

## **#TheIndiaDialog Working Paper Series**

Working Paper (WP–2023–009 September, 2023)<sup>1</sup>

# **Indian States: Innovation and Foreign Direct Investment Sean Randolph<sup>2</sup>**

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<sup>1</sup> The views presented here are those of the authors and do not necessarily represent the position of either Institute for Competitiveness or Stanford University. Working papers are in draft form. This working paper is distributed for purposes of comment and discussion only.

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## **Indian States: Innovation and Foreign Direct Investment**

Indian states, like American states, often serve as laboratories for innovation, and global investors in India are often investing not only in the country but also in a state. Also like the United States, there is considerable variation between Indian states in their approach to technology, investment and business.

The 2021 India Innovation Index measures the competitiveness of Indian states by a range of measures: human capital, investment, knowledge workers, R&D activity, business environment, and safety and legal environment (factors termed “Enablers”), and knowledge output and knowledge diffusion (factors termed “Performers”). In addition to states the Index also evaluates City-States and Union Territories.

The top five states in the 2021 rankings were Karnataka, Telangana, Haryana, Maharashtra, and Tamil Nadu, based on indicators such as the percentage of secondary schools with ICT labs (growing in Karnataka’s case from 29% to 49% and in Telangana’s from 27% to 35%); FDI (noting for example Karnataka’s success in attracting venture capital); enrollment in Ph.D. programs; applications for patents, trademarks and industrial designs; startup growth (where Karnataka accounted for 19,000 out of 61,000 startups nationwide<sup>3</sup>); and state policies (such as Tamil Nadu’s 2018-23 startup and innovation initiative, that aims to turn the state into a global innovation hub).

Among City-States Chandigarh comes out on top followed by New Delhi, with Chandigarh leading in the metric of knowledge workers and investment in schools (the percentage of schools with functional computer facilities is 99%), and Delhi performing best in business environment and investment. Both score strongly in higher education and PhD enrollment.<sup>4</sup>

Variability between Indian states can also be seen in metrics such as fixed capital formation, where Gujarat accounts for 25% of India’s total, followed by Maharashtra and Tamil Nadu. Two states, Maharashtra and Gujarat, account for 50% of all goods exports. Maharashtra accounts for 25% of all patenting and the top five states (with a 40% share of GDP) account for 65% of patenting, with a per capita patenting rate five times the national average.<sup>5</sup>

These factors play an important role as Bay Area and other U.S. investors look beyond the national level to consider the policies and strategies, infrastructure, human capital assets, technology orientation and business environment of India’s states.

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<sup>3</sup> Numbers are inclusive of all startups, of which tech startups recognized by the Department for the Promotion of Industry and Internal Trade (DPIIT) are a subset.

<sup>4</sup> NITI Aayog and Institute of Competitiveness, “India Innovation Index 2021.”

<sup>5</sup> Institute of Competitiveness and Economic Advisory Council to the Prime Minister, “Competitiveness Roadmap for India@100”, 2022.

## Leading Bay Area Companies Investing in India

Silicon Valley/Bay Area companies have an outsized presence in India through offshore R&D, delivery and innovation centers. Among the most important are:

*Cisco:* Cisco supplies technology to major Indian telcos including state-owned Bharat Sanchar Nigam Ltd (BSNL), Reliance Jio Infocom, Bharti Airtel, Vodafone Idea, Tata Communications, and Sify Technologies, with a focus on building the back-end network for India's 5G rollout and developing use cases for end clients.<sup>6</sup> Its footprint in India includes offices in Gurgaon, Mumbai, Chennai, Pune, Kolkata, Hyderabad, and its main campus in Bangalore.

*Google:* In July 2021 Google accounted for 99.6% of online searches in India. Its suite of services in India includes Google Pay, which as of September 2019 had 67 million users.<sup>7</sup> Its India footprint includes offices in Hyderabad, Bangalore, Mumbai and Gurgaon.

In 2020 Google announced plans to invest \$10 billion in India over 5-7 years through its India Digitization Fund, which focuses on infrastructure, affordable internet access and new product development tailored to the Indian market. Focal points include healthcare, education and agriculture.<sup>8</sup> Through the Digitization Fund Google has invested \$4.5 billion in Jio, India's largest telecommunications company by subscribers. In addition to Jio, it is investing \$700 million in Bharti Airtel, another leading telecom provider, and has committed another \$300 million to commercial agreements with the company to support cooperation on 5G technology, cloud services, and engagement with manufacturers to lower the cost of smartphones.<sup>9</sup>

*Meta:* In 2020 Facebook announced that it would also invest \$5.7 billion in Jio Platforms. It has 239.65 million users in India, more than in the United States (179.65 million),<sup>10</sup> and includes offices include Hyderabad, Delhi, Gurgaon, Mumbai and Bangalore.

*Twitter:* Twitter has 23.6 million active users in India, the third largest number in the world after the United States (76.9 million) and Japan (58 million).<sup>11</sup> Its India office is in Bangalore.

*Salesforce:* Salesforce has operated in India since 2005 and supports employees in Bangalore, Mumbai, New Delhi, Pune, and Hyderabad. The Salesforce Centre of Excellence that opened in Hyderabad in 2016 focuses on R&D. The company's approximately 7500 employees (up from 2000 in 2020)

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<sup>6</sup> Ishita Guha, "India to be Part of Cisco's \$5B Funding for 5G Projects", Mint, March 23, 2021.

<sup>7</sup> Newley Purnell, "WhatsApp Mobile Payments to Expand in India", Wall Street Journal, November 7, 2019.

<sup>8</sup> "Google Plans to Invest \$10bn in India", Silicon Valley Business Journal, July 13, 2020.

<sup>9</sup> Diksha Madhok, "Google is Investing Another \$1 billion in India's Smartphone Market", CNN Marketplace Asia, January 28, 2022,

<sup>10</sup> S. Dixon, "Countries with the most Facebook Users 2022", Statista, July 26, 2022.

<sup>11</sup> Social Shepherd, "22 Essential Twitter Statistics You Need to Know in 2022", August 4, 2022

makes India Salesforce's largest employment center outside the United States. Customers are clustered in the fields of manufacturing, banking, financial services, and retail.

*WhatsApp:* WhatsApp has grown its digital payments service in India, enabling users to connect their bank accounts to the app and send money to each other. In November 2019 the government approved the service for a maximum of 20 million users.<sup>12</sup> WhatsApp is also working with banks such as ICICI to explore ways to bring financial services such as insurance, micro-pension and credit to low-wage workers in the informal economy and in rural areas.<sup>13</sup> Its India offices are in Gurugram and Hyderabad.

*LinkedIn:* With 69 million users, up from 10 million in 2011, India is LinkedIn's second largest market after the United States. The company has 1100 employees across three offices, in Delhi, Mumbai and an R&D facility in Bangalore that develops for the Indian and global markets.<sup>14</sup>

*Apple:* Apple has invested in India through its contract manufacturer Foxconn, starting with the assembly of the iPhone 11 at its plant near Chennai in 2020. This was the first time that Apple produced a current generation iPhone in India, having used Taiwan-based contract supplier Wriston to produce older generation phones in India since 2017.<sup>15</sup> The upgrade of its production in India reflects both an investment in India's cell phone market, now the world's second largest, and a move to diversify production away from China. In September 2022 Apple increased its investment further as Foxconn began producing the flagship iPhone 14 in Chennai.

While the vast majority of iPhones are still made in China, the shift reflects an ongoing strategy by Apple to reduce its heavy dependence on Chinese production. In November 2022 Taiwanese contract manufacturer Pegatron, whose facility in Tamil Nadu has like Wriston historically produced older models, became the second Apple supplier to produce the iPhone 14 in India.<sup>16</sup> Apple also and supports an App Design and Development Accelerator in Bangalore.<sup>17</sup>

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<sup>12</sup> Ibid.

<sup>13</sup> Manish Singh, "WhatsApp to Pilot Projects to Deliver Credit, Insurance and Pension to Users in India, Techcrunch, July 20, 2020.

<sup>14</sup> LinkedIn Pressroom, "LinkedIn Reached 10 million Members in India, June 20, 2011. Gaurav Laghate And Vinod Nahants, LinkedIn's India User Base up 24% in a year to 62 Million", Economic Times, December 4, 2019. Apollotechnical, "Top 45 countries by Number of LinkedIn members, <https://www.apollotechnical.com/linkedin-users-by-country/>.

<sup>15</sup> Manish Singh, "Apple Begins Assembling iPhone 11 in India", Techcrunch, July 24, 2020.

<sup>16</sup> Sankalp Phartipal, "In Shift Away from China, Apple adds a New iPhone 14 Supplier in India", Business Standard, November 4, 2022.

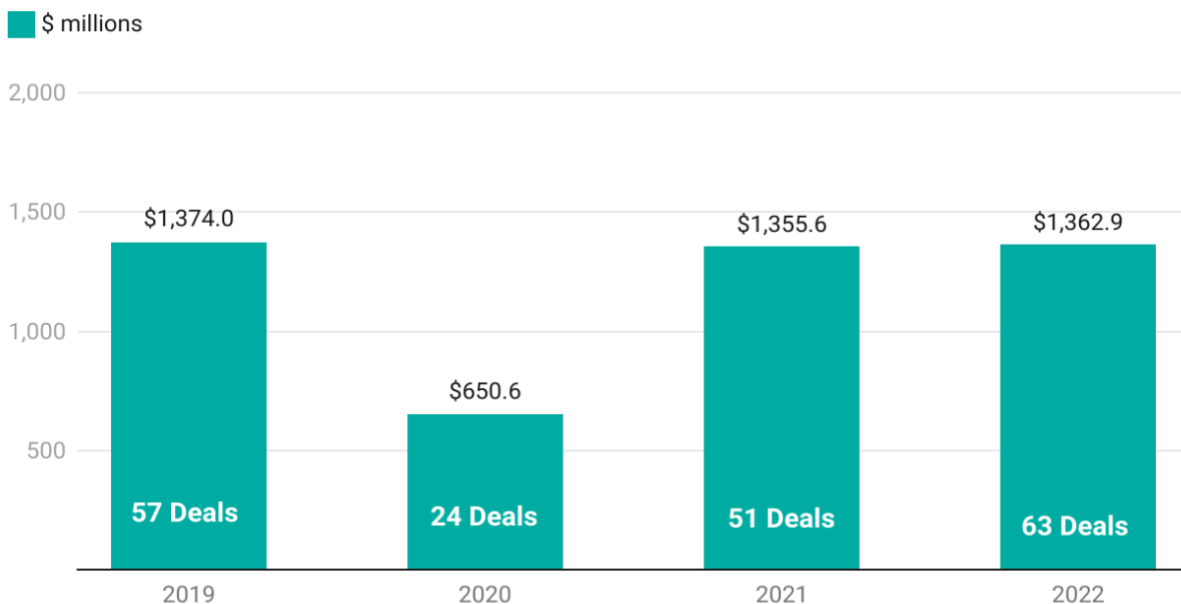
<sup>17</sup> "Apple Plans to Start Selling Online in India Next Month", Bloomberg, August 25, 2020. "Apple Brings Online Store to India September 23", Press Release, September 17, 2020.

*Intel:* Intel has approximately 7000 employees in India, at four facilities in Bangalore and one in Hyderabad, and has invested \$7 billion to date. While not manufacturing, India hosts the company's largest design center outside the United States.<sup>18</sup>

## Investment from the Bay Area to India

Foreign Direct Investment (FDI) from the Bay Area to India builds on decades of investment by the region's technology companies in offshore R&D and engineering centers. Investment declined in 2020 in wake of the COVID-19 pandemic but returned to pre-pandemic levels in 2021. Through the first seven months of 2022, FDI was on track to be the largest in recent history in terms of dollar amount and deals.

### FDI in India from Bay Area Companies



2022 contains data through July

Chart: Bay Area Council Economic Institute • Source: FDI Markets • Created with Datawrapper

In 2019, the top sectors for Bay Area investment were ICT & Electronics (\$709M, or 51.6% of the total), Construction (\$402.6M, 29.3%), and Creative Industries (\$66.2M, 4.8%). After the dip in 2020 Bay Area companies increased their investment in ICT & Electronics in 2021 to \$875.4M (64.6% of the total), continuing the strong focus on R&D, software and engineering.

<sup>18</sup> Kiran Ratahee, "Committed to India for Semiconductor Growth, says Intel", The Financial Express, July 21, 2022.

## FDI in India from Bay Area Companies 2021

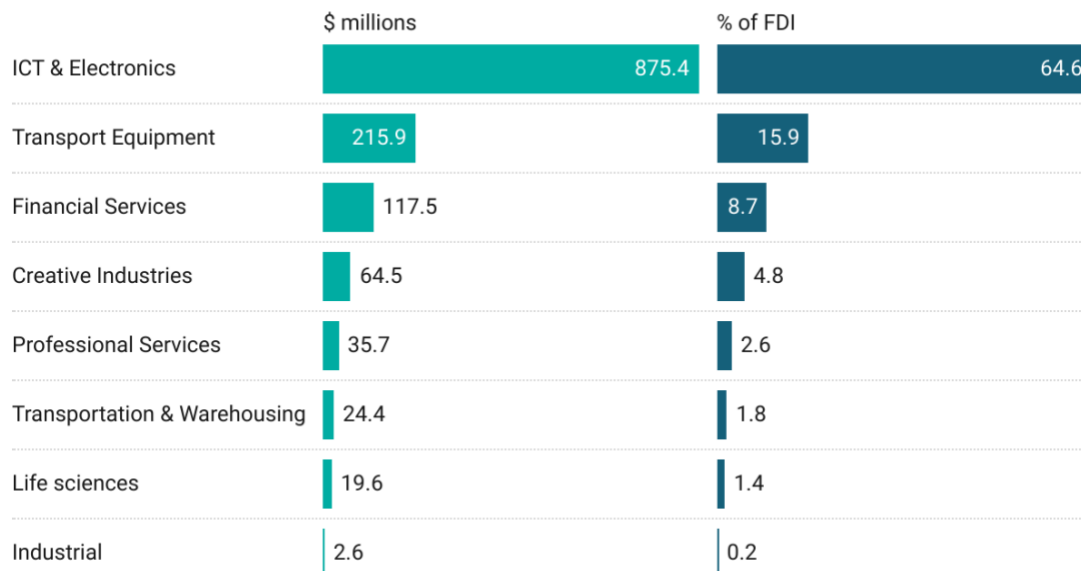


Chart: Bay Area Council Economic Institute • Source: FDI Markets • Created with Datawrapper

As in other countries, investment from Silicon Valley focuses first on talent and the availability of engineers. Sustaining this pool of talent at the state level requires a sustained commitment to education, the development of digital skills, and more broadly to the development of an investment environment that is conducive to research innovation. This can include the presence of IITs or in Bangalore's case the scientific capacity represented by the Indian Institute of Science (IIS). Further behind that lies a pipeline of education and training institutions and programs that enable the development of both innovative Indian companies and research and engineering centers operated by multinationals. The efficiency of infrastructure is another key factor, as witnessed by Hyderabad's growth as a technology center in the last two decades.

The development of innovation ecosystems across India is also an enabler of investment, including startup acquisitions by Silicon Valley companies and venture investment generally. In technology this ecosystem development tends to mirror the states and cities with the same educational and institutional infrastructure that attracts FDI from Silicon Valley, with Bangalore the prime destination. Bay Area venture firms are primarily investing through their India affiliates. In the two years between July 2019 and July 2022 Sequoia Capital was the top investor with 125 deals, Accel partners was the sixth largest with 79, Y Combinator was tenth with 59, Matrix Partners (India) twelfth, Lightspeed Venture Partners was number 18 with 41 deals, and Nexus Venture Partners (India) 20<sup>th</sup> with 36 deals.<sup>19</sup>

<sup>19</sup> Tech in Asia, "These are the Most Active Investors in India's Startups", July 20, 2022.

As India looks to expand its capacity in manufacturing through Make in India and other initiatives many of the same factors will apply, to which can be added land assembly and a receptive business climate. India's assets for engineering are well known but it is not seen yet as a major manufacturing center and the attraction of manufacturing from U.S. companies remains challenged. Attracting that investment will be particularly important, however, as global supply chains realign and more companies seek to reduce their reliance on China.

In this case Apple's operations in Chennai offer a noteworthy case study of where manufacturing in India does take place and can be viewed as a template for conditions that could in the future enable the growth of manufacturing by Bay Area and other U.S. companies. As those decisions are made and the scope of investment activity grows with the U.S.-India relationship, Bay Area companies will be assessing India's states, and India's states will compete for a pie that is growing and at present is highly concentrated.