going digital and advancing in other fields is not likely to change some fundamental traditions of India's philosophy. Moreover, technology is adapting under India's influence, and India has ambitious goals about applying its own experience in order to addressing global challenges.

Conclusion

India's contribution to the global digital revolution is multi-faceted. First, the country's rise to prominence in the world's IT industry had relatively modest beginnings in the early 1970s when a few young and talented Indian programmers started to offer their services to corporations headquartered far away in the US. Several decades later, outsourcing of IT and adjacent services is a multibillion-dollar industry of which India consistently captures the lion's share, despite the arrival of many competitors. Second, though slowing in recent years, the past decade has witnessed consistent economic growth that boosted customer demand. As a result, India's e-commerce market is among the most attractive in the world. Third, the two factors – IT competencies and market size – which merge and give birth to fast-growing digital companies: India's startup ecosystem is the third largest in the world. It is characterised by a remarkable pace of development, accelerated owing to ubiquitous digitisation. It has an increasing number of unicorn companies, and, importantly, of soon-to-be unicorns (where 50 startups are expected to join the unicorn club as early as in 2022). In addition, there is the growing number and quality of incubators across the country and the increasing share of serial entrepreneurs and entrepreneurs-turned-investors, as well as international and domestic venture capital funds active in India. Finally, there is the country's fast progress up the Ease of Doing Business ranking, which India had made one of its top strategic priorities.

The present report presents the diverse landscape of India's digitisation, which includes massive infrastructural investment, numerous software applications, and business models that often merge frontier technologies with traditional social and cultural patterns. A one-line summary of the lessons learned from digitisation in India might be: the benefits of long-term private-public partnership for socio-economic inclusivity in the context of democracy. Of course, not every endeavour leads to success. The sphere of e-commerce in India, for instance, is an arena

of hot battles aimed at finding a fine balance between the interests of the new players and the centuries-old tradition of multiple layers of mediators that contribute to the employment and well-being of tens of millions of families across the country. However, the cases analysed in this report demonstrate a steady path forward not only in technology, but, much more importantly, in economic, social and personal human development. Following this path will contribute to overcoming the key challenge of the Indian economy – the relatively low income level and vast socio-economic disparity, further intensified by the pandemic. Bringing the country into the club of upper-middle income economies is a moving target, but notwithstanding the challenges, India is likely to achieve its goals in the near future.

Besides looking at some India-specific features of digitisation, such as close public-private partnership, the focus on financial inclusion, the delicate balance between national and foreign players on the Indian market, and India's drive towards modernisation with simultaneous strengthening of its cultural foundations, this report focuses on other dimensions of India's digitisation that have global multiplicative effects and a strong influence over international trends in development, such as entrepreneurship and education.

Digitisation plays to India's deep-rooted entrepreneurial traditions, taking the prestige and excitement of starting a business in the country to the new level. India plans to become the engine of global growth resurgence, confident that its own achievements will have an amplifier effect contributing to the stabilisation of the world economic order.

Digital transformation has brought hopes that new digital content and delivery channels will further facilitate access to education in India as well as internationally, and most importantly, will improve its quality. Educational technology has the potential to play a crucial role in educating,

skilling and re-skilling millions of people, and thereby significantly improving their quality of life. The world's leading and most highly-valued educational technology companies were born in India. They have global ambitions and will expand rapidly. Today when businesses build for India, they build for the world.

Still, many questions pertaining to digitisation remain. Some of the most pressing ones relate to the taxation of international tech giants, their monopolistic business inclinations and possible political influence. Governments and businesses also face the challenge of securing their digital operations and maintaining overall technological sovereignty. Protection of personal data is another issue hotly debated in India. A new type of anti-colonialism, this time the struggle against data colonisation, has been proclaimed in India, and Indian entrepreneurs have been compared to present-day freedom fighters. This analogy evokes strong emotions in every Indian heart,

but how well does it describe contemporary reality in which businesses are increasingly interdependent, and the continuous cross-border flow of capital and know-how is indispensable to their success? Will India's inherent strengths and recent achievements ensure that the course towards self-reliance is viable, making it possible for India to carve a new niche for itself in international markets and supply chains despite cut-throat competition among the existing players?

It is no exaggeration to say that the future of the internet and digital technologies in general lies in Asia. Massive data from China, India and other Asian countries will help pioneer many of the new technological developments. Addressing the global challenges on a large scale is also likely to begin in Asia – hence the attention paid to the phenomenon of India's digitisation. Its lessons and its cross-border impact is important today, and will remain so in the foreseeable future.





Supplement: Russia's perspective

In this supplement chapter we deliberate on two aspects of Russia's perspective on India's rapid digitisation: multilateral with the example of the BRICS format, and bilateral, where the need for a new type of strategic partnership is emerging.

BRICS

The BRICS countries – Brazil, Russia, India, China and South Africa – account for 42% of the world's population, 33% of world GDP and 18% of world trade (as of 2019)²¹⁰. The acronym BRIC (which then did not include South Africa) was first used by analysts at the investment bank Goldman Sachs in a report published in 2001²¹¹. It stated that by 2050, these economies would be leading the world.

The first meeting of the leaders of the BRIC countries was held on the sidelines of the G8 in St. Petersburg in July 2006. The association was officially created in September 2006 in New York at the first meeting of the foreign ministers of the BRIC countries, which took place during the UN General Assembly. The first summit of the BRIC heads of state was held in Yekaterinburg on June 16, 2009. South Africa took part in the BRICS summit in Sanya (China) for the first time in April 2011. To date, 12 summits of the BRICS heads of state have taken place (in Yekaterinburg, Brasilia, Sanya, New Delhi, Durban, Fortaleza, Ufa, Goa, Xiamen, Johannesburg, Brasilia and Moscow, via teleconference).

Initially, one of the main tasks of the BRICS club was to stabilize the financial systems of the participating countries, minimize their dependence on the volatility of global financial markets, jointly search for an alternative development model for the global financial system, and increase the role of the BRICS countries in international financial institutions. Later, the interests of BRICS went beyond just economic issues to include a whole

range of topics on the international agenda and problems typical for rapidly developing economies. Particular attention was paid to the fight against international terrorism, the issue of climate change, food security, reforming international financial institutions and the fight against protectionism in international trade. BRICS aims to work in close coordination with the United Nations Organisation (UN) and UN agencies. Energy, transport, communications and infrastructure have also been high on BRICS agenda, among other subjects.

2020 was the year of Russia's presidency in BRICS, themed "BRICS Partnership for Global Stability, Shared Security and Innovative Growth". A wide range of activities was planned for 2020, including the BRICS summit, originally planned for July 2020 in Saint Petersburg. The pandemic crisis forced all BRICS events and meetings scheduled for this year online. The BRICS summit took place on November 17, 2020 via teleconference.

The topic of cooperation between BRICS countries in the areas related to rapid digitisation, found its reflection in the Joint Declaration, released after the meeting and titled "XII BRICS Summit Moscow Declaration"²¹². It states the following: "While emphasizing the formidable potential of the digital revolution for growth and development, we recognize new associated possibilities it brings for criminal activities and threats. We express concern over the rising level and complexity of criminal misuse of ICTs as well as the absence of a multilateral framework to counter the use of ICTs for criminal purposes. We recognise also that new challenges and threats in this respect require international cooperation and discussions on possible legal frameworks, including the need to elaborate a comprehensive international convention on countering the use of ICTs for criminal purposes under the auspices of the UN and note the establishment of an open-ended

ad hoc intergovernmental committee of experts under the auspices of the UN in accordance with UNGA Resolution 74/247 of 27 December 2019”.

Thus, on the political level BRICS heads of state expressed their concern about various threats posed by the rapid development of the digital era, and extended support to UN-led legal initiatives aimed at combating them (for more details please refer to page 85 of this report).

On a more practical level, one of the many tasks in front of BRICS official teams as well as the expert community in 2020 was to review the implementation of the Strategy for BRICS Economic Partnership for 2015-2020 and preparation of the Strategy for BRICS Economic Partnership for 2020-2025²¹³. Of the three main tracks in the new Strategy, one is devoted to the Digital Economy, reflecting the growing importance of this sector to BRICS countries. The other two are: trade, investment and finance, and sustainability. Digitisation carries the potential to promote inclusive economic growth, facilitate decision making, stimulate national economies, increase competitiveness and productivity, and improve quality of life of the BRICS populations and connect the BRICS countries, otherwise separated by geography. According to the document, BRICS countries plan to exchange regulatory experience, enhance the accessibility of each other's goods and services, address the digital divide, promote training, skills development and digital literacy, share best practices in unique digital identification systems, big data management, smart cities and communities. A series of steps is also designed to facilitate further progress in the area of industry, innovation and technology, where the existing framework of cooperation between BRICS countries has already been rather successful.

In many advanced areas of science, technology and innovation, the achievements of the BRICS countries are indisputable, and in several areas, such as computer and digital technologies, space and communication, rocket engineering, nuclear, nano technology and medical science, the five countries occupy leading positions in the world²¹⁴. The BRICS Memorandum of Understanding on Cooperation in Science, Technology and Innovation (STI) was signed in 2015. By now Research collaboration, Research infrastructure, Innovation collaboration and Sustainability are the

main four pillars of BRICS cooperation in Science, Technology and Innovation. A formidable set of working groups include ones on: Biomedicine, Natural Disasters, Photonics, Materials, Energy, Geospatial Technology, Astronomy, Polar and Ocean, ICT & HPC (Information and communication technology & High-performance computers). Almost 100 STI projects, both in fundamental and applied research, have been successfully implemented during the five years since the signing of the Memorandum.

One of the BRICS most successful initiatives so far is the establishment of the New Development Bank. In less than five years of work this developmental institution has won the respect of the international financial community, receiving an AA+ international credit rating and approaching European Bank of Reconstruction and Development (EBRD) in terms of volume of annual transactions. It approved 52 investment projects (worth 15,8 bln USD). 14 of these projects are in China, 14 in India, 9 in Russia, 8 in South Africa and 7 in Brazil. However, none of these projects are cross-border, and just two in the digital sphere: the extension of fibre optic internet connectivity in Brazil and the construction of a smart water management centre in China.

In April 2017, China hosted the 1st Meeting of BRICS Working Group on ICT and High-performance Computers. The focus of this working group has been on digital smart manufacturing, industrial restructuring and upgrading, the application of HPC to life sciences, precision medicine and public health, precision farming, pollution control, the development of smart cities and digital earth modelling. China was also the key driver behind the building of BRICS Innovation and Collaboration Cloud (BICC) as well as the establishment of an Integrated Hub for BRICS Innovation Collaboration on ICT and HPC. There are many other organisational structures within BRICS that work in the area of science, technology, innovation and industry, including: BRICS Science Technology Innovation and Entrepreneurship Partnership (STIEP) Working Group, BRICS Technology Transfer Centre under the STIEP Working Group, Enabling Framework for the BRICS Centres for Technology Transfer Cooperation (BRICS Techtransfer), Partnership for a New Industrial Revolution (PartNIR), BRICS Institute of Future Networks (BIFN), Digital BRICS Task Force (DBTF).

Overall, it has been recognised that the BRICS club is efficient at embracing the fourth industrial revolution²¹⁵. At the same, the Overview of Strategy implementation conducted in 2020, highlights that cooperation in ICT between BRICS countries, though satisfactory, is still at the initial stage of development despite being one of the club's priorities. The opportunities and challenges presented by digitisation have not received visible attention in the work of BRICS, overshadowed by other multiple tracks. Traditionally, issues of digital development were included into the BRICS framework of the scientific and technical cooperation or seen part of the ICT agenda. The Moscow Declaration of 2020 and the new Strategy for BRICS Economic Partnership for 2020-2025 are aimed at filling the gap between a fast-changing environment and the activities of BRICS, and bring digitisation to the forefront of BRICS areas of work.

As is the case with many other associations, India participates in the work of BRICS, striving to maximize the opportunities provided by this platform to meet its goals (political, as well as economic) and India's approach to BRICS is rather pragmatic. Economic development as well as promotion of Indian expertise and the sharing of experience are among its priority areas. India enjoys the well-deserved respect of other countries for many reasons, with IT and digital being some of India's primary areas of expertise. Other such areas traditionally include frugal innovations, electoral processes and space technologies, to name but a few.

A good example is India's approach to working with Africa, where South Africa along with Ethiopia, Nigeria, Mauritius, Kenya, Tanzania and Ghana are India's key partners. For almost 50 years, India has been providing African countries with technical assistance and assistance in training IT specialists. In 2004, India offered to implement a Pan-African e-Network Project²¹⁶. The goal of the project is very ambitious – to provide African countries with opportunities in the field of telemedicine and distance learning through the development of a computer network, including orbiting satellites, fibre optics and wireless. The e-Network was launched in 2009 and it also supports e-governance, e-commerce, infotainment, resource mapping and meteorological services. The project involves 5 regional universities, 53 training centres, 5 regional specialised hospitals

and 53 remote hospitals covering nearly all African countries. On the Indian side, 12 specialised medical centres and 7 universities are involved, as well as the Indian Space Research Organization and the All India Institute for Medical Research.

As India is taking over the BRICS presidency from Russia for 2021, digitisation will no doubt be high on India's agenda for the association. Besides other activities, India will host the 9th BRICS STI Ministerial Meeting, the 11th BRICS STI Senior Officials Meeting as well as the 6th BRICS Young Scientist Conclave during the year of its presidency. Given India's substantial experience in the area, it will have the opportunity to showcase its own achievements and play an active and fruitful role in digitising BRICS.

Bilateral

In 2020 Russia and India celebrated 20 years of the Declaration on Strategic Partnership. This was signed in October 2000 in New Delhi by Prime Minister Atal Bihari Vajpayee and President Vladimir Putin. In December 2010, the partnership between India and Russia was elevated to the level of Special and Privileged Strategic Partnership. In April 2019, President Putin signed an Executive Order Awarding Prime Minister Modi Russia's highest state decoration, the Order of St. Andrew the Apostle, for his distinguished contribution to the development of a privileged strategic partnership between Russia and India and friendly ties between the Russian and Indian peoples. Although the strategic status is not exclusive, the profound mutual understanding on most of the issues on the contemporary and historical agenda, that characterises Russian-Indian relations, is unique.

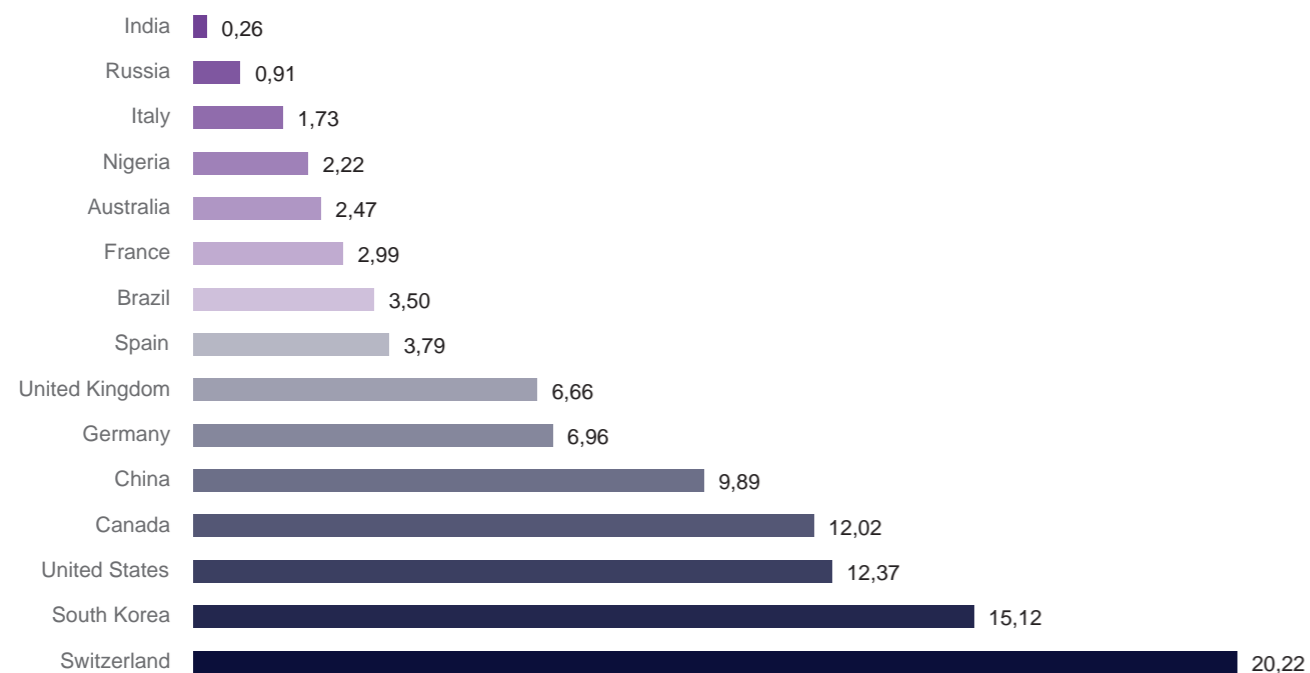
Besides strong political ties, traditionally, cooperation in the energy sector as well as military and technical partnership have been of particularly large scale and importance to both countries. In September 2019 Prime Minister Narendra Modi was the Guest of Honour at the 5th Eastern Economic Summit in Vladivostok. The Russian Far East, the vast area of the country that is being developed to become Russia's new gateway to Asia, is open to Indian business and aims to become one of the new engines for development of the Russian-Indian ties. The Vladivostok-Chennai sea corridor that is being developed will be an important new transport link

connecting the Russian Arctic and Far East with India. With this connection, the energy bridge between the two countries that implies trade and investments in oil and gas, LNG, nuclear power and coal production and processing is bound to expand further, given the countries' natural complementarity in these sectors. In view of the pandemic of 2020, joint anti-COVID-19 vaccine production is a recent addition to the list of priority high-importance areas of cooperation between the two countries.

Still, it is well-known that for various reasons economic cooperation between Russia and India lags behind the level of their enhanced political partnership. Russian-Indian trade turnover stood at 11,2 bln USD in 2019²¹⁷ (with Russian exports to India at 7,3 bln USD, decreasing from the previous year, and Indian exports to Russia at 3,9 bln USD, growing compared to previous year). The governments of both countries are confident that trade could triple to 30 bln USD by the year 2025, while bilateral investment should increase from over 30 to 50 bln USD²¹⁸. Intensifying trade and economic relations has been set as the priority area by Prime Minister Modi and President Putin.

Governments on both sides have been tasked with the identification and removal of bottlenecks and obstacles to improving economic links. Establishment of a free-trade zone is being discussed between India and the Eurasian Economic Union (EAEU). The Russian Ministry of Economic Development has launched a «Single Window Service» to facilitate hassle-free investments by the Indian companies. A similar facility has been organised on the Indian side: the Indian investment promotion and facilitation agency, Invest India, has set up a special Russia Desk, to provide a convenient advisory platform for Russian business to invest in India. Russian Exports Centre, Far East Investment and Export Agency, Business Russia, Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI) are among the many institutions on both sides working to connect the business communities of Russia and India. Two rounds of India-Russia Strategic Economic Dialogue took place in St. Petersburg in 2018, and in New Delhi in 2019. Led by NITI Aayog (for details please refer to page 26 of this report) and the Russian Ministry of Economic Development, these forums brought together industry experts

AVERAGE COST OF 1GB OF MOBILE DATA AROUND THE WORLD IN 2019 (IN USD)



Source: www.forbes.com, www.statista.com

ZOOM-IN: SISTEMA

Sistema Public Joint Stock Financial Corporation (AFK "Sistema" as it is known in Russia), was founded in 1993 by Vladimir Yevtushenkov and his partners. Today Sistema is a publicly-traded diversified company. It has been investing in the areas of: telecommunications, utilities, retail, high tech, pulp and paper, pharmaceuticals, healthcare, railway transportation, agriculture, finance, mass media, tourism, and operates in Russia, CIS, Europe, USA and India. Some of the assets in Sistema's diversified portfolio in Russia include a 50,0177% stake in Russia's leading telecommunication company, PJSC Mobile TeleSystems (MTS), 25,6% stake in Russia's largest development and construction company, Etalon Group, 96,9% ownership in Russia's largest national healthcare chain, JSC Medsi Group and 42,99% take in one of Russia's largest e-commerce platforms, OZON. Sistema also invests in Research and Development in innovative high-tech companies and in global financial markets.

Sistema VC – is a venture capital fund where Sistema holds 80%. It was founded in 2016 and focuses on investing in growth-stage Deep Tech companies in the areas of artificial intelligence, machine learning, computer vision and cognitive technologies (machine recognition of speech, sounds, movement, video analytics etc.), as well as next-generation infrastructure solutions and networks, educational technology, logistics and foodtech.

Sistema has had a presence in India since 2007 when it acquired a stake in Shyam TeleLink Ltd – a telecommunication company based in Jaipur and working primarily in the state of Rajasthan, but the company had the potential to grow into an all-India player. This joint venture grew to become the Sistema Shyam Teleservices (SSTL), under the Mobile TeleSystems India (MTS India) brand. In February 2012 the Supreme Court of India cancelled 122 telecom licences of 22 mobile operators across the country that had been granted on or after January 2008. As a result of this decision SSTL lost 21 of its' 22 licenses. At that time SSTL was in the process of revision of its' strategy, planning to focus on selling mobile data rather than voice services, anticipating the global changes related to the forthcoming spread of smartphones and mobile internet. After SSTL's licenses were called off, shareholders decided to sell the company to Reliance Communications in 2016 (the company belonged to Anil Ambani). The same year Mukesh Ambani launched Jio. At that time, hardly any players in the highly fragmented Indian telecom market could imagine the cardinal and radical changes in store for the sector with the emergence of this new player (for details about Jio please refer to page 42 of this report). As of today, there are only two big players left in India's telecommunication sector besides Jio, and these two are in a deep financial crisis. India's government had to bail out both these companies by allowing large-scale foreign investment and by permitting all players to raise the prices for their services slightly, which had, over the last few years, fallen to an unprecedented low.

Notwithstanding the difficulties related to its' telecom business and seeing the potential of the developing venture capital ecosystem in India, Sistema preserved its' experienced India-focused management team and established Sistema Asia Capital in 2015. Known today as Sistema Asia Fund, this venture capital fund is managed by Sistema Asia, a wholly owned subsidiary of AFK "Sistema", registered in Singapore and licenced by MAS (Monitory Authority of Singapore). Sistema Asia Fund operates in India (Bangalore) and Singapore, investing in high-tech startups with a particular focus on consumer tech, financial technology, e-commerce, e-healthcare and wellness, cybersecurity and artificial intelligence. Some of its' most prominent investments in India include: Seclore, Licious, Subtra, Lendingkart, HealthifyMe, Faasos, Kissh, Uniphore. By 2019, Sistema Asia Fund invested in 12 Indian startups, with two successful exits: from Bangalore-based e-gifting platform Qwiksilver and Netmeds, an e-pharmacy. By the end of 2021, Sistema Asia Fund plans to invest in several more companies in India.

The Fund already has over 120 mln USD under its' management and plans to increase its' available capital. It works across multiple geographies through various channels including Singapore-based platform of Sistema Asia called Sales Jet. Sales Jet is a partnership with Enterprise Singapore, Skolkovo Foundation and MTS helping Russian startups expand to Sounteast Asia, Singapore and India and taking startups from

Singapore to Russia. Sales Jet promotes technology transfer and business development, improvement of its' portfolio companies through innovation, operational excellence and attracting industry partners to enhance expertise and boost growth.

In 2019 Sistema Asia Fund together with MTS Startup Hub (Moscow-based accelerator of MTS Russia), Invest India and Startup India organised Startup India - MTS Innovation Challenge, scouting for technology-based startups. The Challenge focused on Indian companies that have already developed a viable product or ready-to-deploy technology in fields such as fintech, HRtech, internet of things, B2C digital products, software or SaaS for e-commerce. The winners could avail of multiple benefits, including: MTS as a client or investor, money for piloting, access to sales channel, industry expertise, access to MTS corporate resources and intensive business training.

Based on: www.sistema.com, www.sistemaasiacapital.com, www.economicstimes.indiatimes.com, www.thehindubusinessline.com, www.businessinsider.in

and government officials, focussing on core areas such as Transport infrastructure and Connectivity, Tourism, Agriculture and agro-processing, Small and medium business, Trade, Banking, Finance, and Industry. Although digital transformation and frontier technologies were also among the topics discussed, the digital domain is yet to receive the proper attention of governments and the business communities in Russia and India. Given the rapid development of digital technology in both countries, the time is right to synchronise efforts to the mutual benefit of both countries and to upgrade the Russian-Indian relations to technological strategic partnership.

While Russia is well-recognised for its fundamental sciences and development of complex algorithms, India in recent years has also made remarkable progress in increasing internet penetration and digital literacy, as well as areas such as digital government, e-commerce, introduction of a united payment interface, goods tracking and other technologies. Although there is a trend towards growth in cost of mobile data in India, internet traffic prices in Russia and India continuously constitute some of the cheapest rates in the world²¹⁹. Digital transformation is now one of Russia's top priorities. This was reflected in the appointment of Mikhail Mishustin as Prime Minister in January 2020. Tech-savvy, Mishustin earlier headed the Federal Tax Service of Russia and is credited with the successful digitisation of its operations. Russia is also developing the

New Technological Initiative (NTI)²²⁰, a long-term programme aimed at ensuring the leadership of Russian companies in new high-tech markets that will determine the structure of the global economy in the next 15-20 years. The NTI could be coordinated with India's strategic efforts. Just like in India, Russian authorities are now preparing to test and roll out 5G networks. The national programme "Digital Economy" is being implemented, and is planned up till 2030.

The fact that, as of 2017, the Russian economy was 80-100% dependent on imported IT infrastructure²²¹ is seen as one of the biggest challenges and will be one of the focus areas during the implementation of the «Digital Economy» programme. At the same time, Russia risks losing a significant part of its IT workforce due to rouble depreciation and not being able to offer competitive remuneration to the best specialists. The low level of production of microelectronics in Russia is another difficulty, which is part of a bigger challenge Russia is facing – the diversification of its economy away from high level of dependency on natural resource production and exports. When speaking at the State Duma (Russia's lower house of parliament), Mishustin noted²²². «Digital is the oil, gold and platinum of the XXI century. If we do not get digital, digital will get us». Hence, development of the IT sector, as well as supporting entrepreneurship, are some of Russia's top economic policy priorities at this stage.

India's experience in digitisation is not very well known in Russia. Although there are some exceptions, Russian business is mostly not fully aware of the changes that came with it, and it needs to learn to work with the new digital India. The Russian and the Indian IT industries developed in very different ways, but now there are new complementarities, so new opportunities should be explored. Historically, too, there have been positive connections: RUSSOFT, the Russian association of software companies, for instance, was set up in 1999 following the example of NASSCOM (for details please refer to page 63 of this report). Today, companies like MaximaTelecom (development of wi-fi networks for Delhi metro), Lighting Technologies (lighting systems for Smart Cities), Zyfra (artificial intelligence and industrial internet of things-based solutions. For details please see page 90 of this report), as well as state giants like ROSATOM (India's key nuclear industry partner) and others actively participate in India's innovative development, but there is surely scope for more players from Russia to come on board.

Businesses need to think very fast if they wish to succeed in India's digital future. International players have since long realised the potential of India and the fact that if your company is not in this country it is not truly global. The competition for the Indian market is tremendous, with Indian companies receiving tangible and intangible advantages. While one should not overestimate the importance of political good will, in the case of Russia and India it undoubtedly should not be ignored, but made use of. India today cannot be seen just as a potential market, but should be treated as a valuable partner. India welcomes businesses that help meet its pressing needs without aggravating its problems. The country is now focused on educating, skilling and giving employment to its youth, managing scarce resources in a smart way, providing clean energy to move the economy forward, finding a balance between taking millions of its people out of poverty without hurting the environment further, and repairing the damage already done. "Make in India" is one of the Indian government's top priority programmes, and with defence production paving the way²²³, the Russian producers of electronics need to look at Indian opportunities carefully too, as India offers incentives for localised production and has unique experience in scaling low margin products and services. Russian and Indian partners

can target third countries too and, importantly, aim globally, as India sees no boundaries in doing business and supports deserving ideas like no other country today.

Various Russian and Indian institutions are making efforts to connect entrepreneurial communities, promote business education aimed at business development in Russia and India, and build links between the young people of the two countries. The first India-Russia Startup Summit was held in Moscow in December 2018, organised by the Skolkovo Foundation. Another example is the collaboration of India-based Global Education & Leadership Foundation (tGELF) with SKOLKOVO School and Skolkovo Foundation in facilitating Russian and Indian participation in the Entrepreneurship World Cup (EWC). EWC, an initiative of the Misk Foundation (Saudi Arabia), is a global startup competition that in its two years of existence has created an ecosystem of more than 100,000 startups across 190+ countries. tGELF led the organising efforts in various countries, Russia and India being a particular focus. With partnership support from SKOLKOVO, tGELF as one of the global co-hosts of EWC has organised the EWC National Finals in Russia: offline at the Skolkovo Technopark in 2019, and fully online via a specially created platform in 2020. Atal Innovation Mission of NITI Aayog and Sirius Educational Centre focus on young innovators. They exchanged visits of Indian and Russian students and facilitated their joint project work. Moscow School of Management SKOLKOVO aims to become a repository for expertise about doing business in India and to build educational programmes for Russian and Indian innovative businesses, together with its partner in India, the Indian School of Business in Hyderabad.

Several Russian-origin investment funds are already working with India, building bridges and looking for synergy between Russian, Indian and global experiences. These include Sistema Asia Capital (for details please see page 87 of this report), RTP Global (for details please see page 65 of this report), DST Global. The Indian SUN Group is one of the venture capital veterans, which has been investing in Russia, India and other countries since the early 1990's. These are very savvy investors, bringing knowledge about working in complex markets as well as their capital.

ZOOM-IN: ZYFRA

Zyfra is a group of companies, established in 2017. Victor Vekselberg's Renova Capital was one of the early investors in the company. It develops artificial intelligence (AI) and industrial internet of things – based solutions, as well as machine data collection, robotics and drones for mining industry, machine manufacturing, oil and gas and chemical enterprises. Zyfra offers turn-key technology in data analytics and forecasting, optimisation of technological processes as well as equipment and personnel monitoring. It also plans to develop solutions and quality forecasting for smart agriculture. The company promotes its' own products, and acts as an investor into other companies' solutions as well. The company's clients in Russia include many industry majors, such as Rostec and its' companies, Gazprom and its' contractors, Rosatom, Rosneft, GazpromNeft, Sibur, Nornikel, Sakhalinugol, GV Gold and others.

Zyfra started working in India in 2018, where it now has a representative office. Zyfra also operates in Finland, France, Bulgaria, Romania, Germany, Italy, Turkey, Chile, Peru, South Africa, China, Singapore and Morocco, besides Russia. By the end of 2018, Zyfra announced that it had reached 3 mln USD in contracts in India. By April 2019 Zyfra had launched 17 pilot projects with its' major Indian partners, including Spudweb (software engineering company working in LAN and WAN infrastructure), Parivartan Automation (manufactures Indian railway units), Abcon Group (provides consulting and software solutions), Wimera Systems (provides digital transformation solution), Agaram Infotech (IT company that provides software solutions for various industries), Nortech Trinity (provides technical specialist and support services to the oil, gas and energy sectors), Mascot Tools (a machinery company) and OJB Engineering (manufacturer of tools such as jaw sets), as well as other companies from the defence, aerospace, petrochemicals, metallurgy and mining fields. Zyfra plans to reach a target of 50 mln USD in India-related deals by 2021, with India being its' primary international focus area.

According to Igor Bogachev (the Chief Executive Officer of Zyfra), cooperation between Russia and India in AI and internet of things (IoT) is much more than a buyer-seller relationship and simple delivery of solutions, it is about sharing best practices, knowledge and innovating jointly. I. Bogachev believes that Indian sectors with most potential to adopt AI and IoT-based solutions are metallurgy, transportation, aerospace and petrochemicals.

In 2018, Zyfra unveiled its' Manufacturing Data Collection plus (MDCplus) system in India which performs real-time machine monitoring with customisable reports and charts that can be used to track jobs, parts, operations, work centres, scrap costs, downtime and people using computer numerical control (CNC) machines. The same year Zyfra released a report which ranked India among the most advanced countries in terms of development of AI technologies and IoT (ranked 13 out of 200).

In December 2019, Thriveni Earthmovers Pvt. Ltd., the Indian mining company with main operations located in the state of Orissa, awarded Zyfra the contract to implement an "intelligent mine" solution at the Pakri Barwadih Coal Mining Project (PBCMP) in the state of Jharkhand. Zyfra's "Intelligent Mine" solution includes (i) ZM Karier: mine fleet management system with automatic dispatch system of haul trucks; (ii) ZM Drill: automated drilling and blasting control system; and (iii) ZM Scarex: machine guidance digging systems and other resource planning and application software for data import and export related to planning, production, equipment performance, manpower attendance and real-time analytics. As of June 2020, The PBCMP project is more than 60% complete.

In September 2019 the Indian Railways started using Zyfra's MDCplus system to collect real-time data from all types of machines and to monitor energy consumption. Zyfra deployed the system, trained personnel, and it is now providing technical support to the Indian Railways. According to the Indian Railways, the implementation of MDCplus resulted in 9% increase in machine utilisation and substantial energy saving. Overall, by April 2020, the Indian Railways achieved 20% increase of production efficiency at its' 10 factories and workshops in different regions of India where Zyfra's real-time machine monitoring and manufacturing data-collecting systems were deployed. As of 2019 more than 500 CNC machines connected to Zyfra's

MDCplus system were functioning in India.

Marking another milestone in Indo-Russian joint IT projects, in August 2020, the business conglomerate Murugappa Group's subsidiary Shanthi Gears Ltd (India's leading gearboxes manufacturers) has awarded Zyfra a contract to connect its' local equipment to Zyfra's MDCplus. By 2021, the company plans more than 2000 MDCplus installations in India partnering with companies like Murugappa Group, Godrej and others.

The pandemic has significantly increased interest towards technology employed by Zyfra, as companies are looking for robotics and AI-based solutions for their industries and strive to be more efficient and agile. Zyfra's business has reportedly been growing faster than the market, which received additional boost with the crisis, while India has become the key foreign market for Zyfra.

Based on: www.zyfra.com, www.tadviser.ru, www.cnbctv18.com etc.

Besides areas already mentioned, the two countries have potential for cooperation in deep tech sectors such as artificial intelligence, big data and analytics, machine learning, photonics, blockchain, as well as financial technology, advanced materials, sustainable energy infrastructure, smart logistics. One of the important elements of support from the governments on both sides could be the setting up of so-called regulatory playgrounds and opening them up to participation by Russian and Indian companies so that experimental legal regimes could foster easier bilateral technological cooperation, and the free-flow cross-pollination and testing of ideas, especially between tech startups.

Another important potential area of cooperation for India and Russia is information security. In the world we are accustomed to, there were security frameworks surrounding the infrastructure and spaces people wanted to keep safe. In the fast-approaching digital world, the environment becomes pervious and the space requiring defence is difficult to define. Moreover, in future, even critical infrastructure is likely to be controlled by artificial intelligence, so new approaches to, and different principles of, security will be required. Quantum technology and quantum-based cryptography could become the basis for these new safety systems.

In 2020 Ministry of External Affairs of India announced the setting up of New and Emerging

Strategic Technologies (NEST) Division to engage in technology diplomacy and deal with the foreign policy and international legal aspects of new and emerging technologies. It will enable more active participation by India in global forums in the area of technology governance and promoting India's national interests in this context²²⁴. In the new digital world national independence and the sovereignty of countries becomes dependent on technology more than ever before. As a response to growing cyber threats and the lack of comprehensive international regulation, cyberspace has been getting increasingly regionalised. Despite Russia's longstanding efforts in developing a UN-led broad international consensus on the principles of international law regulating cyberspace, it has had limited success in this area. The new unfolding international environment will probably have several technological clusters, each one with its own shared security principles. It would be both in Russia's and India's interests to coordinate these principles early on, so as not to find themselves on different technological continents in the near future. Given both countries' continuous and consistent pursuit of sovereignty and adherence to the principles of non-interference in the domestic affairs of other countries, Russia and India are natural partners in the process of shaping the principles of the new digital world, and their efforts, if stepped up, would benefit the international community as a whole, not just the two countries.



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Alexey KALININ
Research Director
Alexey_Kalinin@skolkovo.ru



Bulat NUREEV
Managing Director
Bulat_Nureev@skolkovo.ru

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RESEARCH AREAS



Dr. Lydia KULIK
Head of India Studies
india@skolkovo.ru



Gaukhar NURGALIEVA
Head of Eurasian Studies
eurasia@skolkovo.ru



Oleg REMYGA
Head of China Studies
china@skolkovo.ru



Ekaterina MOLCHANOVA
Head of Global Strategies
globalstrategy@skolkovo.ru



Natalia ZAITSEVA
Head of Sustainability
sustainability@skolkovo.ru



Vladimir KOROVKIN
Head of Digital and
Innovations
digital@skolkovo.ru

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SKOLKOVO Institute for Emerging Market Studies (SKOLKOVO IEMS)

Moscow School of Management SKOLKOVO
100 Novaya Str, Skolkovo Village, Odintsovsky District, Moscow Region 143025 Russia
+74955393003 | iems@skolkovo.ru | www.iems.skolkovo.ru



HKUST Institute for Emerging Market Studies (HKUST IEMS)

Lo Ka Chung Building, Lee Shau Kee Campus
The Hong Kong University of Science and Technology Clear Water Bay, Kowloon, Hong Kong
+85234692215 | iems@ust.hk | www.iems.ust.hk



ISB Institute for Emerging Market Studies (ISB IEMS)

AC-3, Level 1, Indian School of Business Gachibowli, Hyderabad 500 111 India
+914023187027 | iems@isb.edu | www.isb.edu/iems

Novaya ul. 100, Skolkovo village, Odintsovsky District,
Moscow Region 143025, Russia

Phone: +7 (495) 539 3003

Fax: +7 (495) 994 4668

Email: iems@skolkovo.ru

Website: www.skolkovo.ru