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NITI Aayog

India Innovation Index 2019

Report designed by Jasper Levi for NITI Aayog and Institute for Competitiveness.

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India Innovation Index 2019

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MESSAGE

Innovation has always been a driver of change and progress in any economy as it disrupts traditional practices and businesses. It also generates breakthroughs in both product and process technologies.

Over the last few years, the Government of India has made innovation a priority to realise the goal of 'New India'. Most significantly, the Atal Innovation Mission has been a country-wide effort to promote a culture of innovation from the level of schools to industry. NITI Aayog has played a leading role in the flagship initiative with significant results.

In order to further drive a culture of innovation across Indian States, NITI Aayog has come up with its first-ever India Innovation Index, a tool that will help create a conducive ecosystem for innovation to flourish across the country. Such an Index will not only help States to devise their own strategy for fostering an innovation climate, it will also enable them to benchmark their performance with other States.

The Index has been grouped under two main headings; Enablers - factors that will drive innovation in the States and Union Territories - and Performance that will measure the actual outcomes. The Indian Innovation Index report also focuses on a number of drivers for both Enablers and Performance of any State/UT.

Hopefully, this will lead to healthy competition among the States in terms of boosting their innovative capacities. It will also strengthen the bonds of cooperative federalism with States learning from one another to improve their innovative outcomes.

I congratulate the entire team of NITI Aayog for their unique and laudable effort. My compliments to Central Ministries, States' Nodal Officers and our knowledge partners, Institute for Competitiveness, CII for their contributions towards preparing this Index.

(Rajiv Kumar)

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MESSAGE

India has been at the pinnacle of innovation in a large variety of fields from urbanisation (Indus Valley civilization) and metallurgy (Iron pillar of Delhi) to algebra (invention of Zero) and Science (Raman Effect). However, now as the country moves forward to meet the challenges of the 21st century – the sixth wave of innovation – it needs to create a culture and mindset that is attuned towards science and technology (S&T) right from our education system. Visionaries such as Shri Homi Bhabha and Dr. Vikram Sarabhai strongly believed that S&T that can bring prosperity in our country and alleviate hunger and poverty. Later, Dr. Swaminathan, Dr. Kurien, and Dr. Kalam established and contributed to various milestones in India's scientific history.

Recently, India has made considerable progress in strengthening the S&T infrastructure as well as developing an environment conducive for entrepreneurs. The Atal Innovation Mission (AIM), launched with the Start-Up India initiative, which has set up Atal Tinkering Labs at the school level and Atal Incubation Centres across India, is one of the most innovative policy interventions across India. The Atal Innovation Mission aims to provide a platform where innovative ideas are generated so that the fruits of S&T could reach millions.

The India Innovation Index is another initiative that has been launched by the NITI Aayog to analyse the innovation ecosystem at the sub-national level across the nation. The aim is to give the States a robust measure of their innovative capacities and encourage them to strengthen the innovation ecosystem. This would also give a boost to the development of innovation-led entrepreneurship in India as a healthy innovation culture across States will help them attract start-ups and hi-tech companies with greater ease

Furthermore, apart from the economic benefits, innovation within States/ UTs can also solve important basic problems like inclusive education, affordable health services, and waste management among many others. The Indian Innovation Index can help the States in recognizing the key areas as innovation can be the central driver of growth across sectors from social causes to science.

I would like to thank Shri Amitabh Kant, CEO NITI Aayog, who took up this crucial initiative and led it into fruition; everyone who provided their insights to help create the right structure for analysing innovation in the Indian context including Dr. Murlikrishna Kumar and his team; and everyone else who were involved in the process.

V.K. Saraswat

(Dr. V. K. Saraswat)

New Delhi
15.02.2019

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एक कदम स्वच्छता की ओर

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सत्यमेव जयते

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MESSAGE

India is the fastest growing major economy in the world today and is home to more than 1.3 billion people. The Prime Minister's vision 2022 of 'A New Inclusive India' for poor, middle class and women is attainable if the accelerated and inclusive economic growth is led by innovation. Technology and innovation are at the heart of the transformation of India.

We have taken substantial steps towards transforming India towards an innovation-driven economy. The Government's initiatives such as easing business environment for start-ups, removing regulatory barriers for MSMEs, building infrastructural platforms to facilitate technology solutions, setting up over 2000 Atal Tinkering Labs in schools and 31 Atal Incubation Centres across the country are aimed at promoting a culture of innovation and entrepreneurship.

Taking another major step in this direction, NITI Aayog has come up with the India Innovation Index as a useful tool to analyse and enhance the innovation environment at the State level in India. The Index examines both the conduciveness of the State environment to foster innovation and the results of its innovative practices. The Index will be useful to States and Union Territories by benchmarking their performance against their peers to understand reasons for differential performance and devise better strategies towards creating an environment which fosters innovation.

NITI Aayog will continue to pursue such interventions that play an important role in developing cooperative and competitive federalism. I am sure this Indian Innovation Index will provide much-needed inputs and insights to the States / UTs and encourage them to enhance their innovation eco-system in its entire facets viz. human capital, investment or IP environment.

I congratulate Dr. C. Muralikrishna Kumar, Sr. Consultant and his team who led the process of bringing out this report. I must compliment the Knowledge partners, Institute for Competitiveness, CII, and other stakeholders who have contributed to making this report.

(Amitabh Kant)

February 18, 2019

IFC | INSTITUTE *for* COMPETITIVENESS

AMIT KAPOOR |
Chairman

February 15, 2019

MESSAGE

Throughout history, innovation has been one of the most powerful means of driving growth and prosperity of nations. This is especially true in modern times where innovation in every field is taking place at such a pace that failing to do so can sound the death knell for economies. Countries around the world are beginning to understand the urgency to innovate and shifting their policy focus towards building stronger innovative capacities. Countries like China and Saudi Arabia are pursuing innovation as a long-term strategy.

It is heartening to see that India is showing equal enthusiasm towards enhancing its innovative spirit. The India Innovation Index 2019 stands testament to that fact. The report is a result of concerted efforts led by the NITI Aayog at the behest of the Government of India to assess the state of innovation at the national and sub-national level across India. As the primary catalysts for achievement of national goals and priorities, the states will play an indispensable role in driving the country's innovative capacities forward. The India Innovation Index 2019 is a data-driven effort to identify the core areas that are crucial for innovation and to assess the states based on those parameters.

The Index is aimed at providing stakeholders with an effective tool to track the progress of innovation in India at both the national and the state level. It can help central and state government benchmark regional performance with respect to innovation and provide policy insights on what needs to be done to improve and enhance it. As this is the first effort of its kind for India, it is expected that the Index will be refined over time and improvements will be made to the methodology and the process of evaluation in the coming years.

The Institute for Competitiveness is pleased to provide NITI Aayog with knowledge support in this endeavour and helping the country move towards a more innovative nation. I would like to thank Dr C. Murali Krishna Kumar, Sr. Adviser, NITI Aayog and Shri U.K. Sharma, Adviser, NITI Aayog for their tireless support throughout the evaluation process of the India Innovation Index 2019. I would also like to thank Shri Rajiv Kumar , Shri VK Saraswat, Shri Vinod Paul, Shri Ramesh Chand, Shri Amitabh Kant and Shri Yaduvendra Mathur for their invaluable feedback during the process.

Lastly, I would like to acknowledge the support of my team at the Institute for Competitiveness, including Aniruddh Duttaa, Chirag Yadav, Manisha Kapoor and Nirvan Gupta in compiling this report. I am certain that the study outlined here will enable transformational change in India's innovation environment.

Amit Kapoor

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PREFACE

The India Innovation Index (III) 2019 comes at a time when innovation has become a subject of significant concern for policymakers in the country. With India among the fastest growing economies in the world, the next big challenge is to sustain that level of growth for a longer period of time. Ensuring future economic growth will require solutions that are more creative than any we have seen so far. In that the role that innovation plays in accelerating economic growth and enhancing competitiveness is evident. An understanding of the importance of innovation readiness is what brought prosperity and better living standards in the West.

The challenges faced by India due to its pluralistic society and a rapidly growing population are vastly different from the West. With a population of over 1.3 billion, growing at 1.1%[1] a year — India faces scarcity on a large scale across the board: from water and food to oil and gas, to challenges in primary education and basic health care. To overcome these challenges India must transform itself from a factor-driven to an innovation-driven economy by efficiently using its existing resources to become a global innovation hub. To be successful in this endeavor, the country must bring about the right institutional, industrial, and policy reforms.

Recognizing the role of innovation as a key driver of growth and prosperity for India, NITI Aayog with Institute for Competitiveness as the knowledge partner, have extracted data from government databases and carried out the analysis jointly. The India Innovation Index and the Report are an outcome of extensive research and analysis. The Report evaluates the progress of innovation readiness in states and union territories, highlighting the obstacles that deter governments, businesses, and individuals from fully capturing the benefits of innovation. Confederation of Indian Industry (CII) has also partnered by deploying their officials as state nodal officers to interact with the state officials to take this initiative forward and provide requisite support.

A multi-stage iterative process was followed to reach the most accurate framework for the India Innovation Index. The first stage involved interactions between NITI Aayog and the knowledge partners to develop a pillar level framework for the Index. The second stage involved identifying all possible sets of innovation metrics that are relevant to the Indian setting. The third step involved engaging with key experts and stakeholders to solicit feedback and validation.

India Innovation Index measures innovation inputs through 'enablers' and innovation output as 'performance.' Five enabler pillars capture elements of the state economy that act as inputs to innovation environment: Human Capital, Investment, Knowledge Employment, Business Environment, and Safety & Legal Environment. Two performance pillars - Knowledge Output and Knowledge Diffusion - capture its performance.

The Index aims to perform two objectives. The first one is to help better understand a state's innovation ranking and relative performance by incorporating key indicators relating to the seven pillars that can be used to understand the performance of a state with regards to its innovation capabilities. Secondly, it aims to empower states to improve their innovation policies while leveraging their strengths and overcoming their challenges.

The India Innovation Index Report 2019 presents the latest findings and highlights the regional catalysts and caveats for promoting innovation readiness. The Report offers a comprehensive snapshot of the innovation ecosystem of 29 states and seven union territories. Also included in the Report is a section on state profiles covering 33 indicators looking at the different facets of innovation in India.

It is expected that the Report will come to be recognized as a benchmarking instrument and an invaluable tool for facilitating public-private dialogue, whereby policymakers, business leaders, and other stakeholders can evaluate progress on a continual basis.

1 World Bank database. Link: https://data.worldbank.org/indicator/SP.POP.GROW?locations=IN

EXECUTIVE SUMMARY

The India Innovation Index examines the innovation ecosystem of Indian states and union territories. The objective of the Index is to help policymakers design policies aimed at driving innovation across regions. For a country as large as India, the state of innovation needs to be understood at the regional level for effective policy formulation. A policy just at the national level is not enough. Each state needs to formulate its own policy, based on its unique resources and strengths and which caters to its specific needs.

The study and the methodology employed in the Index have been developed keeping in mind the state of the Indian economy. The traditional approaches for measuring innovation have been to consider parameters such as patents per million of population, publication in scientific journals, percentage of GDP spending on research and development, and so on. This report goes beyond these innovation metrics and adds other parameters that are specific to the Indian economy to give it a more holistic coverage.

The Report consists of four thematic sections. The first section (Chapters 1 - 6) talks about innovation and the increasingly important role it plays in accelerating economic growth and enhancing competitiveness. This is followed by understanding the need to look at the innovation environment at the state level in India. Apart from this, a discussion of various approaches used globally to measure innovation at the national and subnational level has been presented; and a comparison drawn between India and a few select economies, on various innovation parameters to give an idea of how the country fares globally.

The next section (Chapters 7 and 8) lays out the conceptual framework and the methodology employed to build the Index, followed by the key findings at both the country and the state level. Karnataka emerged the topper among 'Major States', with Tamil Nadu and Maharashtra in the second and third positions followed by Telangana, Haryana, Kerala, Uttar Pradesh, West Bengal, Gujarat and Andhra Pradesh, in that order. Among the North-Eastern states and union territories, Sikkim and Delhi occupy the top spots respectively. The section also captures trends and makes deep-dive analyses of the various factors that have driven innovation at the country, state and pillar levels. It is hoped that these analyses will help policymakers and corporates identify some of the issues at a subnational level in India.

The third section (Chapters 9 -12) provides learnings and recommendations at the national and state level for India to ponder over. Several key learnings emerged during the course of the report and it is hoped that sharing of these will benefit the policymakers as well as people who are enthusiastic about innovation in the Indian context.

Also included in this section are detailed profiles for each of the 29 states and seven union territories, offering a comprehensive snapshot of each region's current innovation landscape.

Finally, the fourth section (Appendix) of the report features detailed data tables for each of the 33 indicators comprising the index along with sources and references.

INTRODUCTION | 1

As more and more nations around the world begin to reflect upon the idea of globalisation, the benefits that global economies have long derived from it are worth highlighting. One unmistakable benefit of globalization has been the seamless transfer of technology between nations and the diffusion of knowledge around the world, which has led to rise in productivity. The International Monetary Fund's World Economic Outlook 2018 also pointed out that globalization has given a significant boost to the diffusion of knowledge across the world through free trade, higher foreign direct investment and the international use of patents and copyrights. These by-products of a globalized world have provided conditions that are favourable to innovation.

Even though innovation is not a new phenomenon, globalization has hastened its progress in every field through greater knowledge diffusion across borders. Innovation has also become the key to gaining a greater market share around the world. In fact, it is almost next to impossible for businesses to become competitive without involving some amount of innovative out-of-the-box thinking in its product offering and operations. Thus, more and more countries are now shifting their policy focus on building their innovation capacities, and India is not far behind.

Over the last few years India, with its flagship initiatives like the Atal Innovation Mission, is making a concerted nation-wide effort to foster a conducive environment for innovation at every level of society from schools till industry. Such a push is necessary in a society that is passing through a phase of demographic transition where over 70 percent of its population is below the age of 30. India's demographic dividend, which occurs when the ratio of working age population is high and the dependent population in terms of the elderly and children is low, is expected to last till 2055-56. During this period India can reap immense benefits if it maintains focus on developing human capital and encouraging innovation.

It is also interesting to note that since India is such a large country where different states are at various stages of development, the demographic dividend is not available in all states at the same time. Southern states, for instance, are experiencing a decline in their fertility earlier than the rest of the states across India. The demographic dividend in states like Kerala and Tamil Nadu is expected to close in the next five years. Thus, the capacity to innovate varies spatially across India and so does the area of focus.

This report, therefore, attempts to decipher the innovative capacities for India at the state level. The India Innovation Index 2019 has been formulated with the intent of better understanding the innovation landscape across India and drawing regional insights to drive data-based decision making.

2 | WHAT IS INNOVATION?

The concept of innovation is as old as mankind itself. From the development of the wheel to the creation of the internet, innovation has been the factor that has set humans apart from other animals. Innovation is what drives the human spirit to find new and efficient ways of doing things. Without it, the world that we live in today would be vastly different. It is almost impossible to imagine a modern world without innovations like airplanes, automobiles, and telecommunications.

Joseph Schumpeter was one of the first academicians to study the idea of innovation. He developed a theory of economic and social change, which focused on the importance of innovation and the factors influencing it.

He suggested an important distinction between invention and innovation. According to him, invention is the first occurrence of the idea for a new product or process, but innovation occurs when the idea is put into practice.

A time lag might exist between invention and innovation mainly because the conditions might not be conducive for commercialization. There might not be adequate demand for it or vital inputs required for its creation might not be available in markets yet. For instance, even though Leonardo da Vinci had ideas to build a flying machine, he had no means of implementing it since there was an utter lack of adequate production materials or skills that could have helped create a workable model.

Therefore, it is important to understand that a single innovation is a culmination of lengthy processes of previous innovations. Complementary inventions and innovations are always crucial for subsequent innovations. Kline and Rosenberg (1986) pointed out in an influential paper, "It is a serious mistake to treat an innovation as if it were a well-defined, homogenous thing that could be identified as entering the economy at a precise date – or becoming available at a precise point in time... The fact is that most important innovations go through drastic changes in their lifetimes – changes that may, and often do, totally transform their economic significance. The subsequent improvements in an invention after its first introduction may be vastly more important, economically, than the initial availability of the invention in its original form." [2]

There were further developments in scholarly research that looked upon the concept of innovation in new ways. Michael Porter (1990) suggested that it is an attempt "to create competitive advantage by perceiving or discovering new and better ways of competing in an industry and bringing them to market."[3] Firms innovate to increase their productivity. By innovating, firms can enter new markets and also increase their penetration in existing markets.

Porter's idea of innovation draws a lot from Schumpeter's popular conception of "creative destruction." The term was used by Schumpeter to describe the idea that innovation can strengthen or threaten existing businesses and even markets of existing products by introducing new and efficient ways of delivering goods and services.

Meanwhile, innovation serves a different objective for the government as their objective is different from that of a firm. While a firm innovates for market dominance, the government is concerned with the growth and development of its economy. This process is more evolutionary in nature. The development of countries can be categorized into three stages - from factor-driven, where growth is dependent on exploitation of natural resources, to investment-driven, where production is more efficient and capital-intensive, and finally, to a more innovation-driven approach that focuses on enhancing the productivity of the factors of production.

There is, however, no single stage of development that can encompass the state of all Indian sectors. When considering India's achievements in the field of pharmaceuticals, biotechnology or space, it is difficult to argue that India is not innovation-driven. Service is what drives the growth of the Indian economy forward. However, since a majority of its population is still heavily dependent on agriculture, it is effectively a factor-driven economy.

Therefore, innovation needs to be the focus, if the Indian economy is to make a successful transition from being factor-driven to an innovation-driven economy.

2. Kline, S. J., & Rosenberg, N. (1986): An Overview of Innovation. The Positive Sum Game, Washington. DC, p. 283.
3. Porter, M. E. (1990). The Competitive Advantage of Nations. New York, MacMillan Press, p. 45.

WHY INNOVATE?

3

Economic theories of growth have long held that innovation and economic growth are intricately related, and one drives the other. The traditional understanding was that output (Q) is only a function of capital (K) and labour (L), that is,

$$Q = f(K, L)$$

However, in 1957, Robert Solow pointed out that increases in labour and capital were not able to completely account for economic growth. Thus, another and the most crucial factor of technical change was added, which explained and enhanced the productivity of labour and capital.

$$Q = A\, f(K, L)$$

Neoclassical models of economists like Solow assumed perfect competition, constant returns to scale and complete absence of externalities. Technology was assumed to be exogenous. Paul Romer in 1986 challenged this assumption and argued that technology is a result of explicit efforts through research and development (R&D) and human capital (HC).

$$A = f(R\&D, HC)$$

Therefore, investment in research and development and human capital is an essential, crucial and indispensable ingredient for economic growth. This shows why innovation is essential for growth and prosperity of a nation. In fact, there also exists irrefutable evidence to support the aforementioned theoretical research. Innovation is found to be a critical determinant of a nation's competitiveness. A country's competitiveness is defined as the productivity with which it uses its resources like land (natural resources), labour (human beings) and capital. When firms innovate, they derive prosperity by creating value adding products through realization of the resources. This ability to innovate increases the productivity and in turn enhances the competitiveness. So, innovation should be considered as the basis of creating prosperity. The link between innovation and competitiveness can be realized by mapping the scores of countries in the Global Innovation Index and the Global Competitiveness Index. Figure 3.1 shows that they are highly correlated with an R^2 of 0.88.

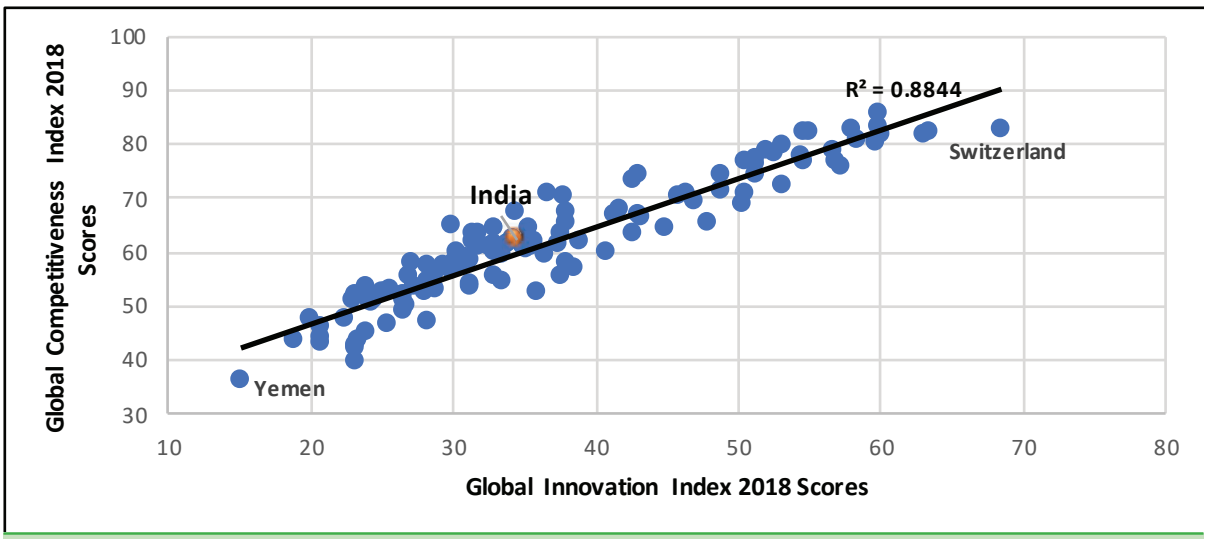


Figure 3.1 Link between Innovation and Competitiveness at the Global Level

Source: Global Competitiveness Report 2018 and Global Innovation Index 2018

4 | NEED TO MEASURE INNOVATION

In a vastly interconnected world, even one that becomes disenchanted with the concept of globalization, innovation will remain the driver of economic growth and development. Schumpeter's wave of "creative destruction" knows no boundaries and borders and it will continue to roll with impunity across the planet. Simply doing the same things as before will be a losing strategy for any nation or business.

Since innovation holds the key to growth and prosperity of regions, it is vital to assess how they measure up with respect to other regions so as to identify avenues of improvement. Innovation is about going beyond the generation of new ideas. It is about transforming those ideas into useful products and services. This requires a strong intent and willingness to adapt on the part of individuals, organizations and the society as a whole. So, it is instructive to find out who is doing it best. What conditions are working for them? Are they replicable?

In the case of India, specifically, the need to measure innovative capacities requires to be undertaken at a regional level. To begin with, this report measures innovation at the state-level. This is necessary for two specific reasons. First, some states in India are so large that they are comparable in size to some major European countries. So, when looking at India's innovation capacity, it is crucial to at least delve at the level of the states. Second, and more importantly, given the uniqueness of every region, and influencing factors like resources at hand, capital, business opportunities, consumer demand, and government support; innovation can take very different forms in different states. So, it is more insightful and meaningful to measure innovation at the level of the states, for India progresses when its states and UTs progress.

Understanding the state of innovation at the regional level is also important for policy-making. For a country the size of India, a policy just at national level is not enough. Each state needs to formulate its own policy which caters to its needs and resources. Therefore, for understanding the opportunities and challenges in every state and union territory, there is a need for a robust framework which can be regularly updated to incorporate the progress made by regions.

Also, most prior approaches to measure the level of innovation in economies have tended to focus primarily on metrics like number of patents, number of articles printed in scientific journals and spending on R&D as a percentage of GDP. Although these are some important indicators, they do not completely translate for capturing innovation in a country like India. Patents are not able to reflect a lot of low cost or frugal innovations in India.

Therefore, some location-specific indicators should be included in the framework which capture the region in its true sense.

GLOBAL APPROACHES FOR MEASURING INNOVATION | 5

Globally, several indices have been developed to capture innovation at the country, state and city levels. Some of these indices are mentioned below.

A. The Bloomberg Innovation Index

Bloomberg ranked countries and sovereigns based on their overall ability to innovate and identified the top 50. Six equally weighted metrics were considered, and their scores combined to provide an overall score for each country from zero to 100.

1. **Research & Development:** Research and development expenditure as a percentage of GDP
2. **Manufacturing:** Manufacturing value-added per capita
3. **High-tech companies:** Number of domestically domiciled high-tech public companies — such as aerospace and defence, biotechnology, hardware, software, semiconductors, internet software and services, and renewable energy companies — as a share of world's total high-tech public companies
4. **Postsecondary education:** Number of secondary graduates enrolled in postsecondary institutions as a percentage of cohort; percentage of labour forcewith tertiary degrees; annual science and engineering graduates as a percentage of the labour force and as a percentage of total tertiary graduates
5. **Research personnel:** Professionals, including Ph.D. students, engaged in R&D per 1 million population
6. **Patents:** Resident utility patent filings per 1 millionpopulation and per $1 million of R&D spent; utility patents granted as a percentage of world total

Of the more than 200 countries and sovereigns evaluated, 69 had data for all six metrics. Postsecondary education and patent activity consisted of multiple factors that were weighted equally. Weights were rescaled for countries with some but not all of the factors in those two metrics. The ranking shows only those countries included in the top 50. Most recent data available were used.

B. EIU's Global Innovation Ranking

The EIU's Global Innovation Ranking was done in 2009 most recently. To rank countries, the Economist Intelligence Unit distinguishes between "innovation output" (performance) and "innovation inputs" (enablers).

Innovation output is measured by the sum of patents granted by three major government patent offices: the European Patent Office (EPO), the Japanese Patent Office (JPO) and the US Patent and Trademark Office (USPTO). The data are averaged over four-year periods and normalised as number of patents per million to create an index on a 1-10 scale. The 2007 index is based on data from the 2002-05 period; the 2009 index uses data from 2004 to 2007.

Innovation inputs include both direct drivers and the broad economic, social and political context, or innovation environment. They are based on the scores from the Economist Intelligence Unit's Business Environment Ranking (BER) model averaged over five-year periods: 2002-06 for the original ranking and 2004-08 for the update.

C. Global Innovation Index

The Global Innovation Index (GII) is published by Cornell University, INSEAD, and World Intellectual Property Organisation (WIPO). The core of GII consists of ranking of world economies' innovation capabilities and results. The GII consists of two sub-indices- the Innovation Input Sub-Index and the Innovation Output Sub-Index.

Five input pillars capture elements of the national economy that enable innovative activities: (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication. Two output pillars capture actual evidence of innovation outputs: (6) Knowledge and technology outputs and (7) Creative outputs.

D. Dubai Innovation Index

The Dubai Innovation Index was conceptualized in 2015 as an effort to baseline Dubai's position compared to 28 leading global innovative cities and to measure the innovation maturity of Dubai's private sector to achieve sustainable economic growth and identify areas of improvement.

The Index takes into account both enablers (as the input) and performance (as the output) as equal contributors towards innovation.

Enablers: The term enablers of innovation refer to elements of the innovation ecosystem that help create an ideal environment for innovation. Enablers of innovation include macroeconomic factors such as political, economic and social environment, government, funding,

infrastructure, skills & talent and culture. Measures of these enablers are forward looking and are expected to have a long-term impact. A higher enabler score implies investments are being made by cities to build a sound foundation to support innovation activities and initiatives in the future.

Performance: Performance measures the outputs of innovation in cities. Both tangible and intangible innovation outputs are considered and measured. Intangible performance measures refer to the development of talent, intellectual property and collaborative partnerships for innovation. In contrast, tangible performance measures include development of new products and services, and economic growth.

E. Massachusetts Innovation Economy

The index of the Massachusetts Innovation Economy has been published by the Innovation Institute at the MassTech Collaborative annually since 1997. It analyses 22 indicators that cover the following categories:

1. **Economic Impact:** One way innovation contributes to economic prosperity in Massachusetts economy is through employment and wages in key industry clusters. Jobs created in the innovation economy typically pay high wages, which directly and indirectly sustain a high standard of living throughout the Commonwealth.
2. **Research:** The index defines innovation as the capacity to continuously translate ideas into novel products, processes and services that create, improve, or expand business opportunities. Academic publications and patenting activity reflect both the intensity of new knowledge creation and the capacity of the Massachusetts economy to make these ideas available for dissemination and commercialization.
3. **Technology:** In close interaction with research activities, but with a specific application as a goal, product development begins with research outcomes and translates them into models, prototypes, tests, and artefacts that help evaluate and refine the plausibility, feasibility, performance, and market potential of a research outcome.
4. **Business Development:** Business development involves commercialization, new business formation and business expansion. For existing businesses, growing to scale and sustainability often involves an initial public offering (IPO), a merger, or an acquisition (M&A). Technical, business and financial expertise all play a role in the process of analysing and realizing business opportunities, which result after research and development are translated into processes, products, or services.
5. **Capital:** Massachusetts attracts billions of dollars of funding every year for research, development, new business formation, and business expansion. The ability to attract public and private funds sustains the unparalleled capacity of individuals and organizations in the state to engage in the most forward-looking research and development efforts.
6. **Talent:** Innovation may be about technology and business outcomes, but it is a social process. As such, innovation is driven by the individuals who are actively involved in science, technology, design, and business development. The concentration of men and women with post-secondary and graduate education, complemented by the strength of the education system, provides the Commonwealth with competitive advantages in the global economy.

INDIA VERSUS THE WORLD | 6

India's performance on the world stage with respect to innovation can be adjudged based on the Global Innovation Index (GII), which is released annually as a joint effort by the World Intellectual Property Organisation (WIPO), Cornell University and INSEAD. Table 6.1 depicts the performance of the country on the index since 2014. The body cautions against drawing too much from year to year comparisons as the number of countries assessed and methodology have changed with time.

Nevertheless, the GII data reveals that India is consistently improving. As of 2018, it was the 57th innovative nation in the world. Over the last few years, India has been consistently termed as an innovation achiever in its economic class of low-income nations. It has also improved its innovation efficiency during the time, which implies that the country is getting more out of its inputs.

Clearly, the recent initiatives by the government to improve the country's innovation ecosystem in the form of Atal Innovation Mission, Startup India, and Digital India have had a positive impact. However, even though India has been making promising progress on the global scale, there is still a significant ground to cover if it has to join the big league of innovative nations. So, it needs to work upon the crucial drivers of innovation. To begin with, the Indian expenditure on research and development presents immense scope for improvement.

Figure 6.1 shows that India spends around 0.7 percent of its GDP on research and development. This level of expenditure is comparable to developing economies like Mexico and Argentina, but if India needs to transform into an innovative nation, it should advance these trends upwards at least to the level of the BRICS economies.

Moreover, India presents a queer distinction from the rest of the world based on where most of the expenditure is raised. Figure 6.2 shows that the private spending in India towards R&D is seriously lacking. Compared to 77 percent

Year	GII Score	GII Rank	Total Countries
2014	33.7	76	143
2015	31.7	81	141
2016	33.6	66	128
2017	35.5	60	127
2018	35.2	57	126

Table 6.1: India's Performance on the Global Innovation Index

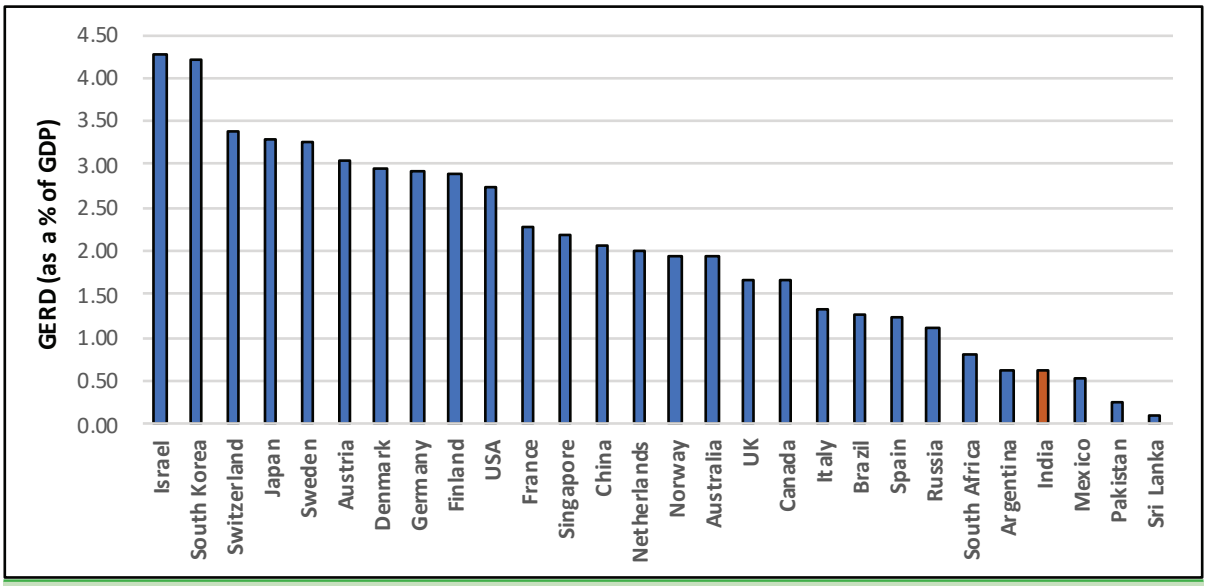


Figure 6.1: Gross Domestic Expenditure on R&D as a Percentage of GDP

Source: UNESCO, 2015

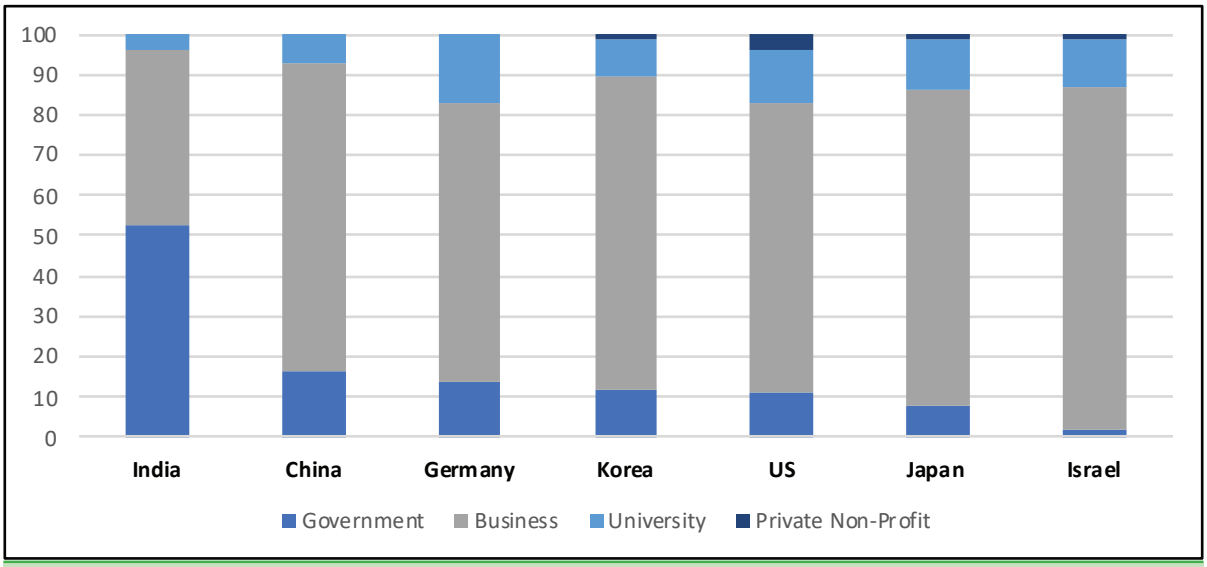


Figure 6.2: Gross Domestic Expenditure on R&D as a Percentage of GDP

Source: UNESCO 2015

in China, the share of private expenditure towards R&D in India is merely 43.5 percent. So, the private sector needs to step up in driving the spirit of innovation forward in India. Meanwhile, the government spending should be diverted towards creating enabling factors for innovation in India like creation of a larger pool of human capital, ease of doing business – simple procedure for closure of start-up/industries – and improving industry-academia linkages.

INDIA INNOVATION INDEX | 7

The India innovation index aims to examine the innovation capabilities and performance of Indian states. The index attempts to create an extensive framework for the continual evaluation of the innovation environment of 29 states and seven union territories in India and intends to perform the following three functions:

- Ranking of states and UTs based on their index score
- Recognizing opportunities and challenges
- Assist in tailoring governmental policies to foster innovation

The framework has been created post discussions with experts in the field of index creation and innovation. The consensus was to include input and output as the main dimensions for the index. Further, four inputs and two output pillars were constructed consisting of indicators which enable and represent innovation in India.

India Innovation Index measures innovation inputs through 'enablers' and innovation output as 'performance.' Five enabler pillars capture elements of the state economy that act as inputs to innovation environment: (1) **Human Capital** (2) **Investment** (3) **Knowledge Workers** (4) **Business Environment** and (5) **Safety & Legal Environment**. Two performance pillars - (1) **Knowledge Output** and (2) **Knowledge Diffusion** - capture the performance.

Each pillar consists of relevant indicators. These indicators were carefully selected to ensure a fair and justified analysis of their respective pillars. The indicators cover both macroeconomic (government) and microeconomic (private enterprise) aspects, by considering firms capabilities to innovate, their activities and their overall impact on innovation.

Categorizing Inputs and Outputs

There is a distinction between the inputs and outputs while measuring innovation in an economy. Inputs are variables that enable an economy to stimulate innovation while outputs are the results of innovative activities within the economy. India Innovation Index considers both enablers (inputs) and performance (outputs) as they are intricately related - one fuels the other.

- **Enablers** are the factors that underpin innovative capacities such as institutions and policies, human capacity, infrastructure, technological adoption, and business markets and capital. Enabler pillars define aspects of environment instrumental in fostering innovation within a State/UT. Together these pillars measure the degree to which a state has created an environment conducive for innovation, which

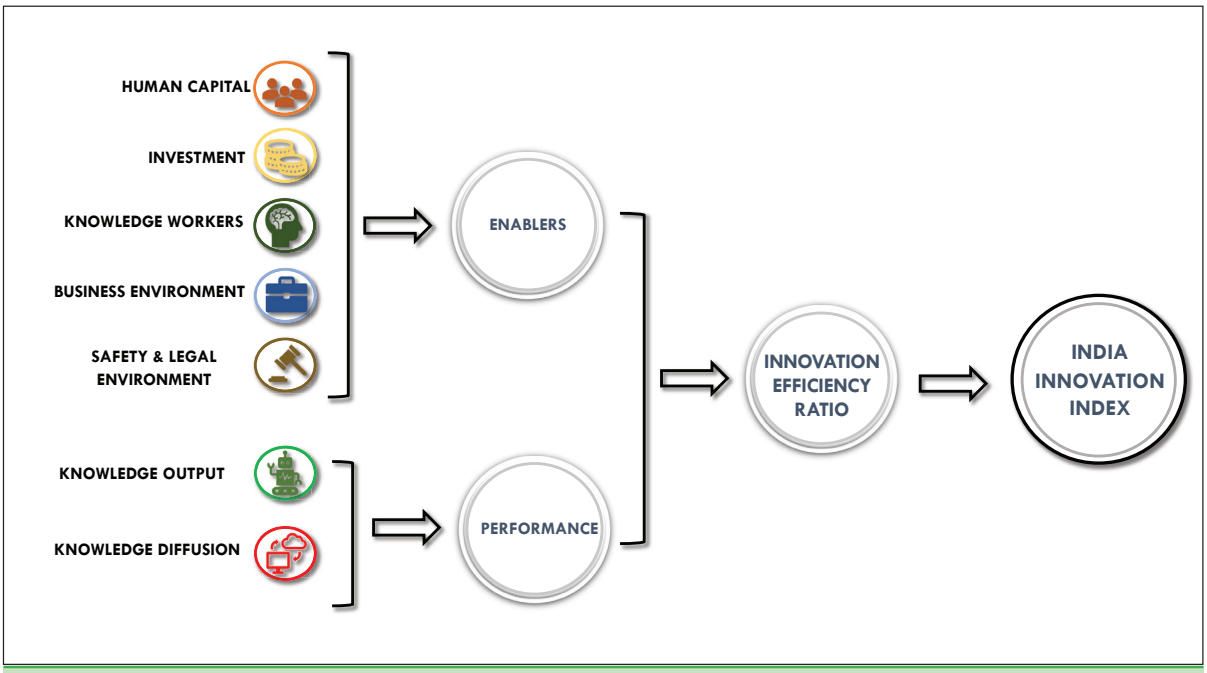


Figure 7.1: India Innovation Index Pillar Level Framework

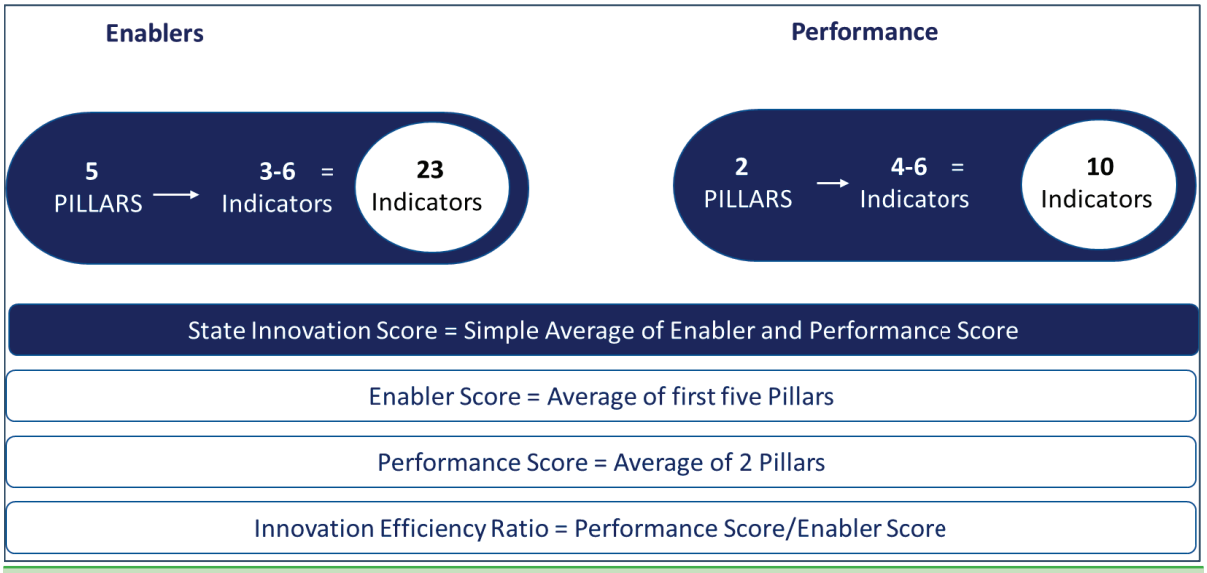


Figure 7.2: India Innovation Index Pillar Level Framework

represents the core components that allow innovation to thrive in states.

- **Performance** is the benefit that a nation derives from the inputs in terms of knowledge creation, competitiveness and wealth generation. This sub-index provides the results of innovation within a State/UT.

Conceptual Framework

- The India Innovation Index relies on two dimensions - Enablers dimension and Performance dimension - each built around pillars (see Figure 7.1). Four measures are calculated
- Enablers Score: Five input pillars capture elements of the economy that enable innovative activities.
- Performance Score: Innovation outputs are the results of innovative activities within the economy. Although the Performance dimension includes only two pillars, it has the same weight in calculating the overall Innovation scores as the Enablers dimension.
- The overall Innovation Score: The overall Innovation score is the simple average of the two dimensions.
- Innovation Efficiency Ratio: The ratio of Performance score to Enablers score. It indicates the state's ability to efficiently leverage its investments and infrastructure to produce successful innovation output.
- The Index consists of two dimensions- Enablers and Performance, and within each dimension are pillars: distinct but related concepts that together make up each dimension.
  - **Human Capital:** The level and quality of education and research capability are important determinants of the innovation capacity of that region. This pillar tries to gauge the human capital of the states through five key indicators. Human resources of a country are a significant factor in the development of innovative ideas, which cannot flourish without adequate investment in education system. Therefore, it is crucial to have good-quality institutions of learning and R&D centres. A static, stagnant education system cannot support innovation. An environment that encourages asking critical questions is the one that can foster innovation. Mere gathering of information is not sufficient, it is far more crucial to see what one does with that information garnered in school. Investing in education leads to long-term benefits by improving human capacity and in turn the innovation capability of a nation, as it is said quality begins and ends in education.
  - **Investment:** Public & private funding gauges the financial standing of a state and what amount it spends on research and development. The ability to attract public and private funds sustains the unparalleled capacity of individuals and organizations in the state to engage in the most forward-looking research and development efforts. Access to financial institutions and investors willing to support entrepreneurial ventures and business expansion are vital to encourage innovative business activities. An efficient market is the one which ensures ready access to credit for business and a steady flow of foreign direct investment (FDI).
  - **Knowledge Workers:** Businesses strengthen their productivity, competitiveness, and innovation potential through the employment of highly skilled professionals. This pillar tries to capture the level of business sophistication to gauge how conducive the firms are to innovation activities.
  - **Business Environment:** Nurturing an environment that attracts business and fosters growth by providing good governance and the correct levels of protection and incentives is essential to innovation. This pillar assesses the business environment in Indian states by considering ease of doing business ranking and governmental technological adoption. Business Environment expands on aspects that affect private entrepreneurial endeavours and also measures the ability of the state to provide supportive

STATE CATEGORISATION

For a country as large and diverse as India where her states have been divided based on language, their geographical sizes are highly varied in nature. The size of state of Uttar Pradesh, for instance, approximately matches that of United Kingdom as a whole. On the other hand, the state of Sikkim measures just 65 km by 115 km in size; approximately the size of the nation of Switzerland. Union territories, which have been formed for administrative ease are even smaller.

With such contrast across Indian states and union territories, comparing them without spatial segregation will introduce complexities into our analysis. This is because the states will vastly differ in terms of innovative capacities and the policy implications for large states will be quite different from that of smaller ones. The states and union territories have thus been classified into three categories: Major States, North Eastern & Hill States, and Union Territories / City States / Small States. These regions are categorized based on the area as spatial homogeneity across states makes for a fair comparison for innovative capacity.

It must be noted that due to the aforementioned reasons, the state of Goa has been incorporated into the category of "Union Territory / City States / Small States" despite being a state as per the Indian Constitution. The north eastern and hill states from northern India have been clubbed under the same category due to their geographical similarities.

States Categorisation		
Major states	**NE & Hill states**	**Union Territories / City States / Small States**
ANDHRA PRADESH	ARUNACHAL PRADESH	ANDAMAN & NICOBAR ISLANDS
BIHAR	ASSAM	CHANDIGARH
CHHATTISGARH	HIMACHAL PRADESH	DADRA & NAGAR HAVELI
GUJARAT	JAMMU & KASHMIR	DAMAN & DIU
HARYANA	MANIPUR	DELHI
JHARKHAND	MEGHALAYA	GOA
KARNATAKA	MIZORAM	LAKSHADWEEP
KERALA	NAGALAND	PUDUCHERRY
MADHYA PRADESH	SIKKIM	
MAHARASHTRA	TRIPURA	
ODISHA	UTTARAKHAND	
PUNJAB		
RAJASTHAN		
TAMIL NADU		
TELANGANA		
UTTAR PRADESH		
WEST BENGAL		

environment for innovation.

- **Safety & Legal Environment:** Governments which enact and enforce fair and open procedures, protect property rights, regulate markets efficiently, and lower the burden of regulations are more likely to see higher levels of innovative entrepreneurial activity.
- **Knowledge Output:** As companies and individuals invest in R&D and develop innovative products and services offering better value, their appeal increases across markets. This, in turn, benefits the region through enhanced competitiveness. Through variables like number of patents and trademarks filed the objective is to cover the fruit of innovation. The scientific and technological output is reflected by the number of scientific articles published.
- **Knowledge Diffusion:** This pillar reflects the degree to which a state can develop and apply knowledge to increase the value-added components in products and services, as well as more general move towards an innovation-driven economy. Knowledge output pillar manifests itself particularly in hi-tech and manufacturing exports, commercialization of intellectual property and handicraft, handloom and GI sales in the states. This pillar reflects the extent to which the state's economy has climbed from resource-driven to innovation driven.

- Further, the indicators were selected considering the state of Indian economy, for instance, India as a country is dominated by low cost or frugal innovation, that facet is captured by incorporating number of grassroots innovations.

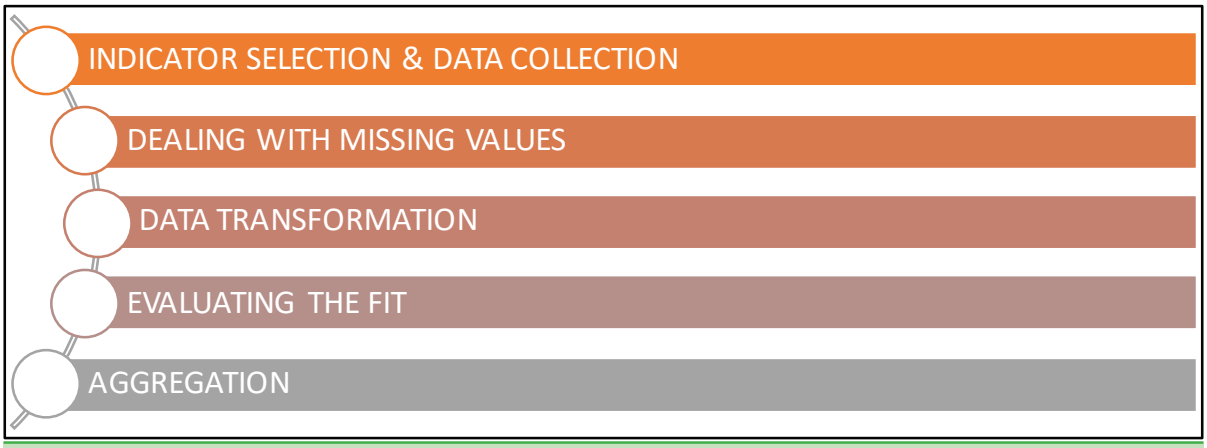


Figure 7.3: Index Calculation Steps

Geographic Coverage

The Index is calculated for the Indian states and union territories. India comprises of twenty-nine states and seven union territories, which are further sub-divided into districts and cities. The scope of this project covers all the twenty-nine states and seven union territories.

The states and union territories are further segregated in three categories- Major states, North Eastern & Hill states, and Union Territories & City States. The rationale behind this division is to rank the states based on their administrative, economic and geographical likeness. This was necessary because policy insights can be drawn in a more meaningful manner if comparable states are grouped together. Due to this reason, Goa is classified in the category of Union Territories & City States despite being a state due to its small size.

Index Calculation

Calculating the India Innovation Index involves a multistage process which is depicted in Figure 7.3 and outlined below.

Indicator Selection and Data Collection

The Indicators for the India Innovation Index were selected following discussions with experts. Furthermore, the credibility of sources, expert feedback, and data availability were also considered. All the data used in the Index was compiled from government sources. The index consists of seven pillars comprised of 33 indicators. Detailed information on individual indicators included in the Index is presented in Appendix A while a detailed table with data availability for each indicator is presented in Appendix B. The final framework is presented in Figure 7.4.

Dealing with Missing Values

To address the problem of missing values, the worst possible value was assigned to the indicator for the state in question. This implies that positive indicators were given a value of zero and negative indicators were awarded the value of the worst performing state. For instance, in the case of pendency of court cases, all-India highest value is used to impute the missing values.

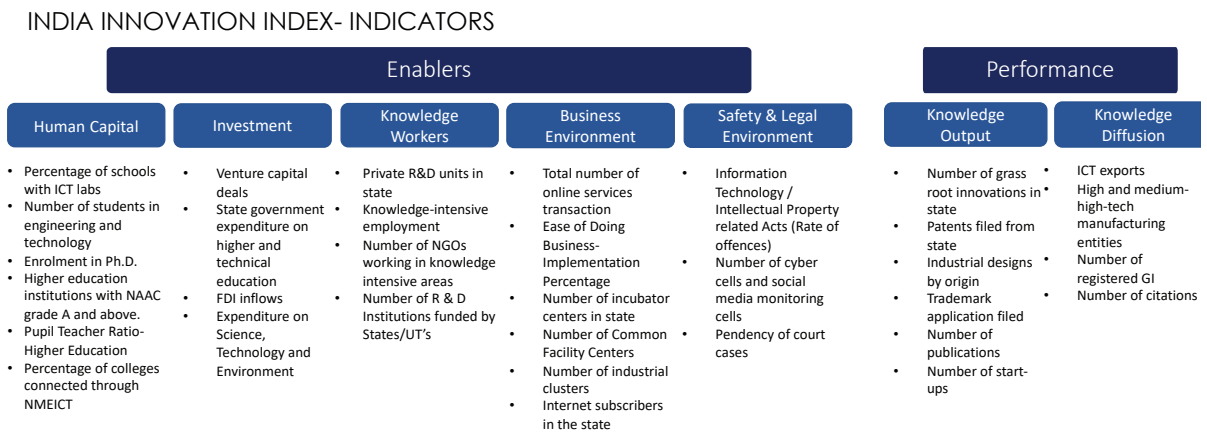


Figure 7.4: India Innovation Index Framework

Indicator/Dimension	Missing Value Estimation
Enabler	
Number of students in engineering and technology	The union territory of Lakshadweep is missing value for Number of students in engineering and technology. Zero has been taken for analysis.
Enrolment in Ph.D.	Enrolment in Ph.D. data is not available for either year for the following union territories: Dadra & Nagar Haveli, Daman & Diu, and Lakshadweep. Zero was used to impute missing data.
Expenditure on Science, Technology and Environment	For the following union territories, Expenditure on Science, Technology and Environment data is not available: Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, and Lakshadweep. Zero was used to impute missing data for all the above states.
FDI inflows	Data for Lakshadweep is not available for FDI inflow indicator. Zero was used to impute the missing value.
Knowledge-intensive employment	Data for Knowledge-intensive employment is not available for the states of Arunachal Pradesh, and Mizoram and union territory of Lakshadweep as Annual Survey of Industries (ASI) does not cover these states and UT. Zero was used to impute the missing value
Internet subscribers in the state	Number of Internet subscribers data is missing for the union territories of Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu and Lakshadweep. The all-India average was used to impute the missing values.
Pendency of court cases	Percentage pendency of court cases was missing for the states of Arunachal Pradesh and Nagaland and union territories of Puducherry and Lakshadweep. The all-India highest value was used to impute the missing value.
Performance	
Number of grass root innovations in the state	For the following states and union territories, Number of grass root innovations in the state data is not available: Goa, Mizoram, Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep and Puducherry. Zero was used to impute the missing data.
Patents filed from state	Data for patents filed from state is not available for Lakshadweep. Zero was used to impute missing data.
Industrial designs by origin	Industrial designs by origin data is missing for the following states and union territories: Arunachal Pradesh, Nagaland, Sikkim, Tripura, Andaman & Nicobar Islands and Lakshadweep. Zero was used to impute missing data.

The state and union territories of West Bengal, Dadra & Nagar Haveli, Daman & Diu and Lakshadweep is missing data for the Gross State Domestic Product (GSDP). For computation of this data the per capita GDP of India was multiplied with the state/union territory population to arrive at an estimate. (Source: GSDP - Central Statistical Organisation; Population- Census 2011)

Data Transformation

All the indicators in the final set are modified so that a greater value means a higher score for the state. For instance, pendency of court cases will have an adverse impact on the index. Therefore, transformations are applied to make its impact positive. The list of the inverted indicators is presented in Appendix C.

In addition, for the case of FDI inflow into states, the data was available for combined regional economies. To resolve this issue, the FDI data was proportionately distributed among states by weighing the combined inflow as per their GDP share.

Standardization

As all the indicators are measured in different units, it is important to standardize them so that they become comparable. Otherwise, a variable that has relatively less

DIMENSION	PILLAR	ALPHA
Enabler	Human Capital	0.76
	Investment	0.57
	Knowledge Workers	0.55
	Business Environment	0.73
	Safety & Legal Environment	0.38
Performance	Knowledge Output	0.81
	Knowledge Diffusion	0.75

Table 7.1: Alpha Values

variance but is measured on a larger scale compared to other variables may appear to have much greater variation than it actually does. Standardization helps to solve this problem by making indicators unitless as it rescales them with a mean of zero and standard deviation of one.

Evaluating the Fit

The indicator selection process includes the indicators that describe the concept of the pillars in the best possible way and are conceptually linked to each other. The rigor of the India Innovation Index methodology is strengthened by assessing multiple aspects of fit between those. First, exploratory factor analysis is used to test the underlying factors among the set of selected indicators in each pillar. In this process, the indicators that are statistically incompatible are removed.

Furthermore, the India Innovation Index methodology involves evaluating the fit between the individual indicators by calculating Cronbach's alpha for each component. Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1 (Tavakol & Dennick 2011). Internal consistency describes the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test. Internal consistency can be employed for research or examination purposes to ensure validity. An applied practitioner's rule of thumb is that the alpha value should be above 0.7 for any logical grouping of variables (Cortina, 1993).

The alpha values are presented in the table below.

Cronbach's alpha values are significantly lower for Investment, Knowledge Workers and Safety & Legal Environment. We acknowledge this shortcoming, but it is important to keep some indicators in the index due to their importance in the innovation landscape of India.

Aggregation

The India Innovation Index uses the Principal Component Analysis (PCA) for calculating the weights of indicators within a pillar.[4] The pillar values are calculated by summing the weighted scores using the following formula:

$$Pillar_p = \Sigma\ (wi * indicator)$$

A complete list of weights is presented in Appendix D.

The Minimum Sample Size in PCA

The users of multivariate methods, including Principal Component Analysis, widely believe that the use of larger sample sizes tends to provide weights (factor loadings) and eigenvalues that are more precise estimates of population values. It is because they are more stable across repeated sampling. There are two categories of recommendations in terms of minimum sample size. One of the proposed rules of thumb is based on the sample size while the other one is based on the subject to variable ratio.

In the context of sample size, Gorsuch (1983) and Kline (1979, p. 40) recommended at least 100 variables. Hutcheson and Sofroniou (1999) recommends at least 150 - 300 cases, more toward the 150 ends when there are a few highly correlated variables. However, there are many studies that recommend that considering the sample size independent of the number of variables is spurious. One should look at the subject to variable ratio while establishing a desirable level of sample size. For instance, Hatcher (1994) recommended that the sample size should be larger than five times the number of variables (p).

In the case of India Innovation Index, there are 33 indicators and the regions under consideration are 36. Based on all the recommendations on the subject to variable ratio, we realised that it is better to calculate the weights using the data for two years. By taking data for two years, the sample size increased to 72.

The last step of determining the pillar score involves transforming the values to a 0 to 100 scale. This is done by calculating scores using best- and worst-case scenario in addition to the regional dataset. The best and worst-case scenario is the actual best, and worst-case values

4 Principal Component Analysis is a multivariate technique which was developed in early 20th century for the purpose of aggregating information. In economics, the method has been applied to the studies of cointegration and spatial convergence (Harris 1997, Drakos 2002), development (Caudill, Zanella & Mixon 2000), panel data (Bai 1993, Reichlin 2002), forecasting (Stock & Watson 2002), simultaneous equations (Choi 2002) and economics of education (Webster 2001). Factor analysis uses variances to produce communalities between variables and the goal is to remove the common variance. (Yong & Pearce 2013).

DIMENSION	Pillar	MEAN KMO
Enabler	Human Capital	0.63
	Investment	0.61
	Knowledge Workers	0.52
	Business Environment	0.41
	Safety & Legal Environment	0.52
Performance	Knowledge Output	0.72
	Knowledge Diffusion	0.53

Table 7.2: KMO Values

from the dataset are considered.

Refer to Appendix E for the worst and best-case scenario.

This method enhances comparability as well as comprehensiveness across the dataset.

The calculation is done using the following formula:

$$\frac{(Xj\text{-}Worst\ Case)}{(Best\ Case\text{-}Worst\ Case)}$$

Where, Xj represents the raw pillar values.

Dimension Scores

Each dimension score is taken to be a simple average of its pillars. The rationale being the absence of any theoretical or empirical proof to weight any of the pillar higher than others.

$$Dimension_d = (1/i) \sum Pillar_p$$

$$i{=}5\ or\ 2$$

Index Scores

The two dimensions (i.e., Enabler and Performance) are believed to reflect equally important aspects of innovation. Therefore, while calculating the index no priority is given to any dimension. Equal weights are assigned to each of them to highlight their role.

$$III = 1/2 \sum Dimension_d$$

After calculating each pillar, the goodness of fit is evaluated using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy[5]. The KMO index ranges from 0 to 1, as a rule of thumb, KMO scores should be above 0.5 (Williams, Onsman, & Brown 2010). The results of this analysis are shown in Table 7.2. The KMO values are above the set standards except for the pillar Business Environment where, we have carefully considered restructuring the pillar by removing some indicators, but as these indicators are important from policy perspective, we decided to retain them in the framework.

A detailed list of weights is presented in Appendix D.

Relative Performance of States

The absolute scores are unable to distinguish states on the basis of economic development. In some cases, it is more illuminating to compare a state's performance with its economic peers. For instance, a state may score low on certain aspects, but its performance could exceed the scores for states with similar income levels. Conversely, a high-income state may have a high absolute score on a pillar, but still fall short of what is typical for comparably wealthy states.

For this reason, the India Innovation Index developed a methodology to assess state's strengths and weaknesses on a relative rather than absolute basis.

Scorecards are used to depict the relative results. The state-level scorecards portray a state's detailed absolute and relative analysis. The scorecards are colour-coded to highlight relative strengths and weaknesses. Red indicates performance below the peer group mean; yellow indicates performance consistent with the peer group; and green highlights areas of relative strength.

To determine the relative strength and weakness of a state, the first step is to identify a peer group. We define state's economic peers as 10 states closest in GDP. We then calculate mean innovation scores for the peer group (overall, and by dimension, pillar, and indicator). A state's performance is then compared to its peer group's mean innovation scores to identify its relative strengths and weaknesses. A strength is performance significantly greater than the mean score, while a weakness is performance significantly lower than the mean score. Neutral performance is neither strong nor weak, but within the same range as economic peers. Significance is determined by a score that is greater than or less than the average absolute deviation from the mean of the comparator group.

5 The statistic is a measure of the proportion of variance among variables that might be common variance.

8 | INDIA INNOVATION INDEX: KEY FINDINGS

The India Innovation Index is the result of an extensive process of research for understanding the innovation landscape of India. The framework of the index is an aggregation of two dimensions, enablers and performance, which have five and two pillars under them respectively, with a total of 33 indicators among them. The index makes for some interesting findings for the innovation ecosystem in India at both national and sub-national levels.

COUNTRY-LEVEL ANALYSIS

Before delving into a granular state-level analysis, it is instructive to get a macroscopic view of the innovation ecosystem in India. This can provide a broad overview of the country's strengths and weaknesses on the innovation front and can help inform nation-wide policies, strategies and action plans. The India Innovation Index ranges from a scale of 0 to 100 (with 0 being the worst and 100 being the best-case scenario). On the whole, the country scores an average of 15.6 on the index. The score shows that the country has a lot of potential for growth and improvement with respect to innovation.

A clearer picture is obtained when this average is broken down into dimensions and pillars. This can be seen in Figure 8.1 below. The two dimensions of the index are Enablers and Performance. The average score of Enablers stand at 18.3 while that of Performance comes out to be 12.8. Since the Enablers outperform Performance, it is evident that the country has not been able to utilise the available drivers of innovation to their maximum potential.

Even though India performs relatively well on enablers of innovation, Figure 8.1 shows that there is a vast disparity among its pillars. The country performs the best with respect to human capital, which has a score of 32, while it faces a challenge of investing towards building innovative capacities, where it has obtained a score of 7. The latter is a result of low expenditure towards science and technology and also missing venture capital investment in most states.

Meanwhile, the performance of Indian states on pillars of knowledge workers also deserves attention. It is paradoxical that such a vast disparity exists between the pillar of human capital and knowledge workers. It basically implies that the country has been unable to provide adequate research opportunities to its graduates and also indicates the quality of graduates.

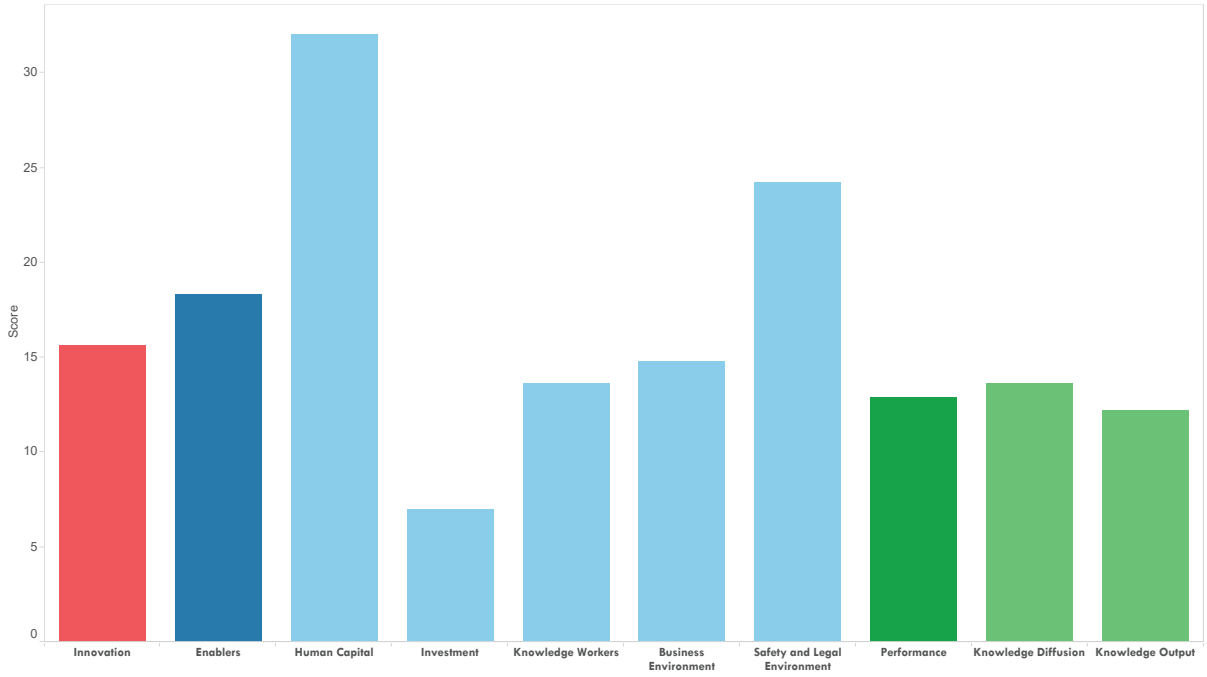


Figure 8.1: Country-level Analysis of India Innovation Index

Souce: authors

Finally, on the Performance front, the aggregate scores of the nation hide vast disparities across states in the pillars of knowledge diffusion and knowledge output. Within knowledge diffusion, for instance, the share of information and communication technology (ICT) exports in a state's GDP is only significant in a few states. A similar issue ails the rate of patent filing across Indian states where concentration among a few of them is very high.

STATE-LEVEL ANALYSIS

Indian states display a high scoring range on the India Innovation Index from a high of 42.98 for Delhi to a low of 6.2 for Jharkhand. These scores and rankings can be seen in Table 8.1 (overleaf). The states have been divided into three segments to give a better sense of comparability. The NE & hill states and the union territories & city states have been segregated from the rest of the Indian states (termed as "Major States" in the table). The former segregation was necessary since their geographical terrain and location have made their comparison with mainland states difficult while the latter are also different from the other Indian states due to their varied size and administrative capabilities.

Among the major states, Karnataka performs the best while Jharkhand finishes last. The former is the result of the prevalence of numerous higher education institutions, research labs and cluster of businesses that help drive innovation forward. It is also notable that three of the top five major states are from southern India. The regional imbalance is a result of an equally skewed concentration of educational and research institutions across the country.

Another notable aspect is the stark disparity between the performance of Andhra Pradesh (rank 10) and Telangana (rank 4). Even though Telangana was carved out of Andhra Pradesh in 2014, the contrast in their innovation capacities is hard to miss. Since both states are geographically and demographically similar, their varied performance on the innovation front presents an interesting case on what drives innovation in India. It is probably the case that a single city, Hyderabad, was driving a bulk of the innovative capacity of the state, which has benefitted Telangana. But Andhra Pradesh can also draw actionable insights from its new neighbour to build a similar innovative ecosystem.

As for the NE & hill states, Sikkim is the best performer while it is Delhi among the group of union territories & city states. In fact, Delhi with a score of 42.98 is the best performing state among all the Indian states taken as a whole. Delhi has the unique advantage of being the capital city of the country, having a high concentration of universities and research labs, and close proximity to the cities of Gurgaon and Noida, which are thriving business hubs. All of these factors work heavily in favour of building Delhi's innovative capacity.

INNOVATION

Innovation		
Major states	**Score**	**Rank**
KARNATAKA	35.65	1
TAMIL NADU	32.98	2
MAHARASHTRA	29.93	3
TELANGANA	22.06	4
HARYANA	20.55	5
KERALA	19.58	6
UTTAR PRADESH	19.08	7
WEST BENGAL	18.21	8
GUJARAT	16.86	9
ANDHRA PRADESH	14.51	10
PUNJAB	13.67	11
ODISHA	12.66	12
RAJASTHAN	11.00	13
MADHYA PRADESH	9.70	14
CHHATTISGARH	8.06	15
BIHAR	7.99	16
JHARKHAND	6.20	17
NE and Hill states		
SIKKIM	15.49	1
HIMACHAL PRADESH	13.76	2
UTTARAKHAND	13.12	3
MANIPUR	11.69	4
JAMMU & KASHMIR	11.07	5
TRIPURA	8.54	6
ARUNACHAL PRADESH	8.50	7
ASSAM	7.74	8
NAGALAND	7.49	9
MIZORAM	6.88	10
MEGHALAYA	6.38	11
Union Territories / City States / Small States		
DELHI	42.98	1
CHANDIGARH	27.97	2
GOA	22.49	3
PUDUCHERRY	13.94	4
ANDAMAN & NICOBAR ISLANDS	12.75	5
DAMAN & DIU	12.10	6
DADRA & NAGAR HAVELI	11.74	7
LAKSHADWEEP	8.35	8

Table 8.1: India Innovation Index State-level Performance

ENABLERS

Enablers		
Major states	**Score**	**Rank**
MAHARASHTRA	25.64	1
HARYANA	25.10	2
KARNATAKA	24.96	3
KERALA	23.88	4
TAMIL NADU	23.56	5
GUJARAT	22.90	6
PUNJAB	19.80	7
ANDHRA PRADESH	18.80	8
TELANGANA	17.29	9
ODISHA	15.25	10
WEST BENGAL	14.45	11
RAJASTHAN	13.06	12
MADHYA PRADESH	12.61	13
CHHATTISGARH	12.30	14
UTTAR PRADESH	11.85	15
BIHAR	10.54	16
JHARKHAND	7.75	17
NE and Hill states		
SIKKIM	29.98	1
HIMACHAL PRADESH	22.68	2
MANIPUR	18.50	3
UTTARAKHAND	17.51	4
JAMMU & KASHMIR	16.45	5
TRIPURA	15.51	6
ARUNACHAL PRADESH	13.00	7
MIZORAM	12.31	8
NAGALAND	11.76	9
MEGHALAYA	11.09	10
ASSAM	7.99	11
UT/ City States/ Small States		
GOA	34.01	1
CHANDIGARH	32.79	2
DELHI	32.13	3
ANDAMAN & NICOBAR ISLANDS	22.35	4
PUDUCHERRY	19.90	5
LAKSHADWEEP	16.67	6
DAMAN & DIU	12.63	7
DADRA & NAGAR HAVELI	12.37	8

PERFORMANCE

Performance		
Major states	**Score**	**Rank**
KARNATAKA	46.35	1
TAMIL NADU	42.40	2
MAHARASHTRA	34.22	3
TELANGANA	26.82	4
UTTAR PRADESH	26.32	5
WEST BENGAL	21.97	6
HARYANA	16.01	7
KERALA	15.29	8
GUJARAT	10.83	9
ANDHRA PRADESH	10.21	10
ODISHA	10.08	11
RAJASTHAN	8.93	12
PUNJAB	7.55	13
MADHYA PRADESH	6.79	14
BIHAR	5.44	15
JHARKHAND	4.65	16
CHHATTISGARH	3.82	17
NE and Hill states		
UTTARAKHAND	8.73	1
ASSAM	7.48	2
JAMMU & KASHMIR	5.68	3
MANIPUR	4.87	4
HIMACHAL PRADESH	4.84	5
ARUNACHAL PRADESH	4.00	6
NAGALAND	3.21	7
MEGHALAYA	1.66	8
TRIPURA	1.56	9
MIZORAM	1.46	10
SIKKIM	1.01	11
UT/ City States/ Small States		
DELHI	53.84	1
CHANDIGARH	23.14	2
DAMAN & DIU	11.56	3
DADRA & NAGAR HAVELI	11.11	4
GOA	10.98	5
PUDUCHERRY	7.97	6
ANDAMAN & NICOBAR ISLANDS	3.14	7
LAKSHADWEEP	0.04	8

HUMAN CAPITAL

Human Capital		
Major states	**Score**	**Rank**
TAMIL NADU	49.20	1
KERALA	46.17	2
PUNJAB	40.88	3
KARNATAKA	38.00	4
GUJARAT	36.99	5
HARYANA	35.39	6
MAHARASHTRA	34.45	7
ANDHRA PRADESH	32.99	8
TELANGANA	31.04	9
ODISHA	28.42	10
RAJASTHAN	25.90	11
CHHATTISGARH	25.50	12
WEST BENGAL	23.91	13
MADHYA PRADESH	23.24	14
UTTAR PRADESH	14.97	15
JHARKHAND	11.24	16
BIHAR	8.98	17
NE and Hill states		
SIKKIM	39.34	1
MIZORAM	33.36	2
HIMACHAL PRADESH	33.18	3
TRIPURA	30.02	4
UTTARAKHAND	28.37	5
MEGHALAYA	27.79	6
JAMMU & KASHMIR	25.89	7
ARUNACHAL PRADESH	24.86	8
MANIPUR	24.36	9
NAGALAND	24.20	10
ASSAM	19.91	11
UT/ City States/ Small States		
CHANDIGARH	74.96	1
PUDUCHERRY	56.32	2
DELHI	50.96	3
GOA	43.79	4
ANDAMAN & NICOBAR ISLANDS	39.89	5
LAKSHADWEEP	25.48	6
DAMAN & DIU	23.28	7
DADRA & NAGAR HAVELI	19.19	8

INVESTMENT

Investment		
Major states	**Score**	**Rank**
KARNATAKA	31.31	1
MAHARASHTRA	22.00	2
HARYANA	12.81	3
KERALA	9.10	4
TAMIL NADU	9.03	5
GUJARAT	7.54	6
TELANGANA	6.55	7
RAJASTHAN	5.12	8
UTTAR PRADESH	4.15	9
ANDHRA PRADESH	4.00	10
MADHYA PRADESH	3.07	11
ODISHA	1.69	12
WEST BENGAL	1.15	13
CHHATTISGARH	1.12	14
PUNJAB	0.91	15
JHARKHAND	0.51	16
BIHAR	0.06	17
NE and Hill states		
MANIPUR	14.54	1
ARUNACHAL PRADESH	11.38	2
TRIPURA	7.90	3
MIZORAM	5.25	4
SIKKIM	4.79	5
NAGALAND	3.63	6
UTTARAKHAND	2.40	7
JAMMU & KASHMIR	2.20	8
HIMACHAL PRADESH	1.67	9
ASSAM	0.80	10
MEGHALAYA	0.21	11
UT/ City States/ Small States		
LAKSHADWEEP	24.03	1
DELHI	21.35	2
GOA	15.82	3
ANDAMAN & NICOBAR ISLANDS	6.86	4
PUDUCHERRY	4.28	5
CHANDIGARH	2.40	6
DADRA & NAGAR HAVELI	1.90	7
DAMAN & DIU	0.11	8

KNOWLEDGE WORKERS

Knowledge Workers		
Major states	**Score**	**Rank**
MAHARASHTRA	21.60	1
GUJARAT	21.39	2
KARNATAKA	21.17	3
ANDHRA PRADESH	19.95	4
TELANGANA	15.82	5
TAMIL NADU	15.42	6
HARYANA	15.40	7
KERALA	14.45	8
PUNJAB	8.81	9
MADHYA PRADESH	7.77	10
RAJASTHAN	7.23	11
WEST BENGAL	7.19	12
UTTAR PRADESH	5.83	13
ODISHA	5.14	14
CHHATTISGARH	3.81	15
BIHAR	3.04	16
JHARKHAND	2.73	17
NE and Hill states		
HIMACHAL PRADESH	35.24	1
SIKKIM	33.62	2
MANIPUR	24.82	3
UTTARAKHAND	21.77	4
JAMMU & KASHMIR	15.48	5
MEGHALAYA	9.76	6
NAGALAND	5.81	7
TRIPURA	5.14	8
ASSAM	4.74	9
ARUNACHAL PRADESH	4.64	10
MIZORAM	1.11	11
UT/ City States/ Small States		
GOA	32.79	1
CHANDIGARH	29.56	2
DELHI	26.32	3
PUDUCHERRY	18.28	4
DADRA & NAGAR HAVELI	13.41	5
DAMAN & DIU	9.95	6
ANDAMAN & NICOBAR ISLANDS	0.80	7
LAKSHADWEEP	0.00	8

BUSINESS ENVIRONMENT

Business Environment		
Major states	**Score**	**Rank**
TAMIL NADU	37.07	1
KERALA	27.45	2
MAHARASHTRA	27.20	3
TELANGANA	23.43	4
KARNATAKA	23.30	5
HARYANA	21.94	6
ANDHRA PRADESH	19.36	7
GUJARAT	18.05	8
WEST BENGAL	16.87	9
PUNJAB	14.50	10
UTTAR PRADESH	13.83	11
MADHYA PRADESH	13.19	12
RAJASTHAN	12.83	13
ODISHA	12.63	14
CHHATTISGARH	11.88	15
BIHAR	11.09	16
JHARKHAND	7.60	17
NE and Hill states		
HIMACHAL PRADESH	21.44	1
JAMMU & KASHMIR	11.01	2
UTTARAKHAND	7.55	3
TRIPURA	5.42	4
MEGHALAYA	5.23	5
ASSAM	4.81	6
MIZORAM	4.80	7
NAGALAND	4.55	8
MANIPUR	4.38	9
ARUNACHAL PRADESH	4.36	10
SIKKIM	3.41	11
UT/ City States/ Small States		
GOA	52.81	1
DELHI	42.57	2
LAKSHADWEEP	16.75	3
DADRA & NAGAR HAVELI	6.63	4
CHANDIGARH	6.31	5
DAMAN & DIU	6.23	6
ANDAMAN & NICOBAR ISLANDS	5.94	7
PUDUCHERRY	5.54	8

SAFETY & LEGAL ENVIRONMENT

Safety & Legal Environment		
Major states	**Score**	**Rank**
HARYANA	39.96	1
PUNJAB	33.87	2
GUJARAT	30.52	3
BIHAR	29.54	4
ODISHA	28.36	5
WEST BENGAL	23.14	6
MAHARASHTRA	22.97	7
KERALA	22.21	8
UTTAR PRADESH	20.47	9
CHHATTISGARH	19.20	10
ANDHRA PRADESH	17.73	11
JHARKHAND	16.69	12
MADHYA PRADESH	15.78	13
RAJASTHAN	14.24	14
KARNATAKA	10.99	15
TELANGANA	9.63	16
TAMIL NADU	7.08	17
NE and Hill states		
SIKKIM	68.74	1
TRIPURA	29.05	2
JAMMU & KASHMIR	27.68	3
UTTARAKHAND	27.47	4
MANIPUR	24.42	5
HIMACHAL PRADESH	21.88	6
NAGALAND	20.59	7
ARUNACHAL PRADESH	19.76	8
MIZORAM	17.01	9
MEGHALAYA	12.46	10
ASSAM	9.70	11
UT/ City States/ Small States		
ANDAMAN & NICOBAR ISLANDS	58.26	1
CHANDIGARH	50.74	2
GOA	24.85	3
DAMAN & DIU	23.60	4
DADRA & NAGAR HAVELI	20.72	5
DELHI	19.44	6
LAKSHADWEEP	17.06	7
PUDUCHERRY	15.09	8

KNOWLEDGE OUTPUT

Knowledge Output		
Major states	**Score**	**Rank**
TAMIL NADU	30.22	1
MAHARASHTRA	26.26	2
KARNATAKA	25.63	3
TELANGANA	18.76	4
HARYANA	15.95	5
UTTAR PRADESH	15.44	6
WEST BENGAL	11.52	7
GUJARAT	11.01	8
KERALA	9.83	9
PUNJAB	9.19	10
MADHYA PRADESH	6.43	11
RAJASTHAN	6.26	12
JHARKHAND	6.25	13
ANDHRA PRADESH	6.11	14
ODISHA	4.99	15
CHHATTISGARH	3.86	16
BIHAR	3.62	17
NE and Hill states		
UTTARAKHAND	10.44	1
ARUNACHAL PRADESH	7.39	2
MANIPUR	7.33	3
ASSAM	5.90	4
JAMMU & KASHMIR	5.80	5
HIMACHAL PRADESH	5.72	6
NAGALAND	4.61	7
TRIPURA	3.13	8
MIZORAM	2.31	9
MEGHALAYA	1.73	10
SIKKIM	0.94	11
UT/ City States/ Small States		
DELHI	72.20	1
CHANDIGARH	36.42	2
GOA	18.04	3
DAMAN & DIU	17.06	4
DADRA & NAGAR HAVELI	11.49	5
PUDUCHERRY	10.21	6
ANDAMAN & NICOBAR ISLANDS	6.28	7
LAKSHADWEEP	0.08	8

KNOWLEDGE DIFFUSION

Knowledge Diffusion		
Major states	**Score**	**Rank**
KARNATAKA	67.06	1
TAMIL NADU	54.59	2
MAHARASHTRA	42.17	3
UTTAR PRADESH	37.20	4
TELANGANA	34.89	5
WEST BENGAL	32.43	6
KERALA	20.75	7
HARYANA	16.07	8
ODISHA	15.16	9
ANDHRA PRADESH	14.31	10
RAJASTHAN	11.59	11
GUJARAT	10.65	12
BIHAR	7.26	13
MADHYA PRADESH	7.15	14
PUNJAB	5.91	15
CHHATTISGARH	3.78	16
JHARKHAND	3.06	17
NE and Hill states		
ASSAM	9.07	1
UTTARAKHAND	7.01	2
JAMMU & KASHMIR	5.56	3
HIMACHAL PRADESH	3.97	4
MANIPUR	2.42	5
NAGALAND	1.82	6
MEGHALAYA	1.60	7
SIKKIM	1.07	8
ARUNACHAL PRADESH	0.61	9
MIZORAM	0.61	10
TRIPURA	0.00	11
UT/ City States/ Small States		
DELHI	35.48	1
DADRA & NAGAR HAVELI	10.73	2
CHANDIGARH	9.87	3
DAMAN & DIU	6.06	4
PUDUCHERRY	5.73	5
GOA	3.92	6
ANDAMAN & NICOBAR ISLANDS	0.00	7
LAKSHADWEEP	0.00	8

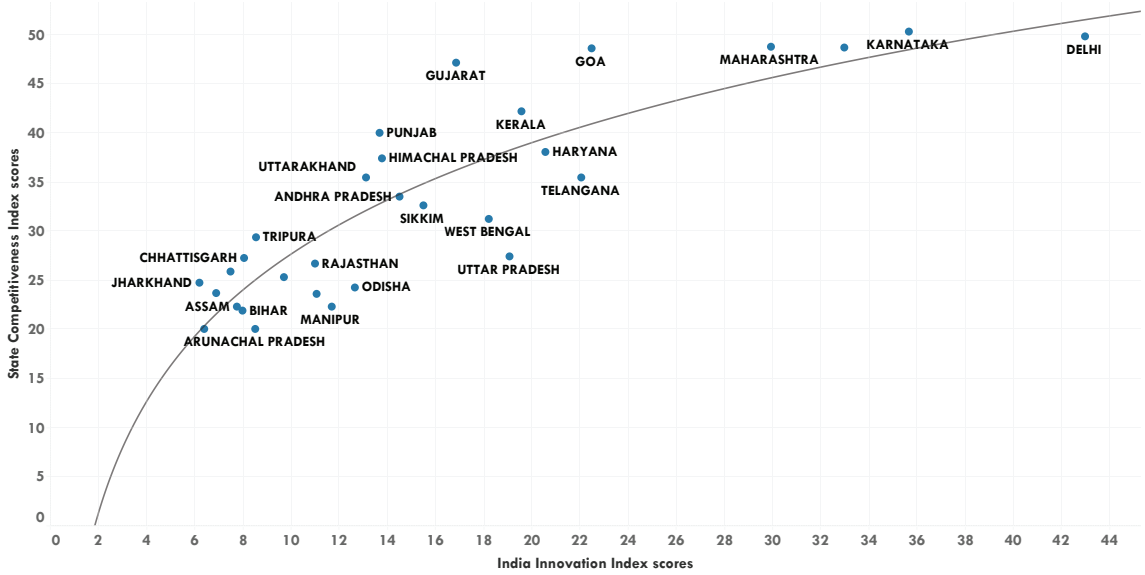


Figure 8.2: Link between Innovation and Competitiveness

Link between Innovation and Competitiveness

As has been pointed out earlier, there exists a strong relationship between competitiveness of regions and their innovative capacities. We have not established causality and that remains a matter for further research. But it can be said with certainty that the two aspects are intricately related to each other.

It would, therefore, be interesting if the scores of the India Innovation Index are found to be correlated with the competitiveness of the respective states. This has been illustrated in Figure 8.2. The state scores from the India Innovation Index are mapped against the state scores from the report "Clusters: The Drivers of Competitiveness"[6] submitted to EAC-PM.

The regional competitiveness has been calculated by looking at four broad areas:

Factor Conditions:

They measure the health of the factors that directly affect the productivity of any region. These include factors of production; not just the conventional ones like land, labor, and capital but also specialized factors like better infrastructure, skilled labor, etc.

Demand Conditions:

These represent the forces that are important in shaping consumer expenditure. The changes in the type of demand shape the relationships between firms / enterprises / business and consumers.

The context for strategy and rivalry:

Firms work to increase productivity and innovation primarily by direct competition. Thus market becomes the battlefield for domestic and foreign companies to compete for profits and sustainability. The local rules for taxation, FDI, foreign trade, remittances and the incentives structure can, therefore, make or mar the conditions for business success.

Related and supporting industries:

Presence of clusters rather than isolated firms offers proximity of upstream and downstream industries and allows for the interchange of knowledge and increases firm productivity. This also helps in meeting depth of demand and innovation.

It can be clearly seen that competitiveness and innovation of Indian states are highly correlated. In fact, an R^2 of 0.75 is achieved. It can also be seen that the relationship between the two phenomena taper off after a certain level of development. This implies that the effects of one on the other are initially quite high, but they reduce with more regional development. In other words, the states that are in the bottom rung of competitiveness can make the highest gains from the pursuit of innovation. Since most of the Indian states are concentrated in the lower end, such a trend is quite promising.

Link between Innovation and Economic Development

The link between innovation and growth is almost intuitive. A sustained economic growth is driven by growth in productivity of the factors involved in production.

6 For more details: https://issuu.com/arthsastra/docs/clusters_the_drivers_of_competiti?e=15240061/65872465

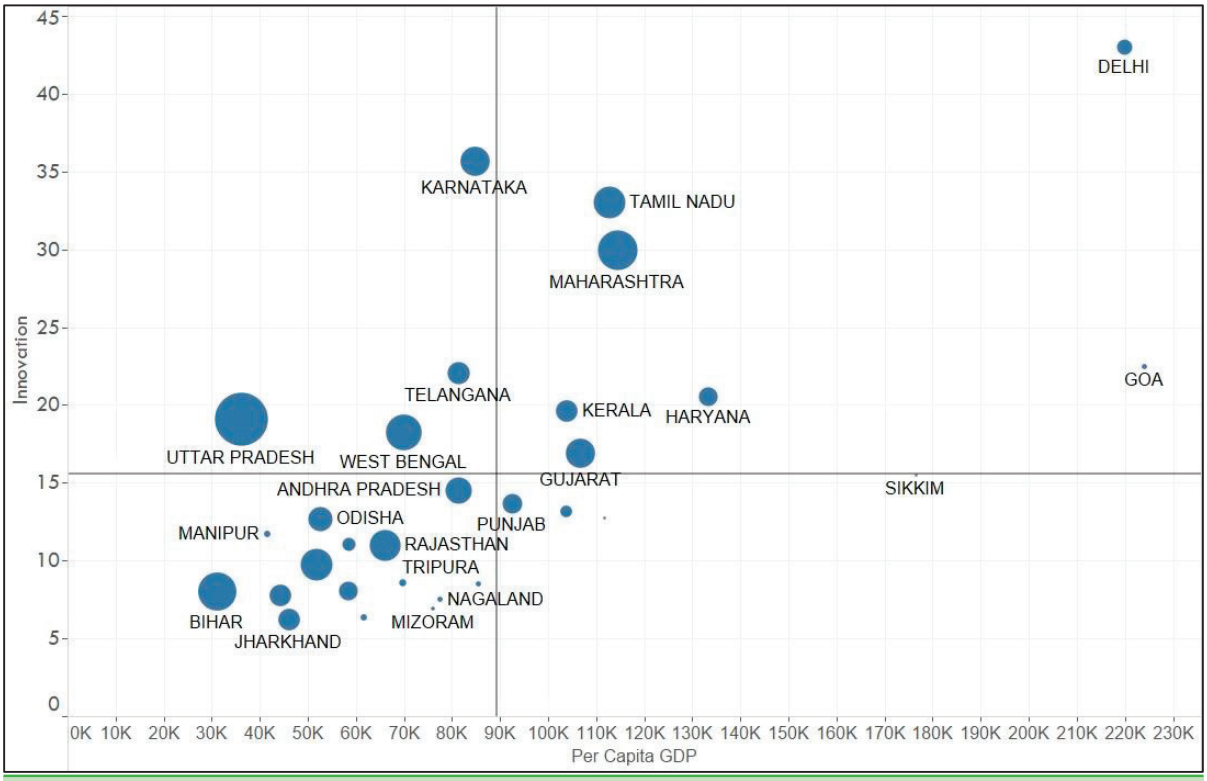


Figure 8.3: Link between Innovation and Economic Development

Productivity, in turn, arises from constant innovation that helps infuse efficiency into the production process. Meanwhile, as innovation drives growth, the opposite is also true. Higher economic growth provides more resources to innovate; something which can be seen in the performance of the states on the India Innovation Index. So, a two-way linkage exists between innovation and economic development of regions.

The Figure 8.3 depicts this linkage for Indian states. Even though the linkage is not as evident as the one between innovation and competitiveness, a general upward trend between innovation and growth is apparent. The first quadrant carries states that have higher income than the national average and are also highly innovative. Delhi, Tamil Nadu, Maharashtra, Goa, Haryana, Kerala and Gujarat fall into this category.

The second quadrant is an interesting category as it consists of states which have income lower than the national average but are more innovative than the average state. Uttar Pradesh, West Bengal, Telangana and Karnataka fall under this category. However, the latter two are almost as rich as the average Indian state as well.

The states in the third quadrant need to work the most as their incomes are lower than the national average and are less innovative the average Indian state as well. A majority of the states fall in this quadrant. And lastly, the fourth quadrant, which consists of states that are richer than the national average but are not as innovative, comprises of only three states (Sikkim, Punjab and Uttarakhand) and one Union Territory (Andaman & Nicobar Islands).

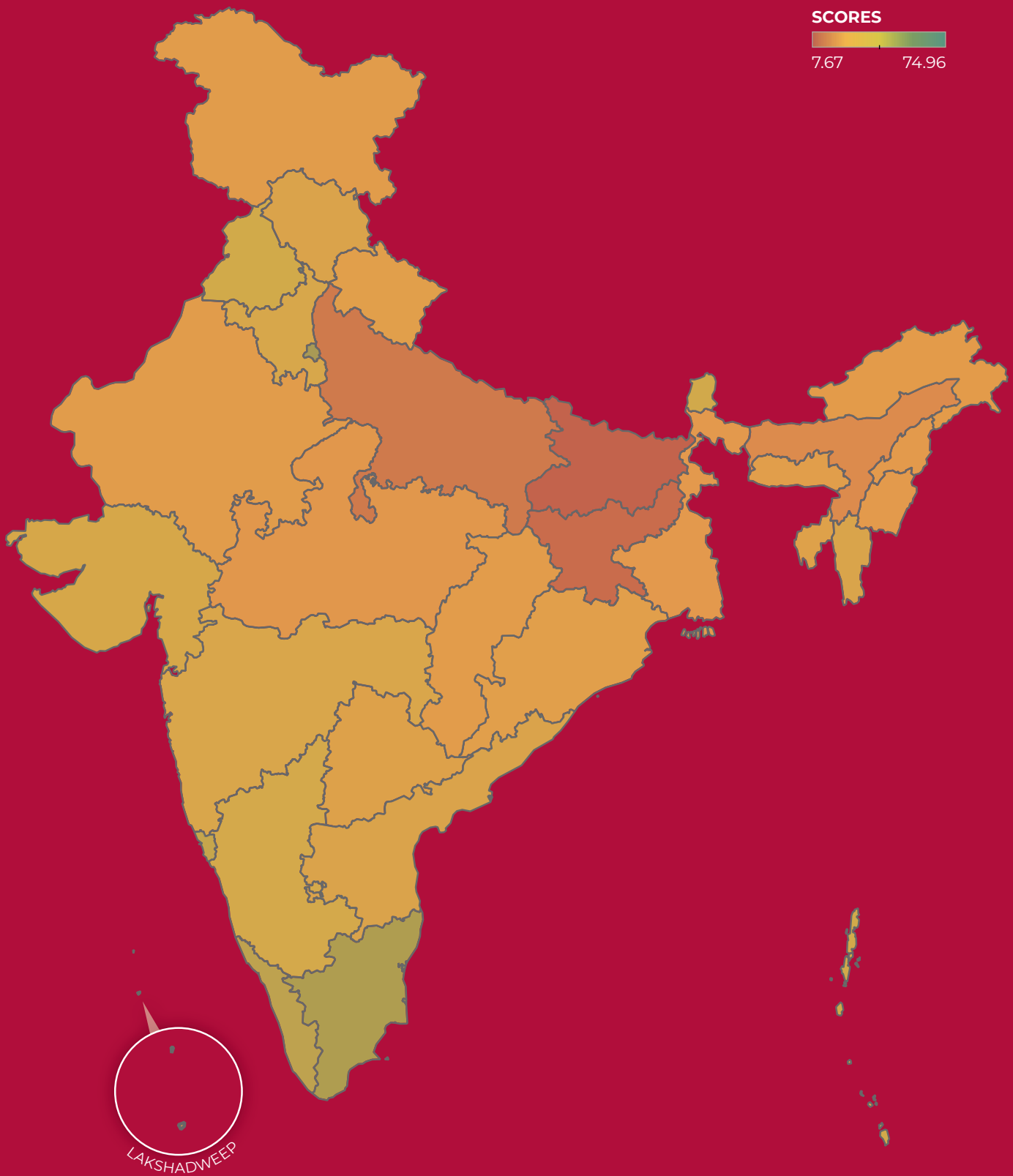


Figure 8.4: Performance of states on Human Capital

HUMAN CAPITAL

Among both enablers and performance pillars, human capital is the best-performing pillar on an average in the India Innovation Index. However, it is also the indicator that presents the maximum level of disparity among states with scores ranging from 8.98 to 74.96. The overall picture of the country reinforces the need to make further improvements in the area.

In the category of major states, the southern states perform well on producing human capital on an average, while the states in the northern heartland of the country show immense scope for improvement. The states of Bihar, Jharkhand and Uttar Pradesh especially show need for higher institutional investment towards innovation.

Meanwhile, most of the union territories and city states display a superior performance. Chandigarh and Puducherry lead the group with Delhi trailing close behind. All three of them perform better than the best major state due to high availability of educational institutions and researchers.

It is unmistakable from the performance of the states that income and size are strong drivers of human capital. The states that out-perform, that is the ones on the positive side of the figure, are mostly the richer states of India or are small in size. The former is true because the state has more resources to devote towards building its human capital while the latter is the case because the administration is simple and focused in smaller regions.

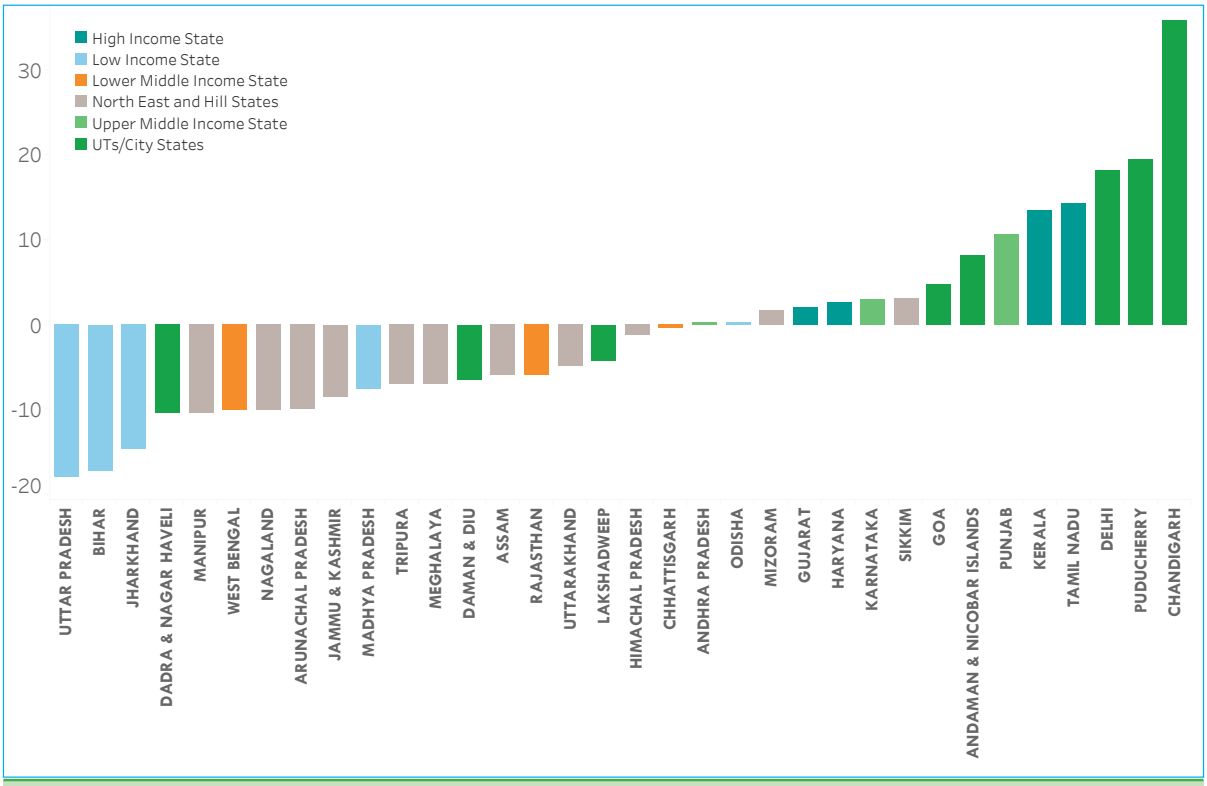


Figure 8.5: Over-performing and under-performing states

Note: Income categorisation has been made for "Major States" based on classification into four quartiles by GDP per capita of states

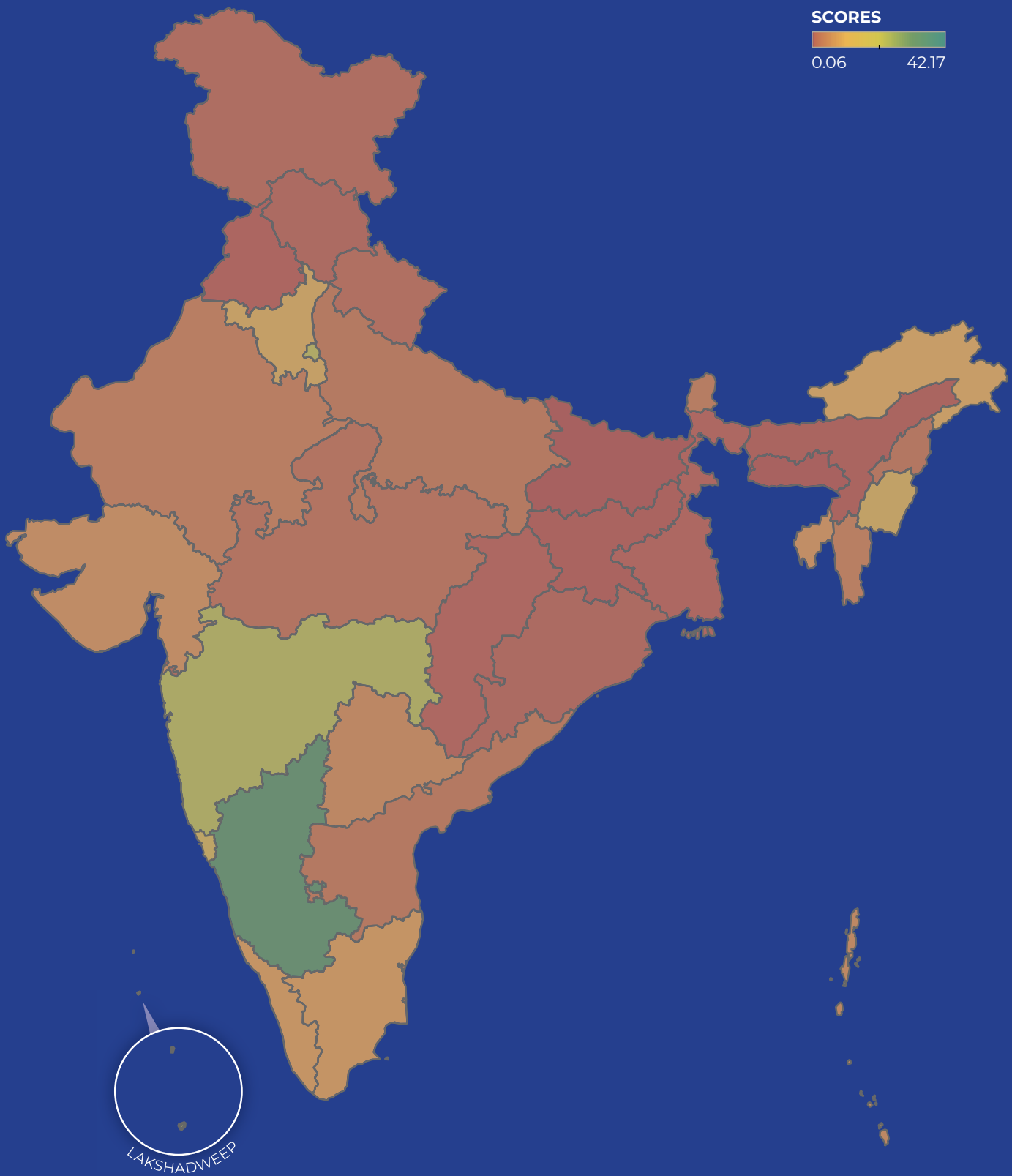


Figure 8.6: Performance of states on Investment

INVESTMENT

Among the major states the investment pillar is led by Karnataka, Maharashtra and Haryana. This is mainly because their major cities – Bangalore, Mumbai and Gurgaon – attract significant amount of foreign direct investment (FDI). The Eastern belt of major states like Bihar, Jharkhand, West Bengal, Chhattisgarh and Odisha show a clear need for higher investment towards innovation.

Surprisingly, among the north-eastern states, Manipur and Arunachal Pradesh while Lakshadweep among the union territories perform at par with the best states. The former is due to a higher expenditure in science and technology by the government while the latter is a result of higher investment in higher education based on their respective economy size.

Delhi expectedly performs well on this front mainly due to higher foreign direct investment into the capital.

The segregation between over performers and underperformers is curiously not income-based for the states. The figure shows that quite a few rich states also fall into the underperformer category.

The over performance of states like Karnataka, Delhi and Maharashtra is not surprising. It is, however, surprising that Lakshadweep, Arunachal Pradesh and Manipur over-perform on investment. It turns out that while Lakshadweep spends a significant amount on higher education, both the north-eastern states do the same for science and technology.

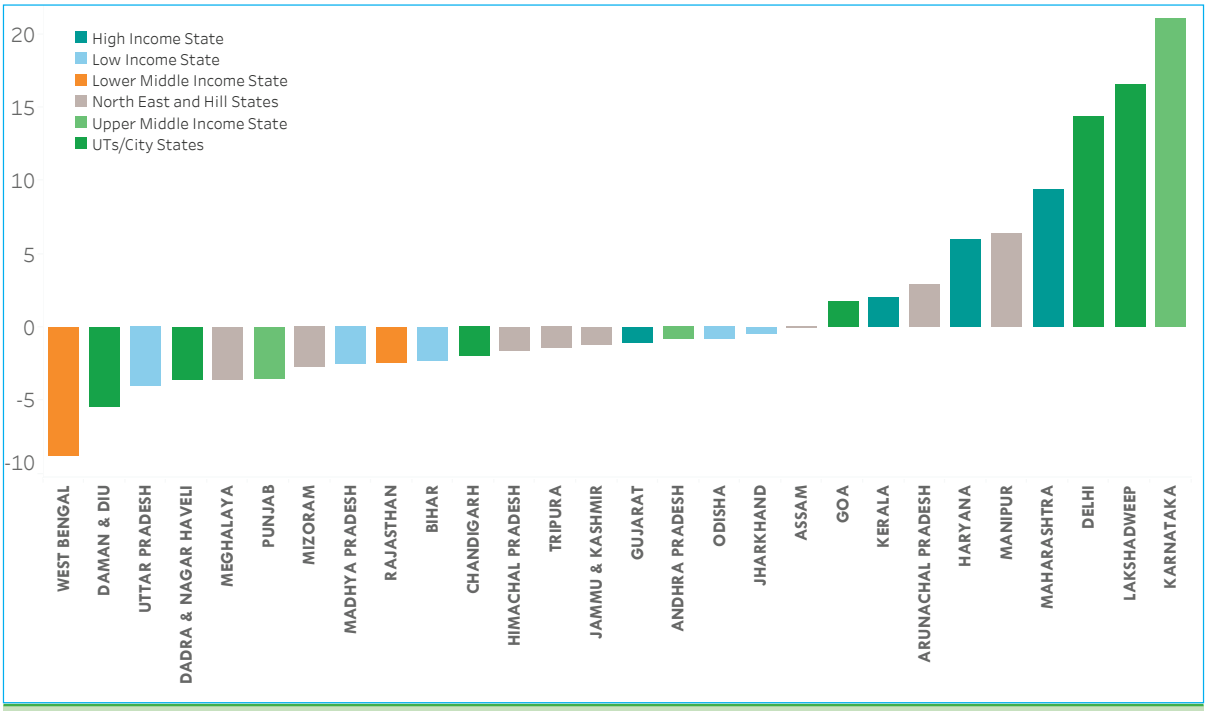


Figure 8.7: Over-performing and under-performing states

Note: Income categorisation has been made for "Major States" based on classification into four quartiles by GDP per capita of states

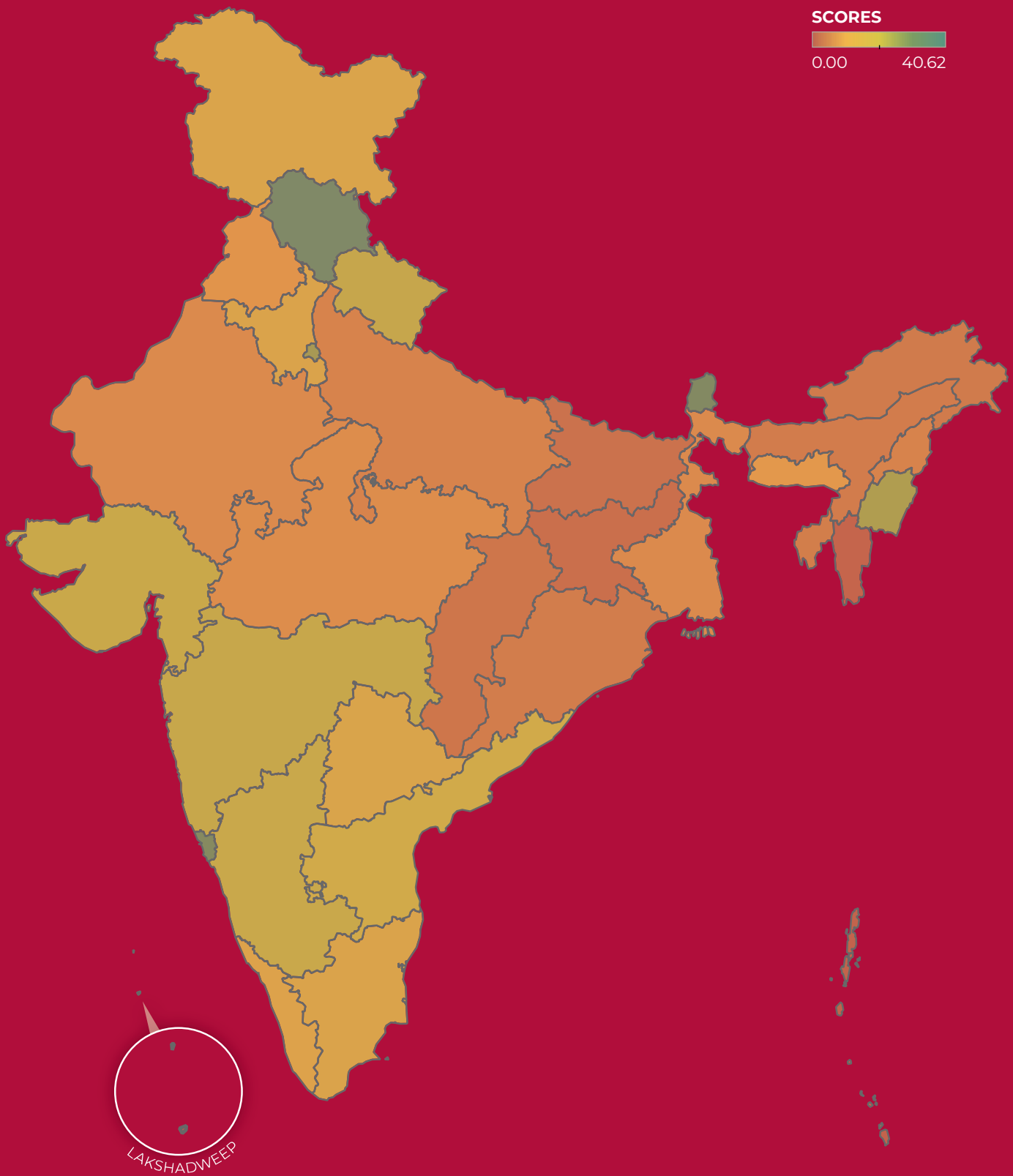


Figure 8.8: Performance of states on Knowledge Workers

KNOWLEDGE WORKERS

The highest score achieved by a state in this pillar is 35.24. When compared with the maximum score in the human capital pillar of 74.96, the scores achieved in this pillar indicate that India is producing substantial graduates but has issues in employing them in knowledge-intensive activities. This can either mean that adequate employment opportunities are not available in such sectors or the graduates are not employable. Further study is required to understand the situation better.

On an average, India also has a serious lack of R&D workers per million. Moreover, most of the R&D employment comes from private-funded labs. State funded labs are much lower in proportion. Therefore, Indian states need to work towards addressing these gaps. As for state-wise performance, it can be seen that smaller states perform better on this pillar.

It is surprising that smaller states like Sikkim, Goa and Himachal Pradesh are over performers. However, it needs to be highlighted that smaller states do better because the data is only available for the organised sector, which are few in smaller states. If some of these are knowledge-intensive sectors, it balloons up the prevalence of knowledge workers in the state. This makes cross-country comparisons challenging. Therefore, the over-performance of the smaller states needs to be read with caution.

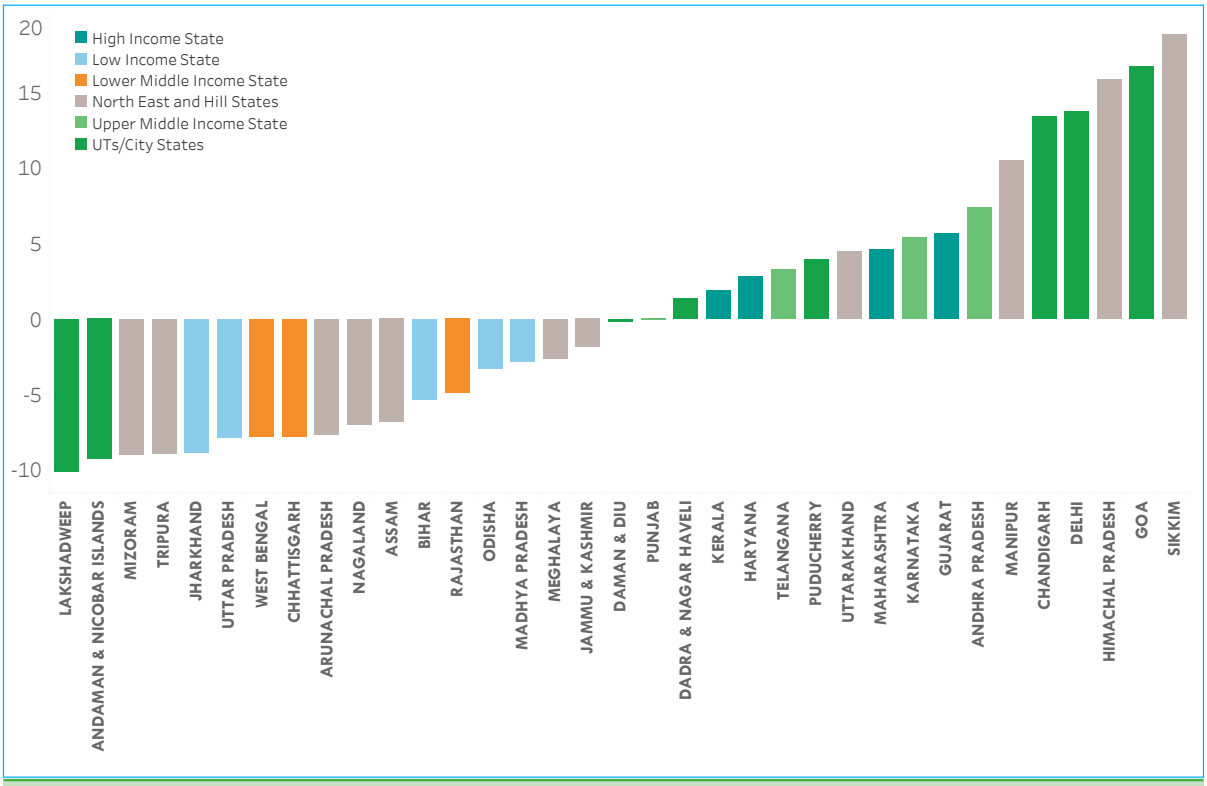


Figure 8.9: Over-performing and under-performing states

Note: Income categorisation has been made for "Major States" based on classification into four quartiles by GDP per capita of states

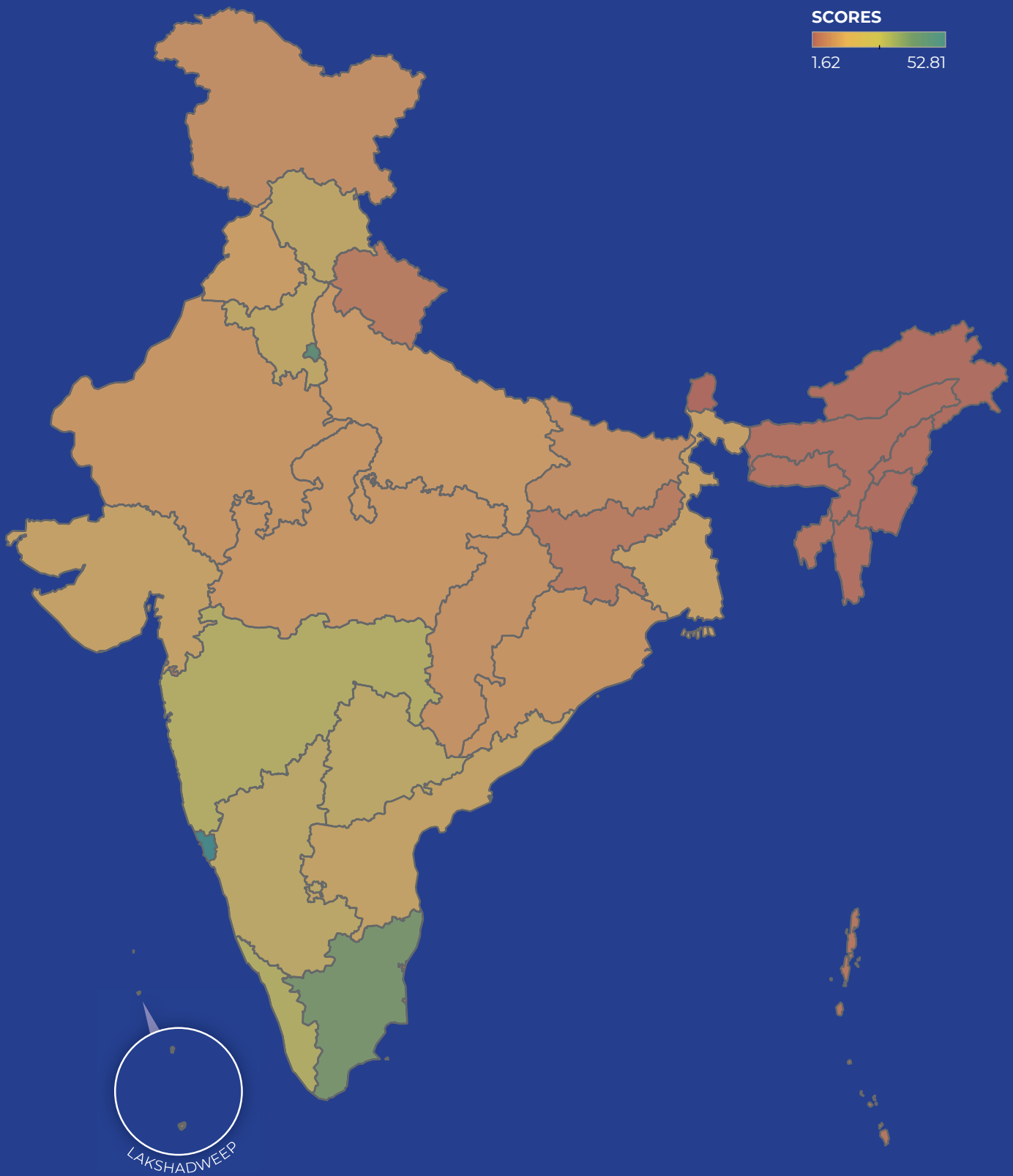


Figure 8.10: Performance of states on Business Environment

BUSINESS ENVIRONMENT

The absolute results provide us with three clear outliers in Business Environment, namely Goa, Delhi and Tamil Nadu. The scores of these states are 52, 42 and 37 respectively. The business environment in these states is conducive for innovation.

Goa scores more than the country's average in most of the parameters including internet connections, presence of incubators, industrial clusters and number of CFCs. The scores of Delhi are driven by the high internet connections in the region. The number of internet connections in Delhi are 125.86 (per 100 population) while the country average stands at 38.37. The performance of Tamil Nadu is above average in all the indicators by a slight margin, except one - CFCs. The actual number of CFCs in Tamil Nadu is 17, against the country average of 1.5 which helps it to make it to the top three.

These three states not only achieve high absolute scores but are also the three top over performers.

The absolute scores of all other regions are below 30. However, it is very encouraging that most low scoring regions having a high ease of doing business implementation score. It is reflective of them implementing the policies and actions suggested to improve their business environment.

However, many of these regions over perform compared to their peers, for instance, Lakshadweep, Kerala, Himachal Pradesh, Telangana, Maharashtra and Haryana. These states can grow faster than other regions and set examples for their peers as well.

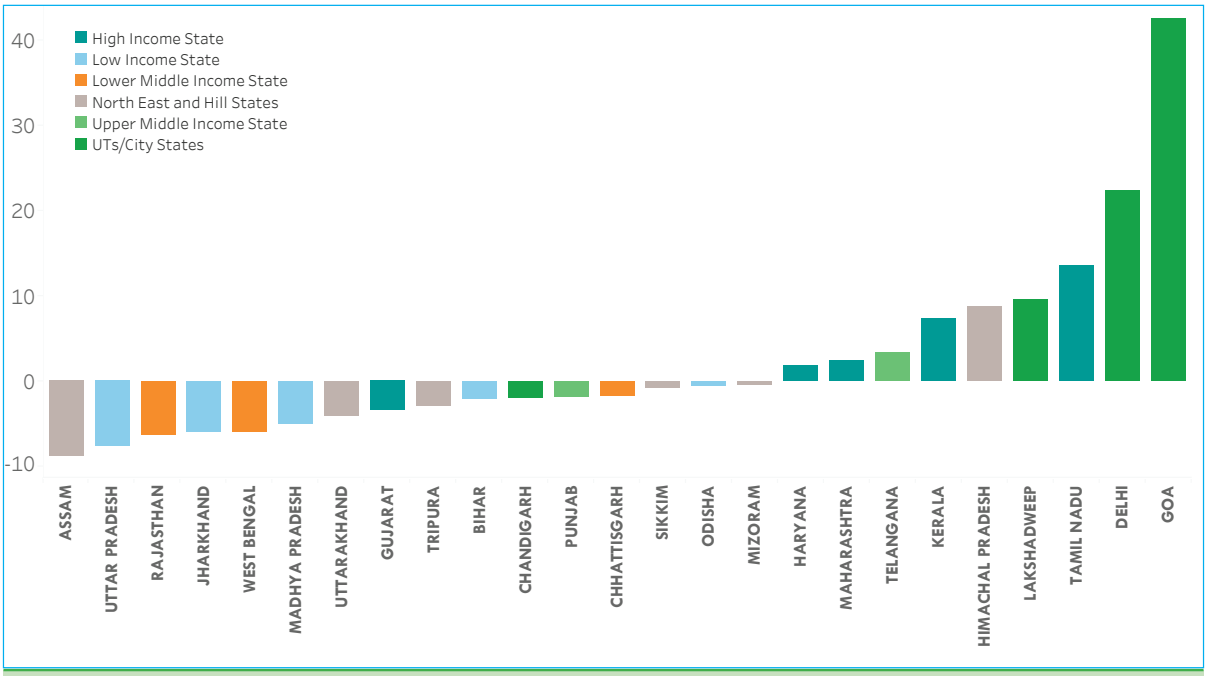


Figure 8.11: Over-performing and under-performing states

Note: Income categorisation has been made for "Major States" based on classification into four quartiles by GDP per capita of states

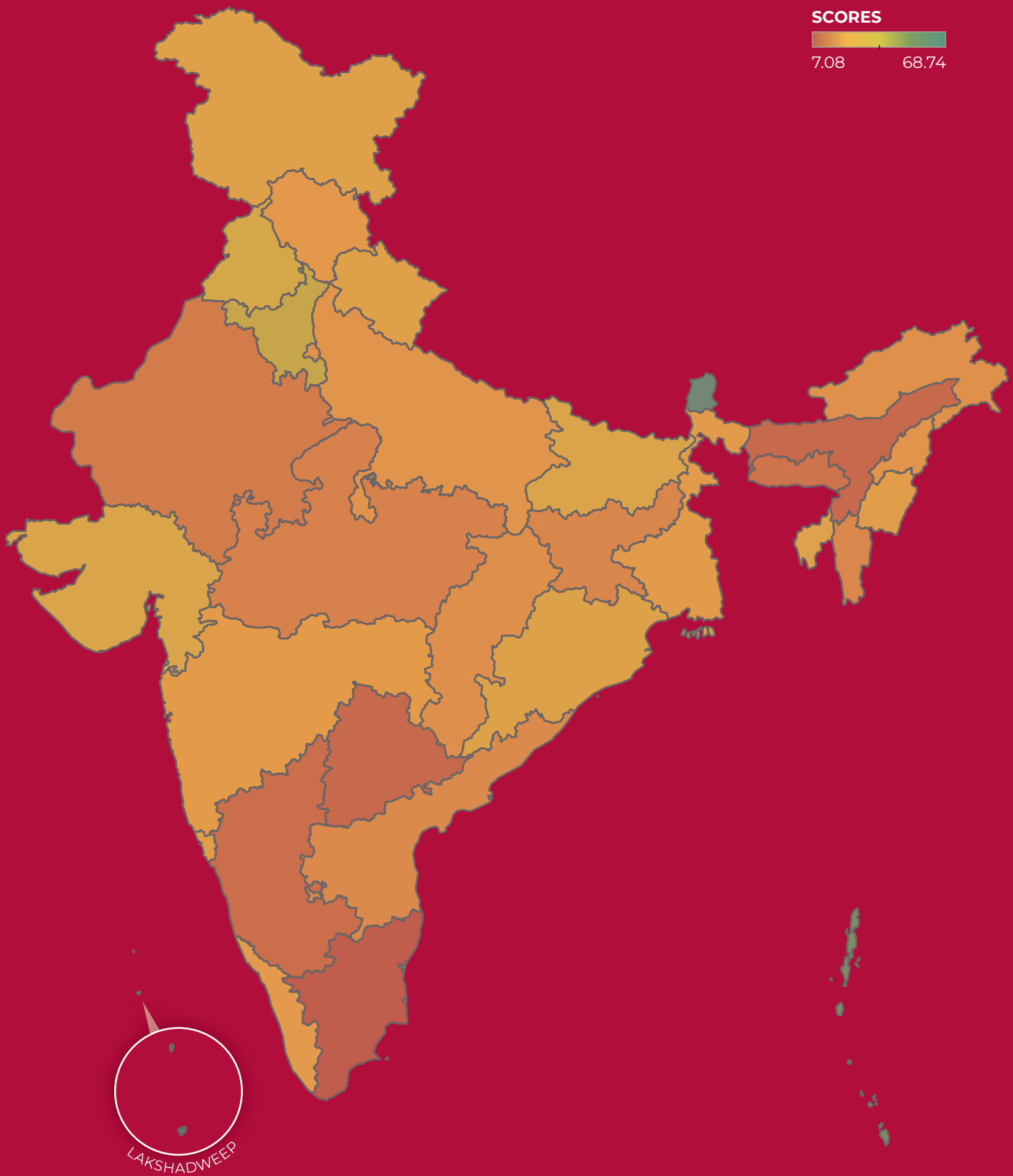


Figure 8.12: Performance of states on Safety & Legal Environment

SAFETY & LEGAL ENVIRONMENT

Absolute results show that only three regions across India namely, Sikkim, Andaman and Nicobar Islands and Chandigarh register scores above fifty. None of the major states score above forty. The low scores of all these regions reflect that creating a safe and legal landscape still remains an elusive goal for most regions. Also, the Indian society faces a lot of challenges during their interaction with the country's legal system.

It is quite surprising, however, that economically developed states are faring badly on this indicator. States like Tamil Nadu, Telangana and Karnataka, which were among the top three states in the Business Environment pillar, fare the worst among major states in this pillar. This can be attributed to better reporting of crime in these states than the less developed ones.

The group of over performers in the pillar is a healthy mix of low-income, lower-middle income, upper-middle income, high income and north-eastern states. This is reflective of the fact that regions at any level of economic development can enact and enforce fair and open procedures, protect property rights, regulate markets efficiently, and lower the burden of regulations.

On an absolute basis the performance of richer states is not up to the expectations. However, relative results show that three high income states Haryana, Gujarat and Maharashtra can serve as role models for their peers. Similarly, north-eastern states can learn from Sikkim that has just three percent of the court cases pending against the country average of 28 percent.

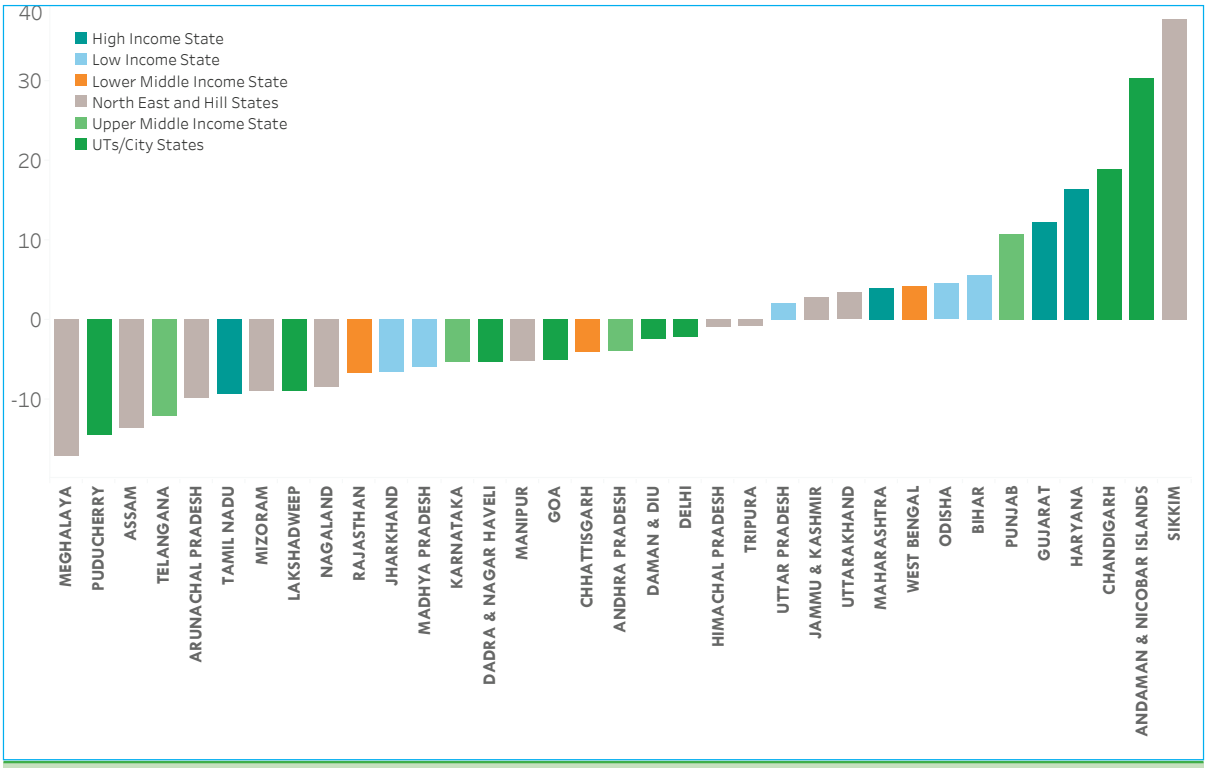


Figure 8.13: Over-performing and under-performing states

Note: Income categorisation has been made for "Major States" based on classification into four quartiles by GDP per capita of states

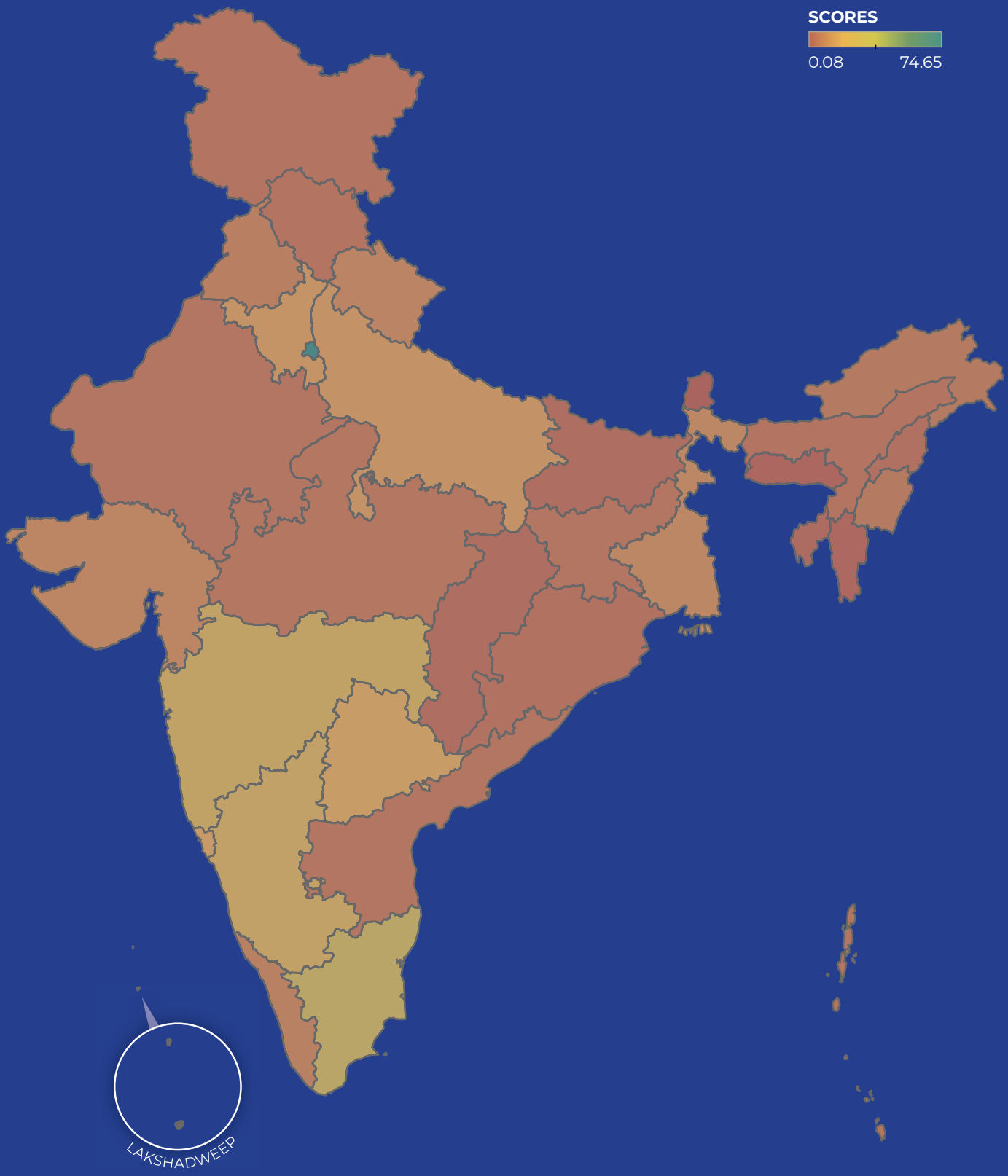


Figure 8.14: Performance of states on Knowledge Output

KNOWLEDGE OUTPUT

The variation of scale in knowledge output from 0.08 to 72.2 might seem quite significant at first glance. But the standard deviation of the state scores is not high for the pillar, that is, relative disparities are not as high. This is because Delhi is an outlier among the states. While Delhi has the highest score of 72.2, the region that comes next, Chandigarh, has a score of 36.42. The leading state, Tamil Nadu, also has a score of 30.22. This is probably because a lot of patent, design and trademark applications are filed from Delhi.

The figure also shows that the southern states do well on knowledge output. Among the major states, Tamil Nadu, Maharashtra, Karnataka and Telangana occupy the top four spots.

Although a lot of focus is given to patents, it is a notoriously Western concept and not a perfect indicator for a country like India. Grassroot innovation is a fairer indicator. Although it does not show in the figure, Kerala has the highest number of absolute grassroot innovations while Manipur commands the highest number of grassroot innovations per capita.

The over performance of Delhi and the major states of southern India is along expected lines as their cities have the highest concentration of researchers and research labs.

A curious anomaly lies in the contrasting performance of Telangana and Andhra Pradesh, which were a united state until 2014. But, in terms of knowledge output, the former is an over performer while the latter is the opposite. Telangana unambiguously outperforms its neighbour across all indicators within the pillar. The case makes for an interesting study on what drives innovation.

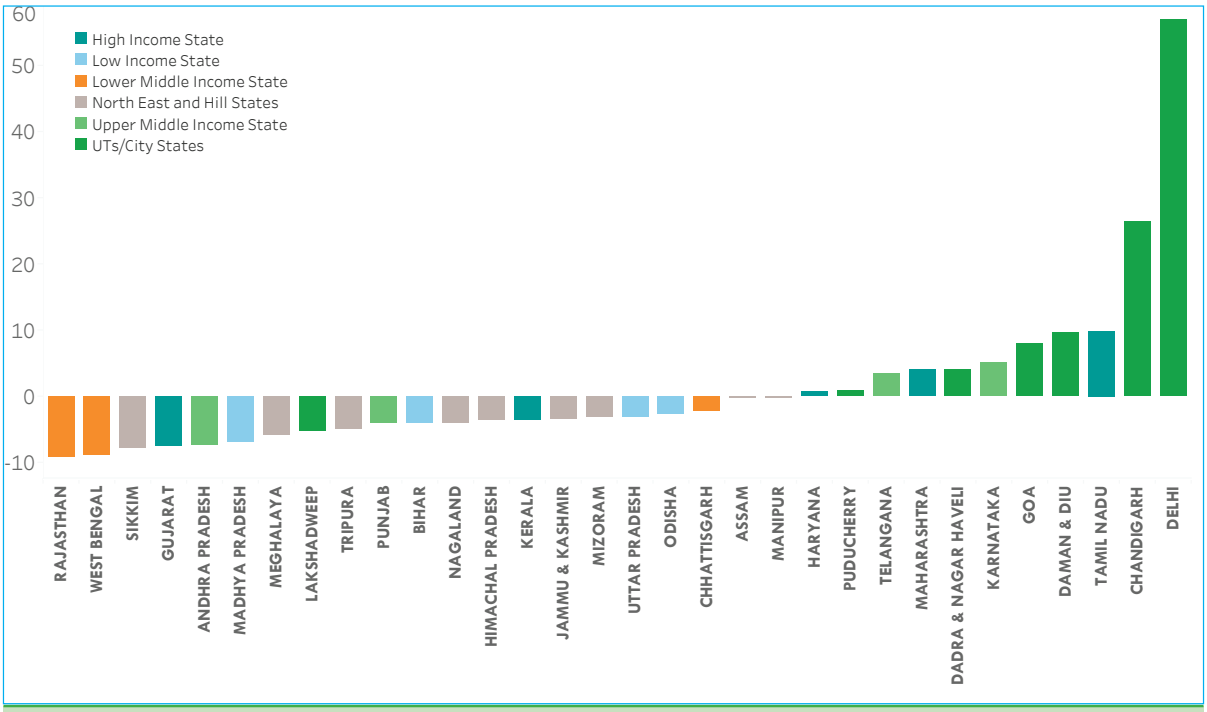


Figure 8.15: Over-performing and under-performing states

Note: Income categorisation has been made for "Major States" based on classification into four quartiles by GDP per capita of states

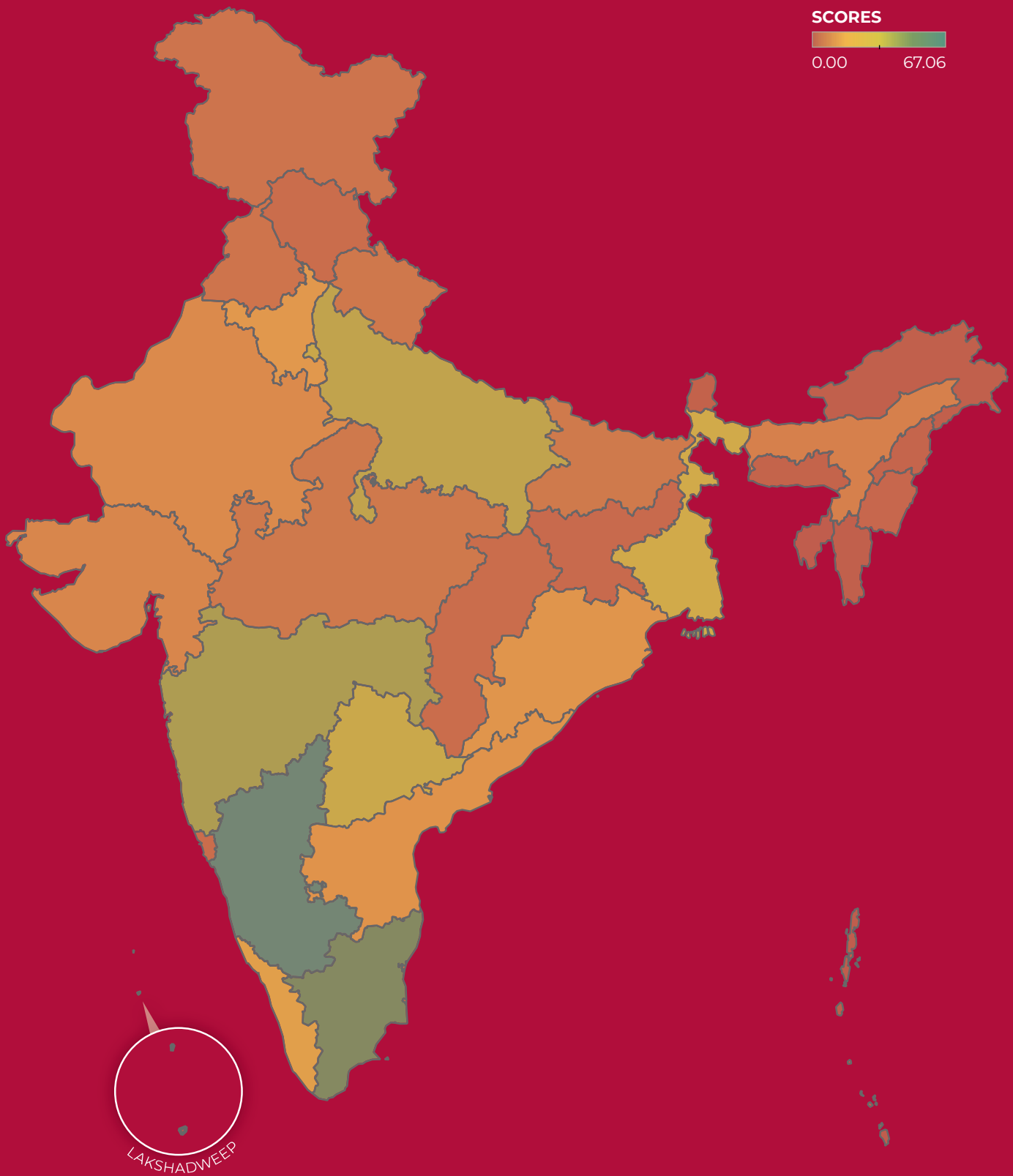


Figure 8.16: Performance of states on Knowledge Diffusion

KNOWLEDGE DIFFUSION

The kind of variation observed among the state scores for Knowledge Diffusion can be understood through two statistics. One, the scores of 27 regions out of 36 lie below 15. Second, the scores of top nine regions lie between from 16 to 67.

The low scores of the 27 regions is explained through the ICT exports. 97 percent of the total ICT exports in the country are from nine regions only – Karnataka (40%), Maharashtra (19%), Telangana (13%), Tamil Nadu (9%), Haryana (5%), Uttar Pradesh (4%), West Bengal (2%) and Kerala (1%). It gives them an edge over other regions.

The variation in the scores of the top nine states is explained by their performance on other parameters of knowledge diffusion such as high and medium tech manufacturing, registered GIs and citations of academic publications.

Regions that out perform their peers in knowledge workers, namely Sikkim, Goa, Himachal Pradesh, Delhi and Chandigarh are expected to outperform in knowledge output and diffusion as well. However, most of these regions either outperform by a small margin or underperform.

It is surprising that two low income states – Uttar Pradesh and Odisha make it to the group of over performers. These states can serve as role models for other low-income states as they reflect how resources can be used more efficiently.

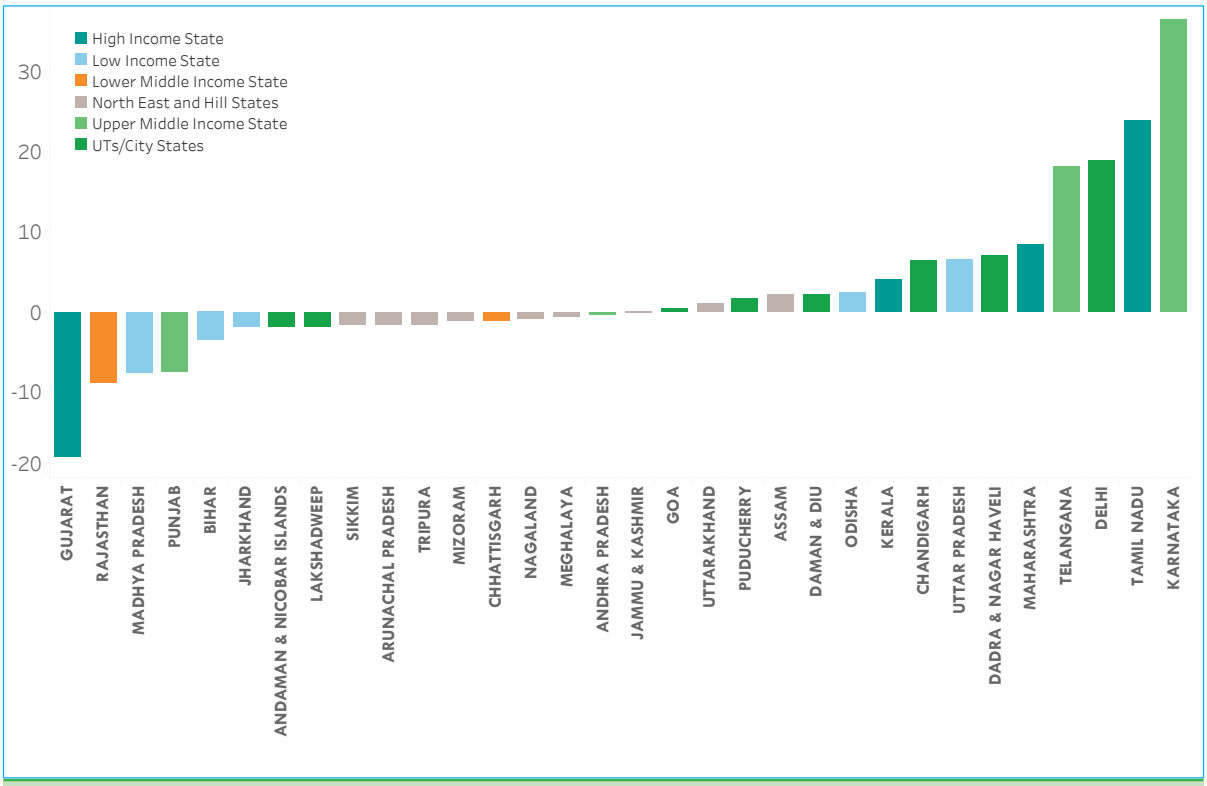


Figure 8.17: Over-performing and under-performing states

Note: Income categorisation has been made for "Major States" based on classification into four quartiles by GDP per capita of states

SCORES: INDIA INNOVATION INDEX 2019

	Dimension	Pillar					Dimension	Pillar	
States	Enablers	Human Capital	Investment	Knowledge Workers	Business Environment	Safety & Legal Environment	Performance	Knowledge Output	Knowledge Diffusion
ANDHRA PRADESH	18.80	32.99	4.00	19.95	19.36	17.73	10.21	6.11	14.31
ARUNACHAL PRADESH	13.00	24.86	11.38	4.64	4.36	19.76	4.00	7.39	0.61
ASSAM	7.99	19.91	0.80	4.74	4.81	9.70	7.48	5.90	9.07
BIHAR	10.54	8.98	0.06	3.04	11.09	29.54	5.44	3.62	7.26
CHHATTISGARH	12.30	25.50	1.12	3.81	11.88	19.20	3.82	3.86	3.78
DELHI	32.13	50.96	21.35	26.32	42.57	19.44	53.84	72.20	35.48
GOA	34.01	43.79	15.82	32.79	52.81	24.85	10.98	18.04	3.92
GUJARAT	22.90	36.99	7.54	21.39	18.05	30.52	10.83	11.01	10.65
HARYANA	25.10	35.39	12.81	15.40	21.94	39.96	16.01	15.95	16.07
HIMACHAL PRADESH	22.68	33.18	1.67	35.24	21.44	21.88	4.84	5.72	3.97
JAMMU & KASHMIR	16.45	25.89	2.20	15.48	11.01	27.68	5.68	5.80	5.56
JHARKHAND	7.75	11.24	0.51	2.73	7.60	16.69	4.65	6.25	3.06
KARNATAKA	24.96	38.00	31.31	21.17	23.30	10.99	46.35	25.63	67.06
KERALA	23.88	46.17	9.10	14.45	27.45	22.21	15.29	9.83	20.75
MADHYA PRADESH	12.61	23.24	3.07	7.77	13.19	15.78	6.79	6.43	7.15
MAHARASHTRA	25.64	34.45	22.00	21.60	27.20	22.97	34.22	26.26	42.17
MANIPUR	18.50	24.36	14.54	24.82	4.38	24.42	4.87	7.33	2.42
MEGHALAYA	11.09	27.79	0.21	9.76	5.23	12.46	1.66	1.73	1.60
MIZORAM	12.31	33.36	5.25	1.11	4.80	17.01	1.46	2.31	0.61
NAGALAND	11.76	24.20	3.63	5.81	4.55	20.59	3.21	4.61	1.82
ODISHA	15.25	28.42	1.69	5.14	12.63	28.36	10.08	4.99	15.16
PUNJAB	19.80	40.88	0.91	8.81	14.50	33.87	7.55	9.19	5.91
RAJASTHAN	13.06	25.90	5.12	7.23	12.83	14.24	8.93	6.26	11.59
SIKKIM	29.98	39.34	4.79	33.62	3.41	68.74	1.01	0.94	1.07
TAMIL NADU	23.56	49.20	9.03	15.42	37.07	7.08	42.40	30.22	54.59
TELANGANA	17.29	31.04	6.55	15.82	23.43	9.63	26.82	18.76	34.89
TRIPURA	15.51	30.02	7.90	5.14	5.42	29.05	1.56	3.13	0.00
UTTARAKHAND	17.51	28.37	2.40	21.77	7.55	27.47	8.73	10.44	7.01
UTTAR PRADESH	11.85	14.97	4.15	5.83	13.83	20.47	26.32	15.44	37.20
WEST BENGAL	14.45	23.91	1.15	7.19	16.87	23.14	21.97	11.52	32.43
ANDAMAN & NICOBAR ISLANDS	22.35	39.89	6.86	0.80	5.94	58.26	3.14	6.28	0.00
CHANDIGARH	32.79	74.96	2.40	29.56	6.31	50.74	23.14	36.42	9.87
DADRA & NAGAR HAVELI	12.37	19.19	1.90	13.41	6.63	20.72	11.11	11.49	10.73
DAMAN & DIU	12.63	23.28	0.11	9.95	6.23	23.60	11.56	17.06	6.06
LAKSHADWEEP	16.67	25.48	24.03	0.00	16.75	17.06	0.04	0.08	0.00
PUDUCHERRY	19.90	56.32	4.28	18.28	5.54	15.09	7.97	10.21	5.73

STATE PROFILES

ANDHRA PRADESH

Rank: 10
Efficiency Ratio: 0.54
Category: Major States

Scorecard

ANDHRA PRADESH

India Innovation Index 2019

Innovation 14.51

Enablers 18.8

Human Capital	**32.99**
Enrolment in Ph.D	15.06
Higher education institutions with NAAC grade A and above	8.89
Number of students in engineering and technology	65.79
Percentage colleges connected through NMEICT	30.51
Percentage of schools with ICT labs	19.91
Pupil teacher ratio-higher education	86
Investment	**4.00**
Expenditure on Science, Technology & Environment	2.25
FDI inflow	18.94
State govt. expenditure on higher & technical education	3.42
Venture capital deals	0
Safety & Legal Environment	**17.73**
Information Technology/Intellectual Property Acts	53.85
Number of cyber cells and social media monitoring cells	0.38
Pendency of court cases	21.23

Knowledge Workers	**19.95**
Knowledge-intensive employment	12.33
Number of NGO's involved in knowledge intensive areas	5.9
Number of R&D institutions funded by state	34.96
Private R&D units in state	35.86
Business Environment	**19.36**
Ease of Doing Business-Implementation Score	100
Internet subscribers in the state	19.67
Number of Common Facility Centers	4.13
Number of incubator centers in state	11.4
Number of Industrial clusters	5.87
Total number of online services transaction	41.07

Performance 10.21

Knowledge Output	**6.11**
Industrial designs by origin	0.16
Number of grass root innovations in state	1.67
Number of publications by state universities	8.65
Number of startups in the state	11.44
Patents filed from state	8.74
Trademark application filed	1.52
Knowledge Diffusion	**14.31**
High and medium-high-tech manufacturing entities	12.91
ICT exports	0.62
Number of citations	6.68
Number of registered GI	46.15

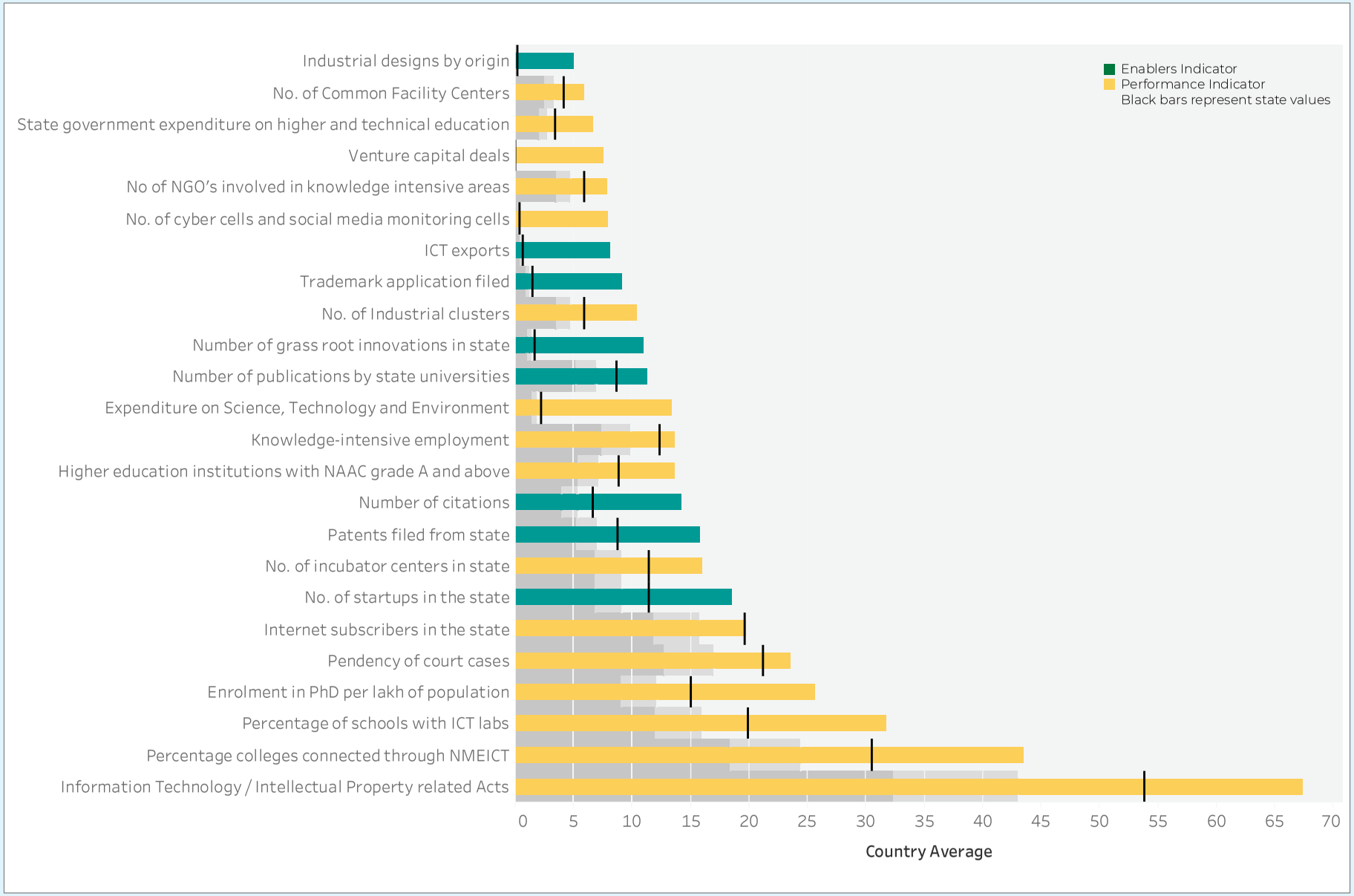
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centers
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cells
ICT exports
Trademark application filed
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of startups in the state
Internet subscribers in the state
Pendency of court cases
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Information Technology / Intellectual Property related Acts
Enablers Indicator
Performance Indicator
Black bars represent state values
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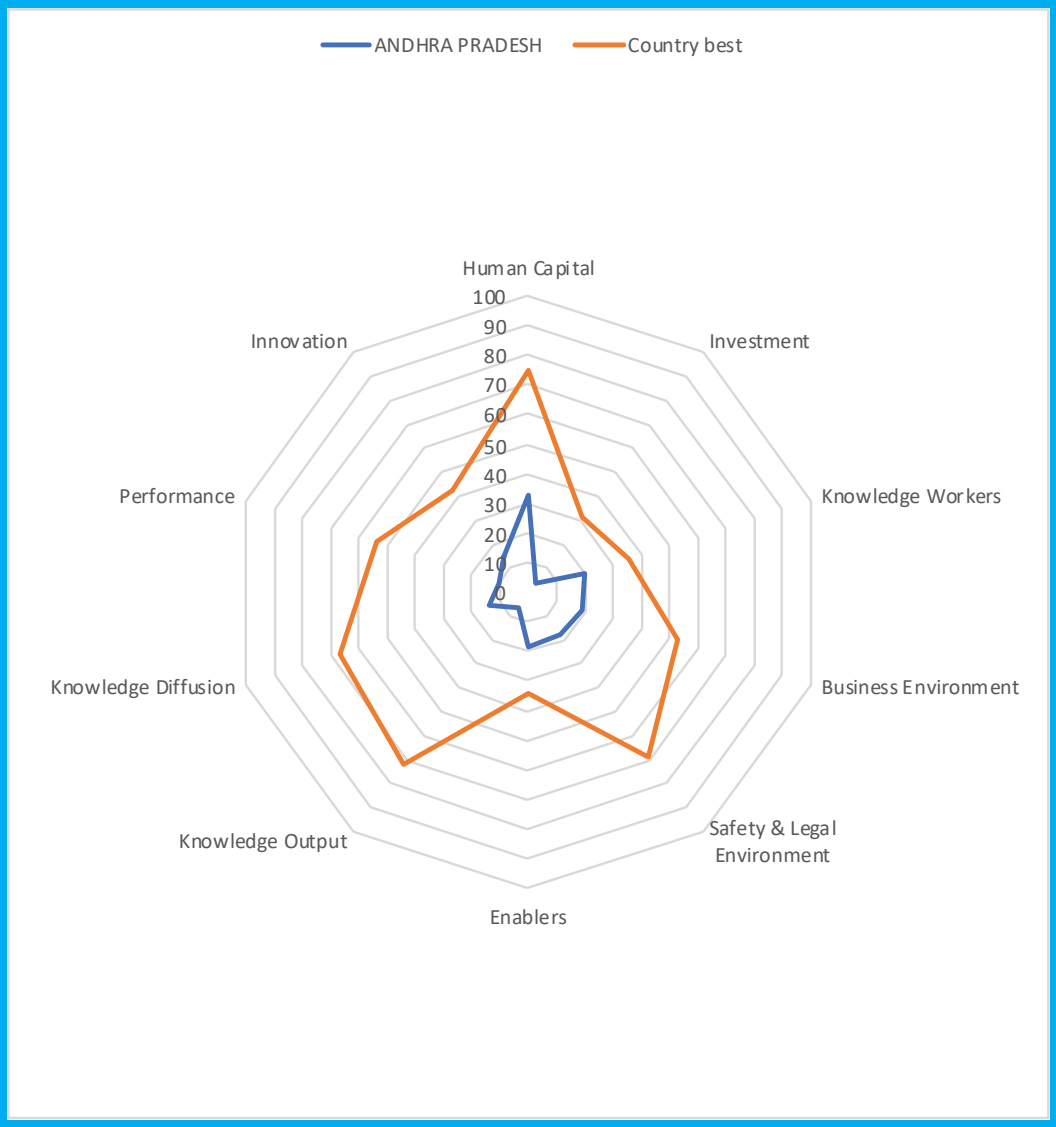
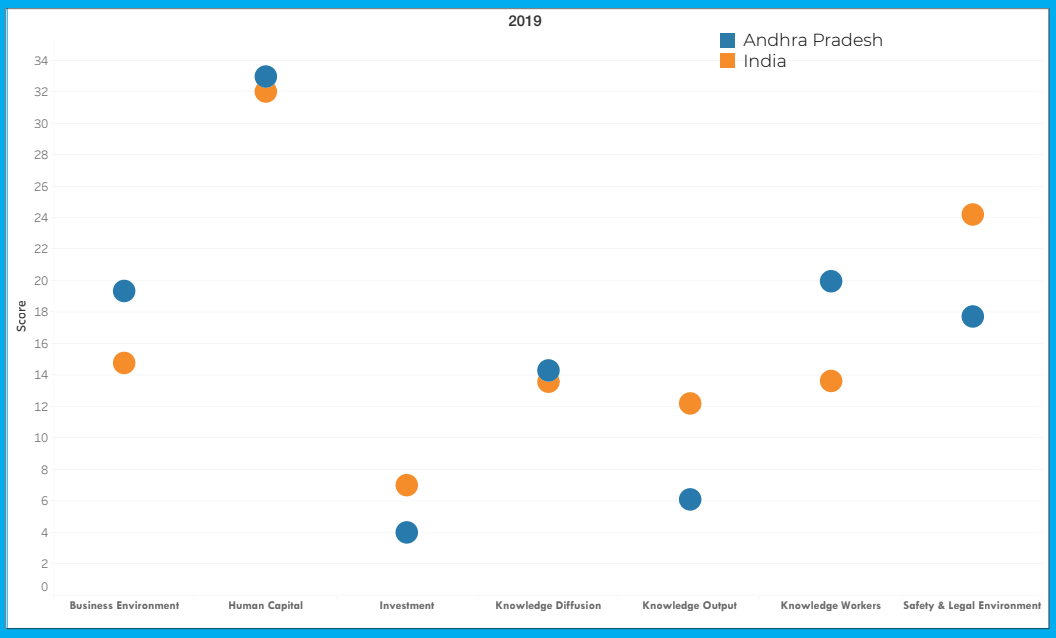
Country Average

Distance to Frontier



Comparative Analysis



ARUNACHAL PRADESH

Rank: 7
Efficiency Ratio: 0.32
Category: NE & Hill States

Scorecard

ARUNACHAL PRADESH

India Innovation Index 2019

Innovation 8.5

Enablers 13

Performance 4

Human Capital	**24.86**	**Knowledge Workers**	**4.64**	**Knowledge Output**	**7.39**
Enrolment in Ph.D	55.37	Knowledge-intensive employment	0	Industrial designs by origin	0
Higher education institutions with NAAC grade A and above	16.23	Number of NGO's involved in knowledge intensive areas	22.34	Number of grass root innovations in state	100
Number of students in engineering and technology	10.82	Number of R&D institutions funded by state	0	Number of publications by state universities	0
Percentage colleges connected through NMEICT	0	Private R&D units in state	0	Number of startups in the state	5.62
Percentage of schools with ICT labs	19.08			Patents filed from state	6.77
Pupil teacher ratio-higher education	64			Trademark application filed	0.1
Investment	**11.38**	**Business Environment**	**4.36**	**Knowledge Diffusion**	**0.61**
Expenditure on Science, Technology & Environment	77.05	Ease of Doing Business-Implementation Score	0	High and medium-high-tech manufacturing entities	0
FDI inflow	0.06	Internet subscribers in the state	18.05	ICT exports	0
State govt. expenditure on higher & technical education	1.33	Number of Common Facility Centers	0	Number of citations	0
Venture capital deals	0	Number of incubator centers in state	0	Number of registered GI	2.56
Safety & Legal Environment	**19.76**	Number of Industrial clusters	0		
Information Technology/Intellectual Property Acts	80.77	Total number of online services transaction	0.27		
Number of cyber cells and social media monitoring cells	13.75				
Pendency of court cases	0				

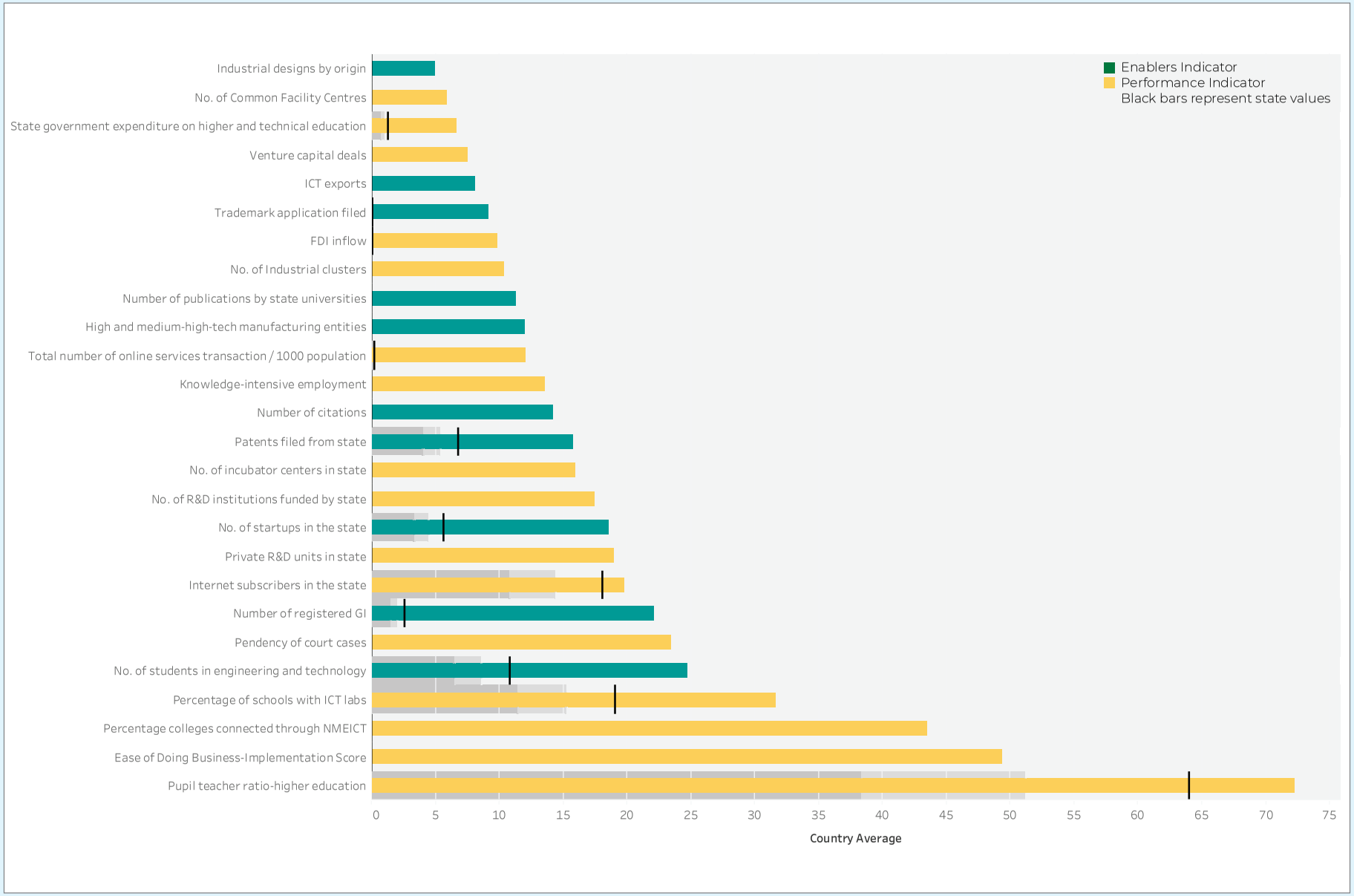
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Knowledge-intensive employment
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Pupil teacher ratio-higher education
0
5
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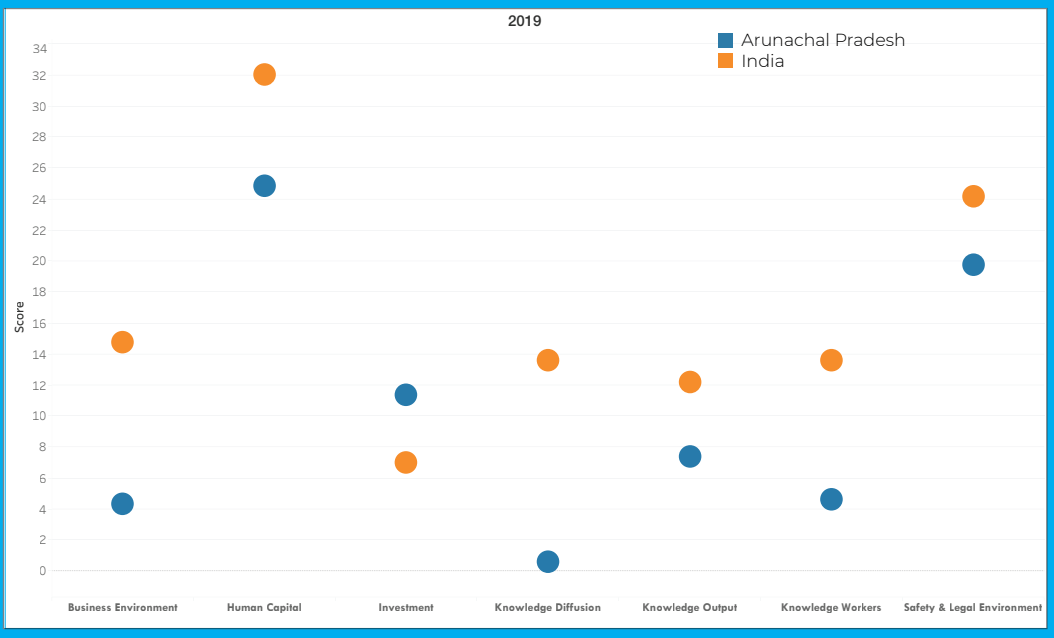
75
Country Average

Rank: 7 | **Efficiency Ratio:** 0.32 | **Category:** NE & Hill States

Distance to Frontier

Comparative Analysis



ASSAM

Rank: 8
Efficiency Ratio: 0.93
Category: NE & Hill States

Scorecard

ASSAM

India Innovation Index 2019

Innovation 7.74

Enablers 7.99

Human Capital 19.91

Enrolment in Ph.D	15.77
Higher education institutions with NAAC grade A and above	6.32
Number of students in engineering and technology	3.54
Percentage colleges connected through NMEICT	30.5
Percentage of schools with ICT labs	5.42
Pupil teacher ratio-higher education	64

Investment 0.80

Expenditure on Science, Technology & Environment	5.52
FDI inflow	0.06
State govt. expenditure on higher & technical education	0
Venture capital deals	0

Safety & Legal Environment 9.7

Information Technology/Intellectual Property Acts	11.54
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	19.61

Knowledge Workers 4.74

Knowledge-intensive employment	1.44
Number of NGO's involved in knowledge intensive areas	5.28
Number of R&D institutions funded by state	13.59
Private R&D units in state	1.83

Business Environment 4.81

Ease of Doing Business-Implementation Score	14.21
Internet subscribers in the state	8.03
Number of Common Facility Centers	5.77
Number of incubator centers in state	12.5
Number of Industrial clusters	4.67
Total number of online services transaction	0.88

Performance 7.48

Knowledge Output 5.9

Industrial designs by origin	0.03
Number of grass root innovations in state	0.89
Number of publications by state universities	12.35
Number of startups in the state	13.31
Patents filed from state	3.45
Trademark application filed	0.84

Knowledge Diffusion 9.07

High and medium-high-tech manufacturing entities	0
ICT exports	0.03
Number of citations	18.03
Number of registered GI	15.38

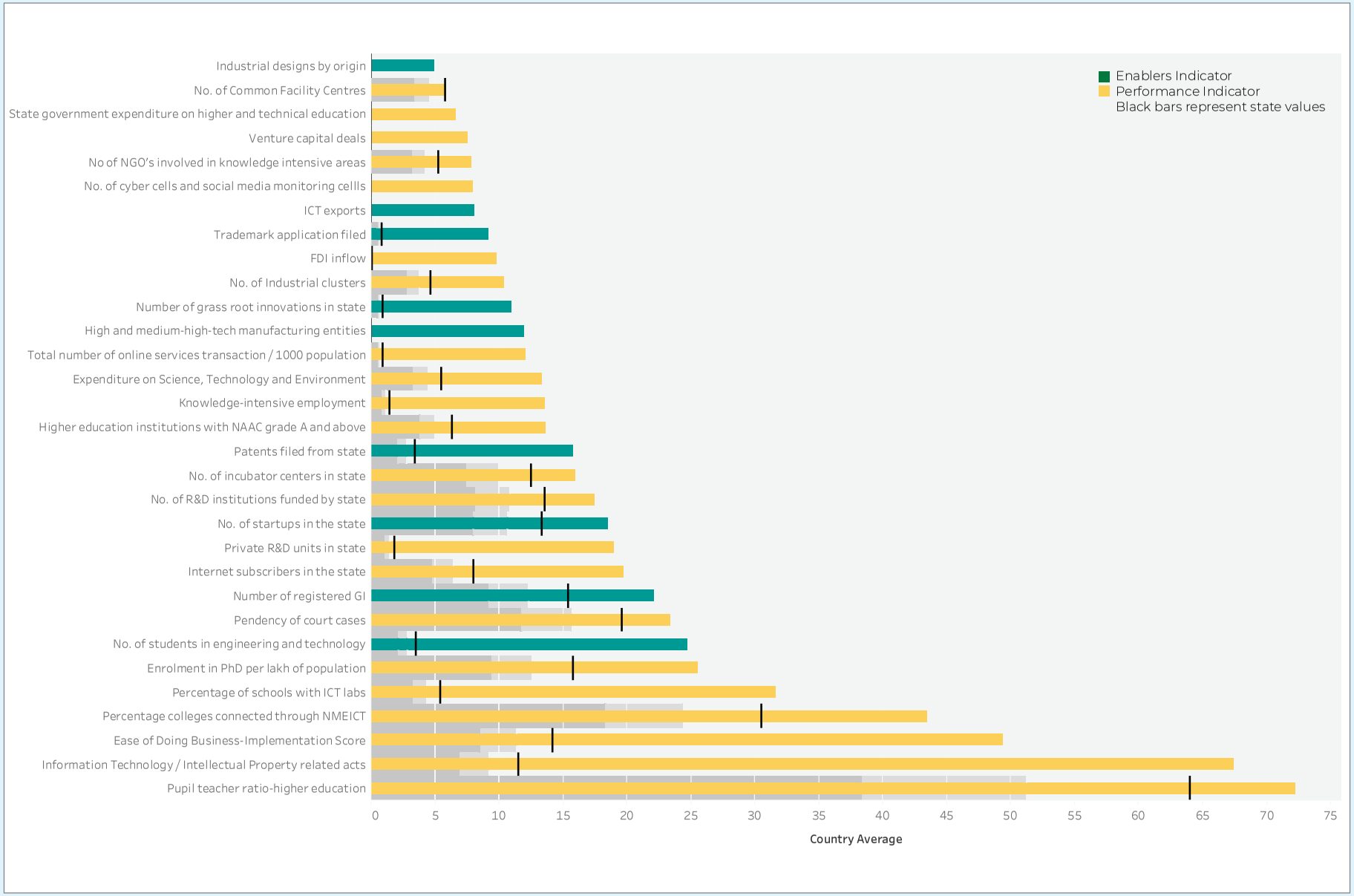
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
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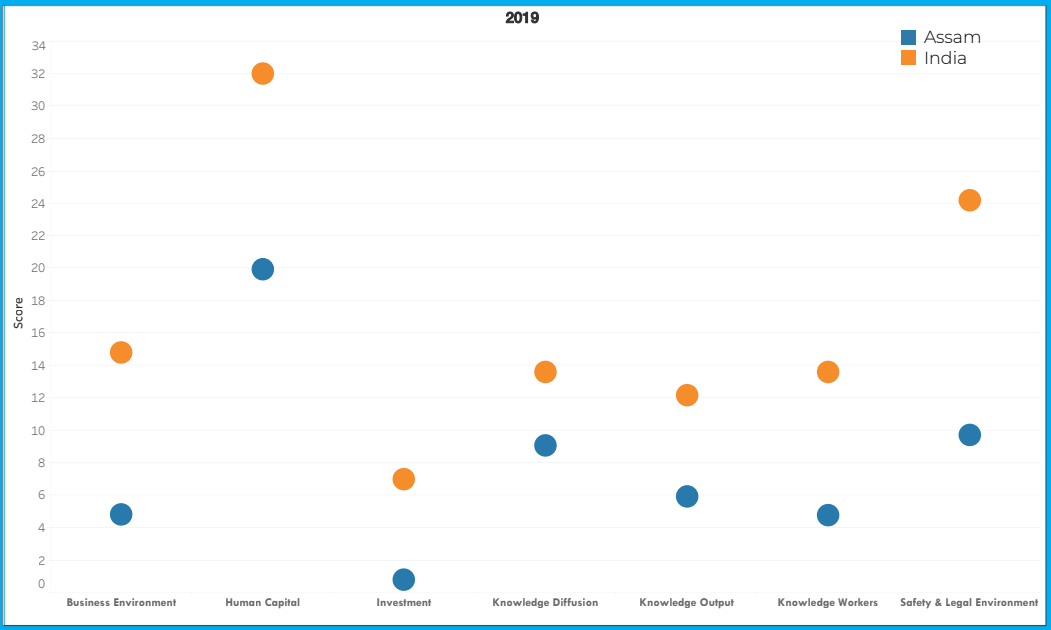
Country Average

Distance to Frontier

Comparative Analysis



BIHAR

Rank: 16
Efficiency Ratio: 0.52
Category: Major States

Scorecard

BIHAR

India Innovation Index 2019

Innovation 7.99

Enablers 10.54

Human Capital 8.98

Enrolment in Ph.D	3.26
Higher education institutions with NAAC grade A and above	3.36
Number of students in engineering and technology	3.32
Percentage colleges connected through NMEICT	28.11
Percentage of schools with ICT labs	11.02
Pupil teacher ratio-higher education	0

Investment 0.06

Expenditure on Science, Technology & Environment	0
FDI inflow	0.17
State govt. expenditure on higher & technical education	0.13
Venture capital deals	0

Safety & Legal Environment 29.54

Information Technology/Intellectual Property Acts	88.46
Number of cyber cells and social media monitoring cells	0.37
Pendency of court cases	36.23

Knowledge Workers 3.04

Knowledge-intensive employment	2.27
Number of NGO's involved in knowledge intensive areas	3.65
Number of R&D institutions funded by state	7.37
Private R&D units in state	0.17

Business Environment 11.09

Ease of Doing Business-Implementation Score	76.69
Internet subscribers in the state	0
Number of Common Facility Centers	2.03
Number of incubator centers in state	26.04
Number of Industrial clusters	1.4
Total number of online services transaction	0.13

Performance 5.44

Knowledge Output 3.62

Industrial designs by origin	0.02
Number of grass root innovations in state	1.6
Number of publications by state universities	1.61
Number of startups in the state	13.7
Patents filed from state	0.41
Trademark application filed	0.62

Knowledge Diffusion 7.26

High and medium-high-tech manufacturing entities	0.26
ICT exports	0.01
Number of citations	1.92
Number of registered GI	28.21

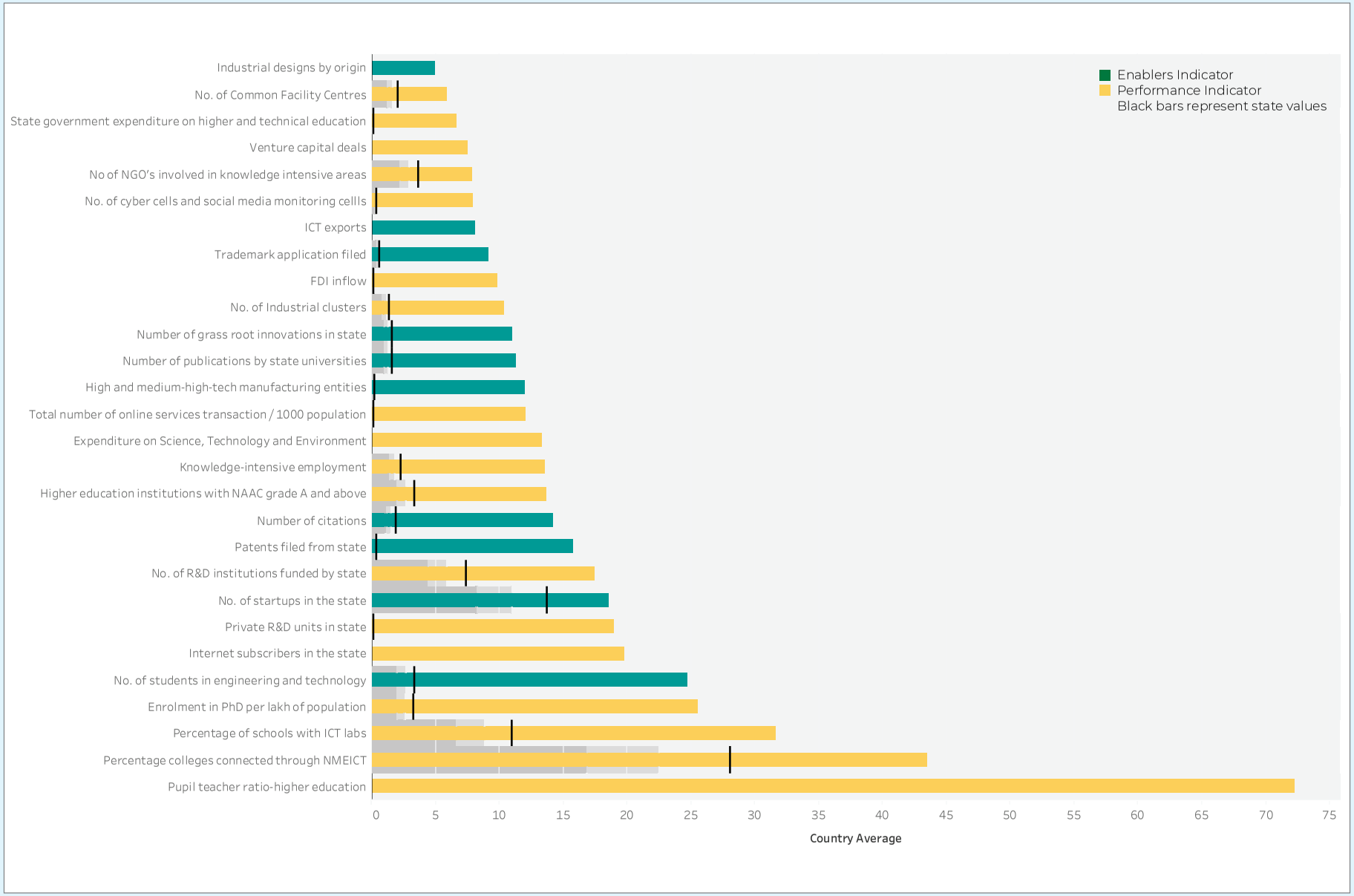
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

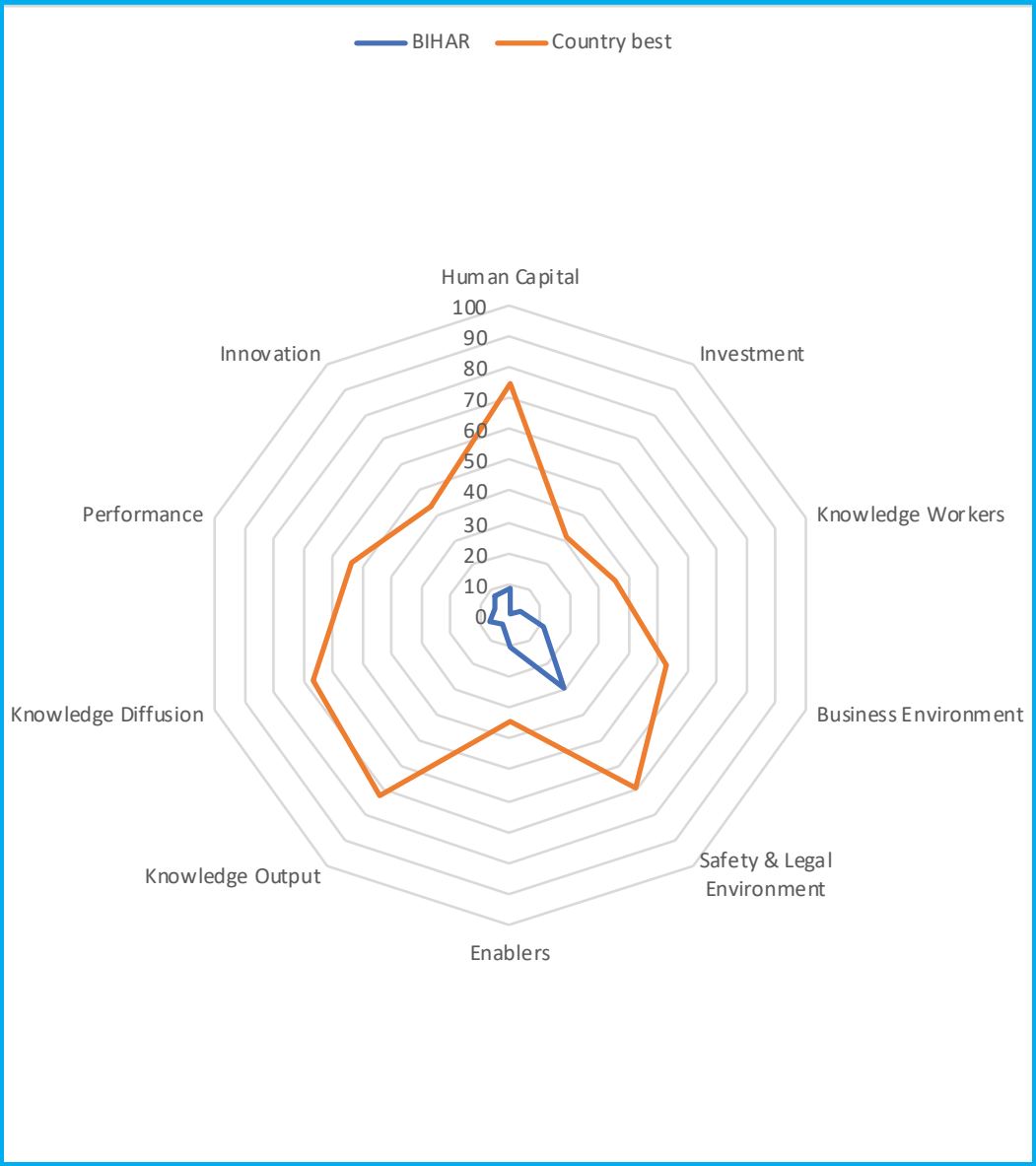
How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas

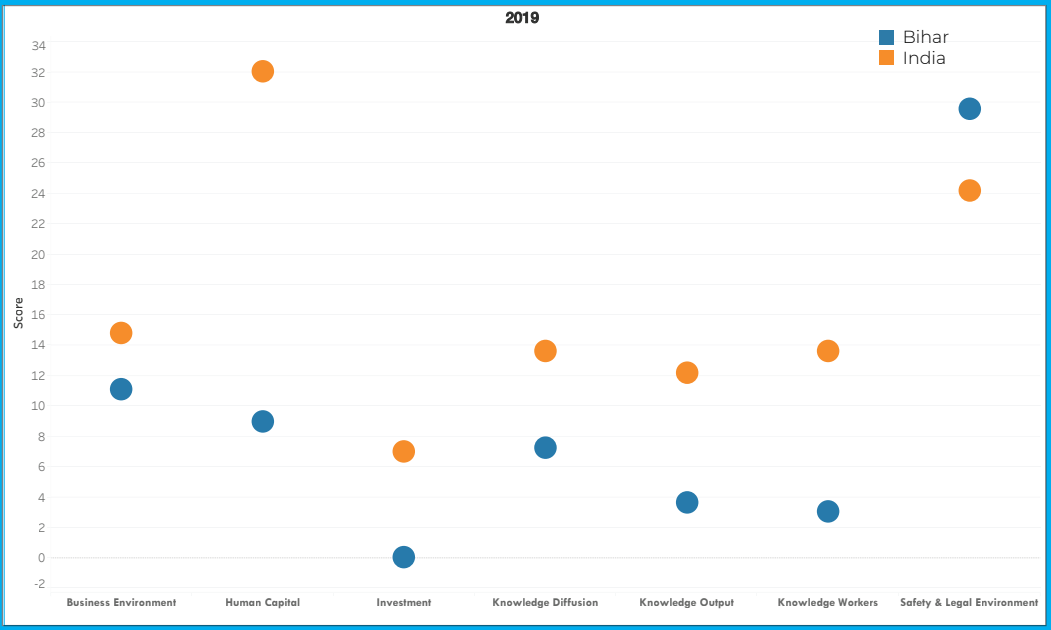

Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
Country Average

Rank: 16 | **Efficiency Ratio:** 0.52 | **Category:** Major States

Distance to Frontier



Comparative Analysis



CHHATISGARH

Rank: 15
Efficiency Ratio: 0.31
Category: Major States

Scorecard

CHHATTISGARH

India Innovation Index 2019

Innovation 8.06

Enablers 12.3

Performance 3.82

Human Capital 25.5

Enrolment in Ph.D	5.43
Higher education institutions with NAAC grade A and above	2.58
Number of students in engineering and technology	15.56
Percentage colleges connected through NMEICT	43.45
Percentage of schools with ICT labs	27.98
Pupil teacher ratio-higher education	76

Investment 1.12

Expenditure on Science, Technology & Environment	2.75
FDI inflow	0.96
State govt. expenditure on higher & technical education	2.43
Venture capital deals	0

Safety & Legal Environment 19.2

Information Technology/Intellectual Property Acts	88.46
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	10.42

Knowledge Workers 3.81

Knowledge-intensive employment	4.18
Number of NGO's involved in knowledge intensive areas	3.05
Number of R&D institutions funded by state	7.11
Private R&D units in state	1.72

Business Environment 11.88

Ease of Doing Business-Implementation Score	98.52
Internet subscribers in the state	4.56
Number of Common Facility Centers	0
Number of incubator centers in state	10.7
Number of Industrial clusters	0
Total number of online services transaction	15.16

Knowledge Output 3.86

Industrial designs by origin	0.08
Number of grass root innovations in state	3.25
Number of publications by state universities	0
Number of startups in the state	13.84
Patents filed from state	1.41
Trademark application filed	1.52

Knowledge Diffusion 3.78

High and medium-high-tech manufacturing entities	9.34
ICT exports	0.1
Number of citations	0
Number of registered GI	12.82

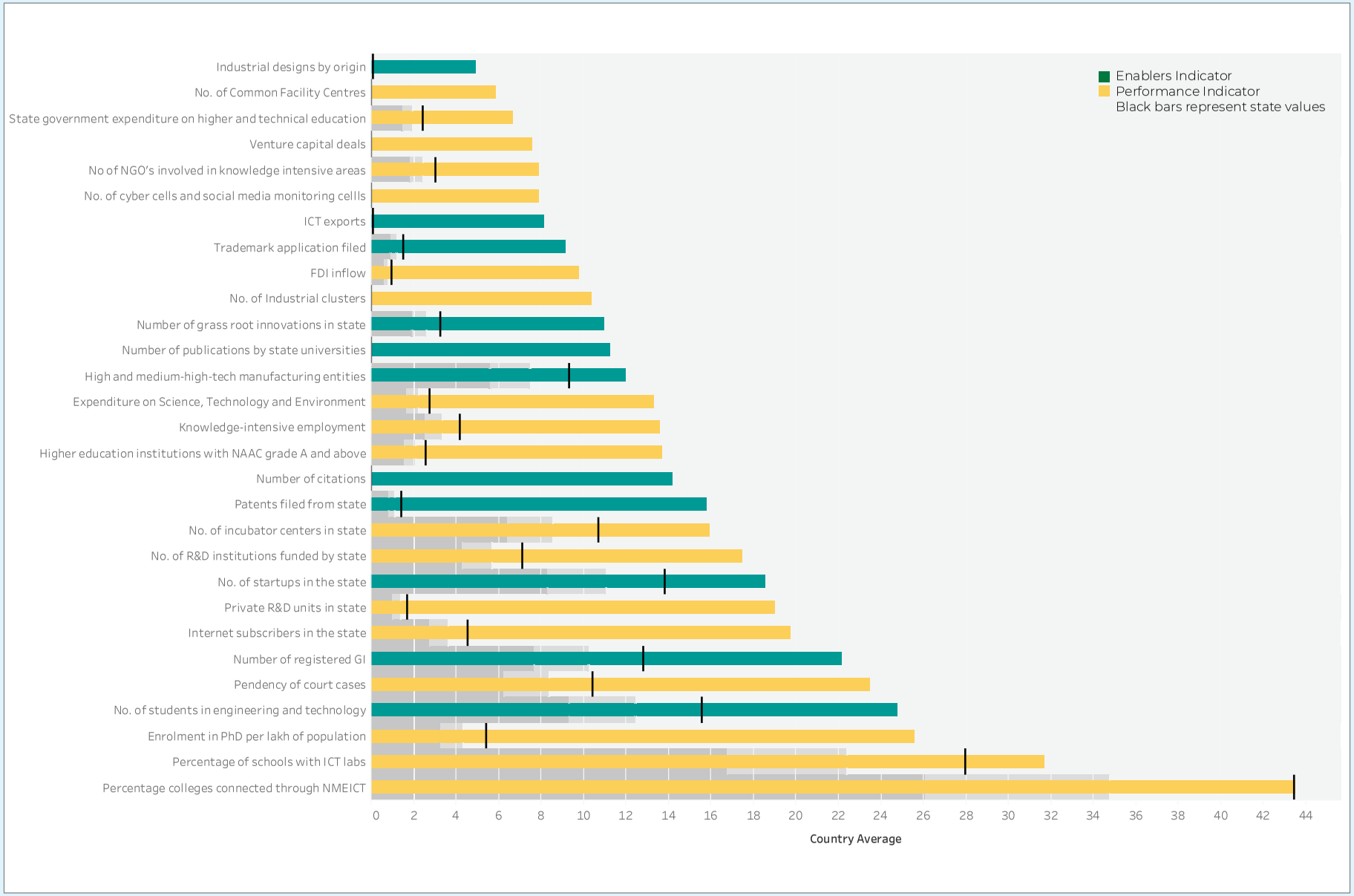
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

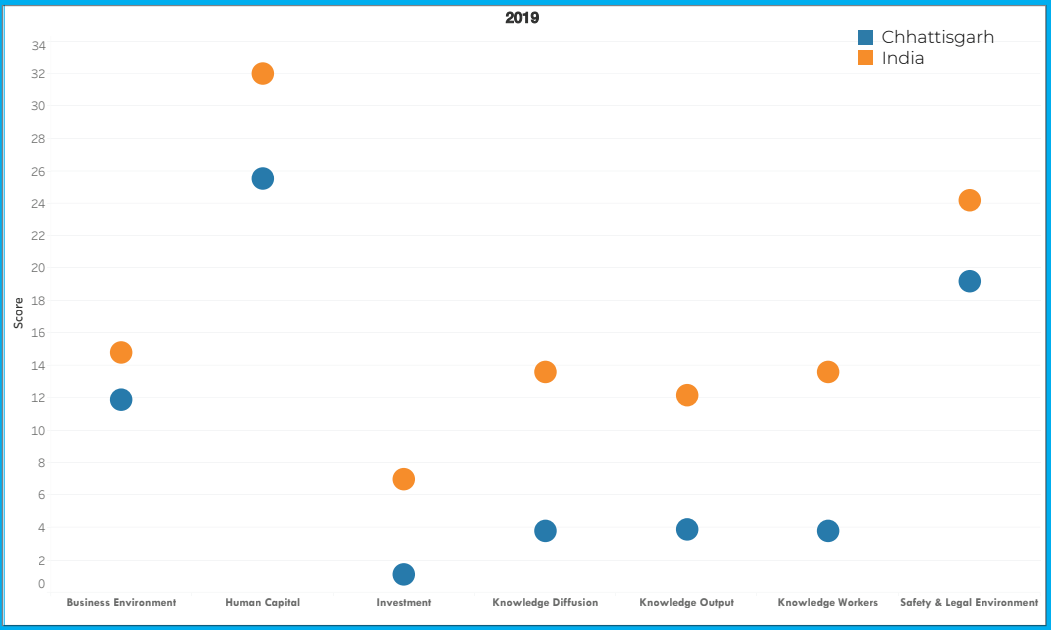
Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Enablers Indicator
Performance Indicator
Black bars represent state values
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44
Country Average

Rank: 15 | **Efficiency Ratio:** 0.31 | **Category:** Major States

Distance to Frontier

Comparative Analysis



DELHI

Rank: 1
Efficiency Ratio: 1.68
Category: UT / City States / Small States

Scorecard

DELHI

India Innovation Index 2019

Innovation 42.98

Enablers 32.13

Human Capital 50.96

Enrolment in Ph.D	100
Higher education institutions with NAAC grade A and above	55.93
Number of students in engineering and technology	8.93
Percentage colleges connected through NMEICT	43.54
Percentage of schools with ICT labs	35.23
Pupil teacher ratio-higher education	74

Investment 21.35

Expenditure on Science, Technology & Environment	1.49
FDI inflow	100
State govt. expenditure on higher & technical education	4.91
Venture capital deals	18.39

Safety & Legal Environment 19.44

Information Technology/Intellectual Property Acts	50
Number of cyber cells and social media monitoring cells	3.4
Pendency of court cases	23.92

Knowledge Workers 26.32

Knowledge-intensive employment	12.6
Number of NGO's involved in knowledge intensive areas	18.68
Number of R&D institutions funded by state	0
Private R&D units in state	87.23

Business Environment 42.57

Ease of Doing Business-Implementation Score	48.05
Internet subscribers in the state	100
Number of Common Facility Centers	0
Number of incubator centers in state	63.67
Number of Industrial clusters	0
Total number of online services transaction	11.15

Performance 53.84

Knowledge Output 72.2

Industrial designs by origin	17.62
Number of grass root innovations in state	9.89
Number of publications by state universities	40.2
Number of startups in the state	100
Patents filed from state	100
Trademark application filed	100

Knowledge Diffusion 35.48

High and medium-high-tech manufacturing entities	61.63
ICT exports	1.79
Number of citations	59.54
Number of registered GI	2.56

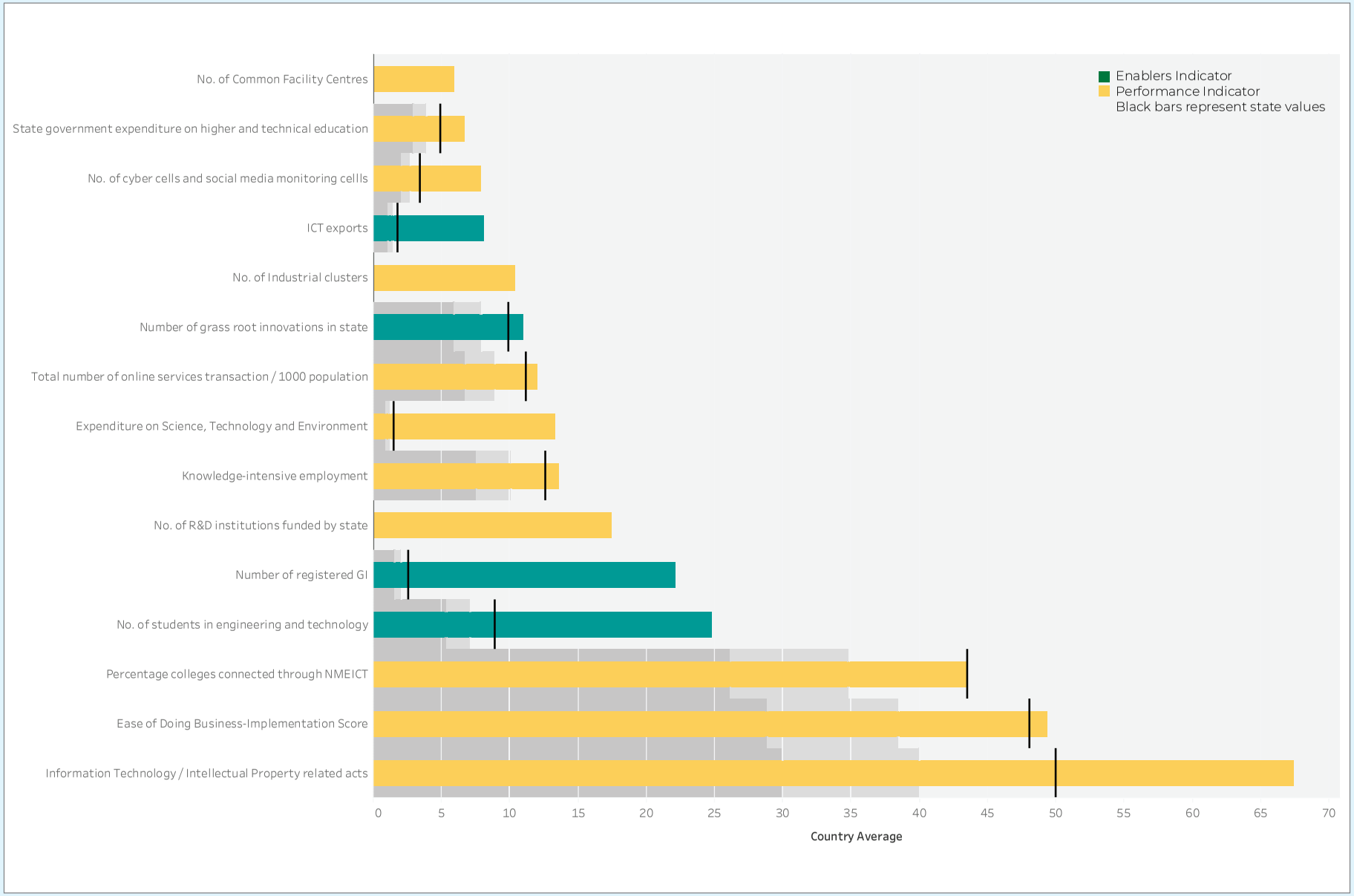
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

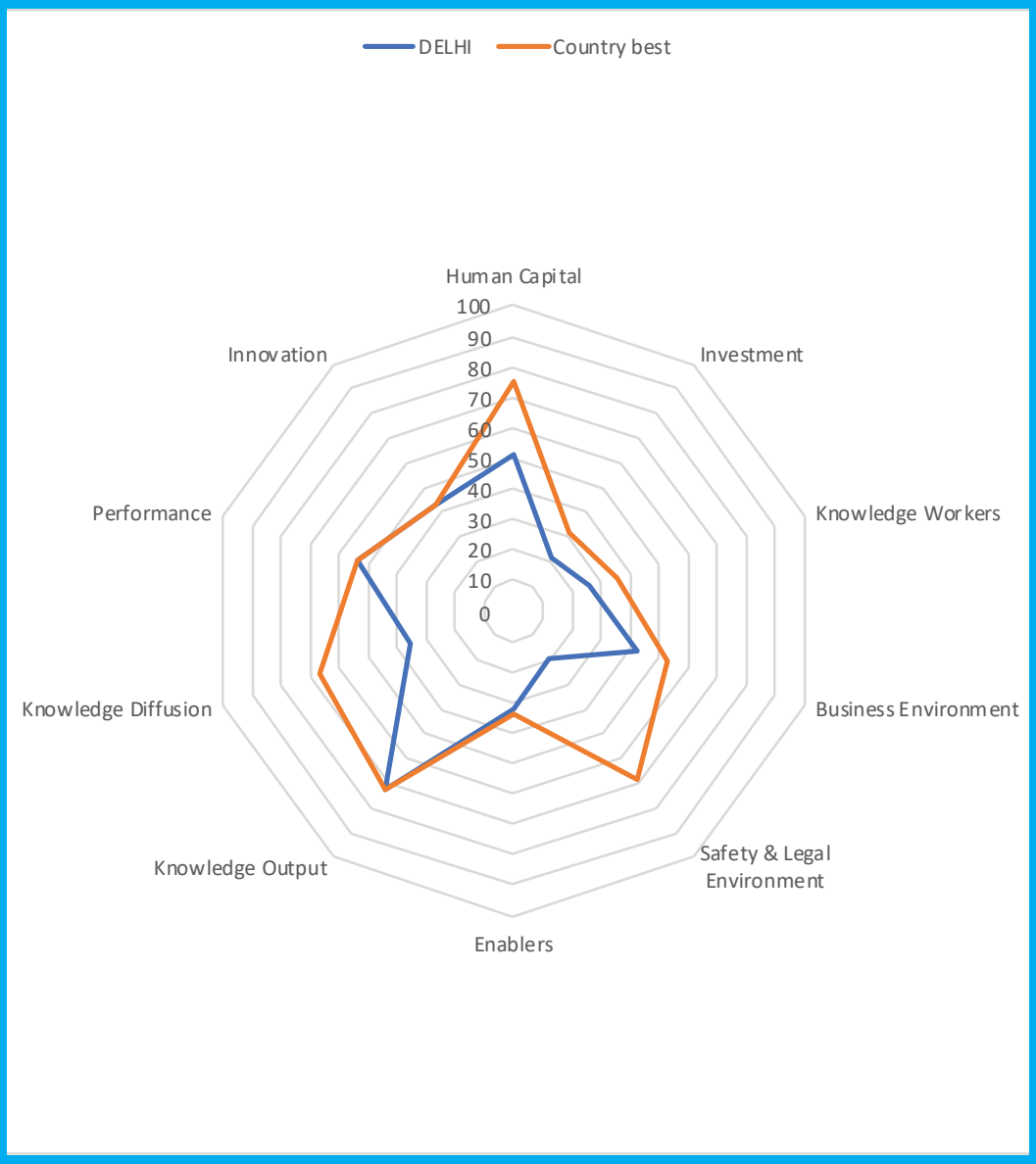
How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas

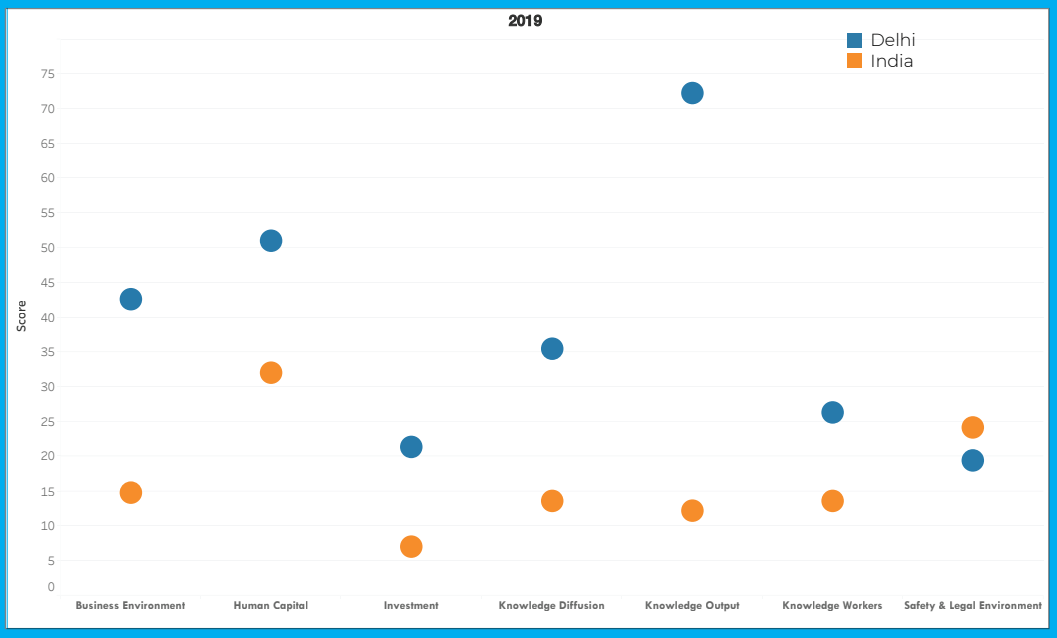

Enablers Indicator
Performance Indicator
Black bars represent state values
No. of Common Facility Centres
State government expenditure on higher and technical education
No. of cyber cells and social media monitoring cellls
ICT exports
No. of Industrial clusters
Number of grass root innovations in state
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
No. of R&D institutions funded by state
Number of registered GI
No. of students in engineering and technology
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Country Average

Rank: 1 | **Efficiency Ratio:** 1.68 | **Category:** UT / City States / Small States

Distance to Frontier



Comparative Analysis



GOA

Rank: 3
Efficiency Ratio: 0.32
Category: UT / City States / Small States

Scorecard

GOA

India Innovation Index 2019

Innovation 22.49

Enablers 34.01

Human Capital 43.79

Enrolment in Ph.D	9.13
Higher education institutions with NAAC grade A and above	45.45
Number of students in engineering and technology	32.05
Percentage colleges connected through NMEICT	31.82
Percentage of schools with ICT labs	76.25
Pupil teacher ratio-higher education	92

Investment 15.82

Expenditure on Science, Technology & Environment	67.45
FDI inflow	14.9
State govt. expenditure on higher & technical education	16.23
Venture capital deals	0

Safety & Legal Environment 24.85

Information Technology/Intellectual Property Acts	46.15
Number of cyber cells and social media monitoring cells	13.05
Pendency of court cases	28.64

Knowledge Workers 32.79

Knowledge-intensive employment	45.74
Number of NGO's involved in knowledge intensive areas	3.03
Number of R&D institutions funded by state	13.84
Private R&D units in state	69.35

Business Environment 52.81

Ease of Doing Business-Implementation Score	18.13
Internet subscribers in the state	27.46
Number of Common Facility Centers	100
Number of incubator centers in state	100
Number of Industrial clusters	100
Total number of online services transaction	6.81

Performance 10.98

Knowledge Output 18.04

Industrial designs by origin	2.47
Number of grass root innovations in state	0
Number of publications by state universities	0.88
Number of startups in the state	33.68
Patents filed from state	31.05
Trademark application filed	18.96

Knowledge Diffusion 3.92

High and medium-high-tech manufacturing entities	8.74
ICT exports	1.09
Number of citations	1.52
Number of registered GI	2.56

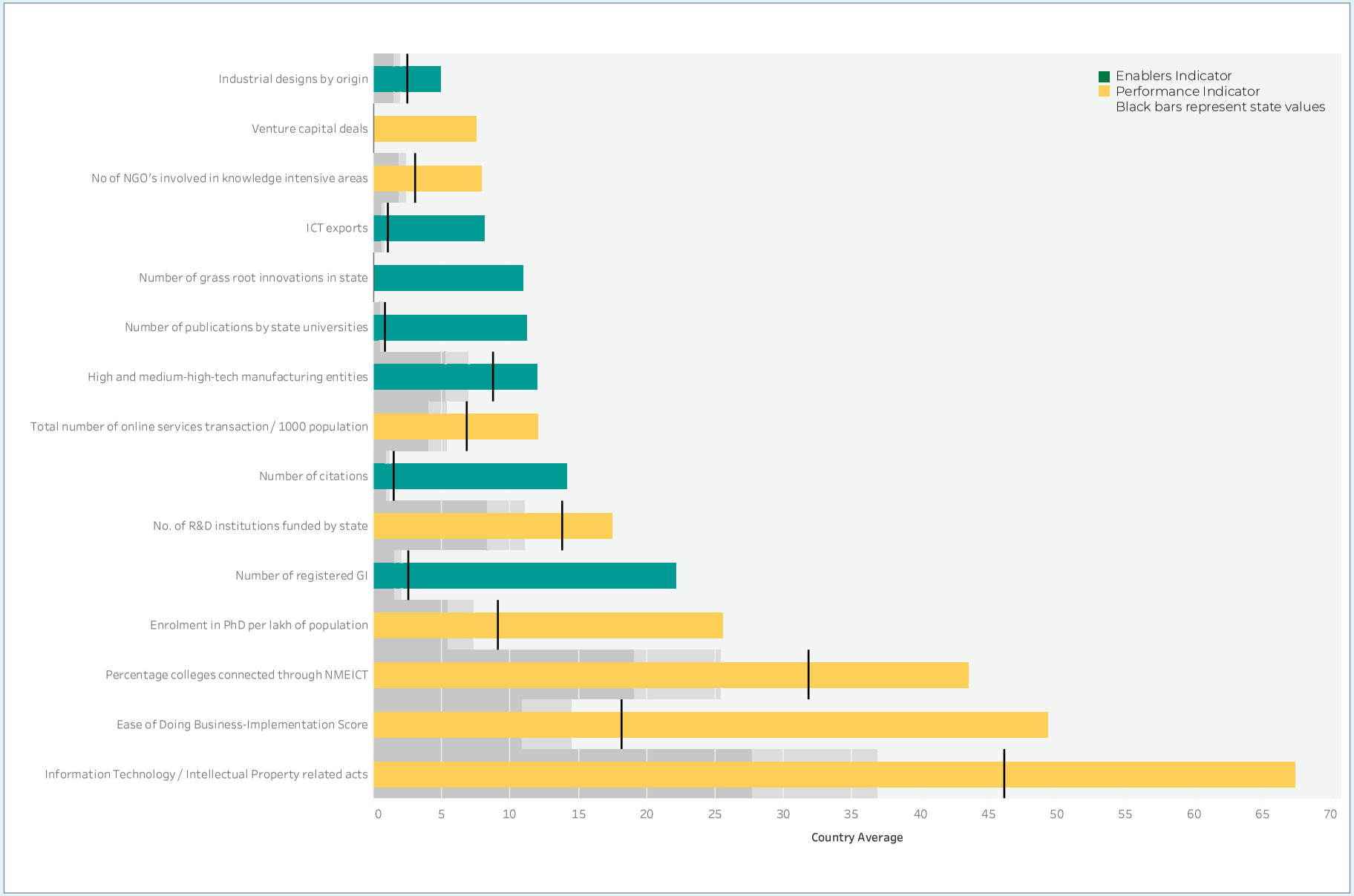
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

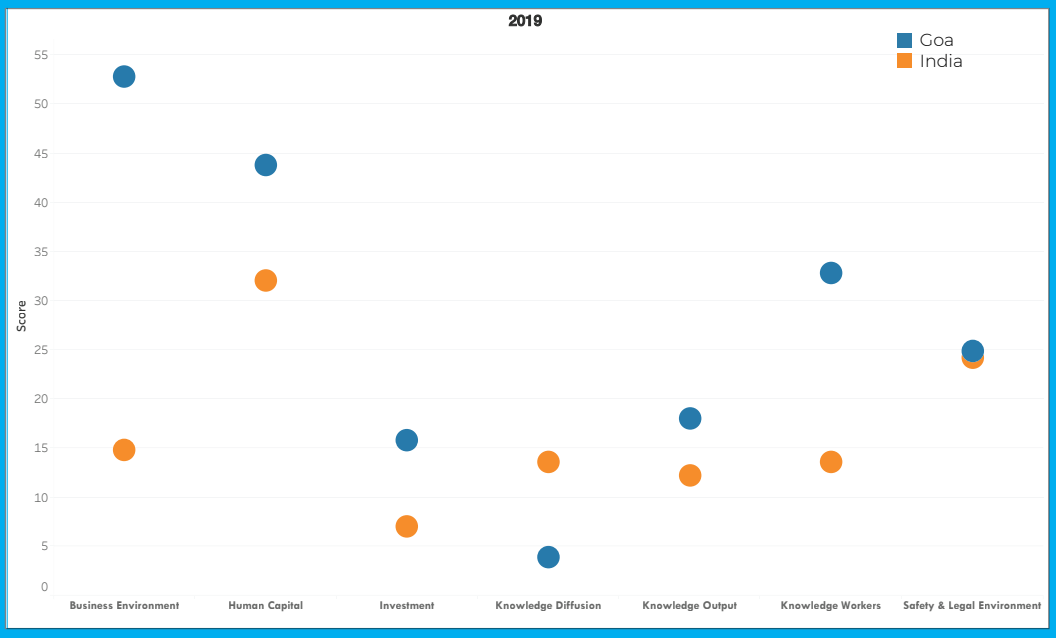
Focus Areas


Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
Venture capital deals
No of NGO's involved in knowledge intensive areas
ICT exports
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Number of citations
No. of R&D institutions funded by state
Number of registered GI
Enrolment in PhD per lakh of population
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Country Average

Rank: 3 | **Efficiency Ratio:** 0.32 | **Category:** UT / City States / Small States

Distance to Frontier

Comparative Analysis



GUJARAT

Rank: 9
Efficiency Ratio: 0.47
Category: Major States

Scorecard

GUJARAT

India Innovation Index 2019

Innovation 16.86

Enablers 22.9

Human Capital 36.99

Enrolment in Ph.D	10.34
Higher education institutions with NAAC grade A and above	4.62
Number of students in engineering and technology	26.2
Percentage colleges connected through NMEICT	77.62
Percentage of schools with ICT labs	62.43
Pupil teacher ratio-higher education	70

Investment 7.54

Expenditure on Science, Technology & Environment	10.44
FDI inflow	30.34
State govt. expenditure on higher & technical education	2.54
Venture capital deals	3.25

Safety & Legal Environment 30.52

Information Technology/Intellectual Property Acts	76.92
Number of cyber cells and social media monitoring cells	0.63
Pendency of court cases	43.43

Knowledge Workers 21.39

Knowledge-intensive employment	22.73
Number of NGO's involved in knowledge intensive areas	3.36
Number of R&D institutions funded by state	38.42
Private R&D units in state	25.98

Business Environment 18.05

Ease of Doing Business-Implementation Score	99.42
Internet subscribers in the state	25.25
Number of Common Facility Centers	2.11
Number of incubator centers in state	13.74
Number of Industrial clusters	4.83
Total number of online services transaction	28.07

Performance 10.83

Knowledge Output 11.01

Industrial designs by origin	4.45
Number of grass root innovations in state	9.39
Number of publications by state universities	1.4
Number of startups in the state	17.17
Patents filed from state	16.36
Trademark application filed	12.86

Knowledge Diffusion 10.65

High and medium-high-tech manufacturing entities	8.03
ICT exports	1.52
Number of citations	3.96
Number of registered GI	33.33

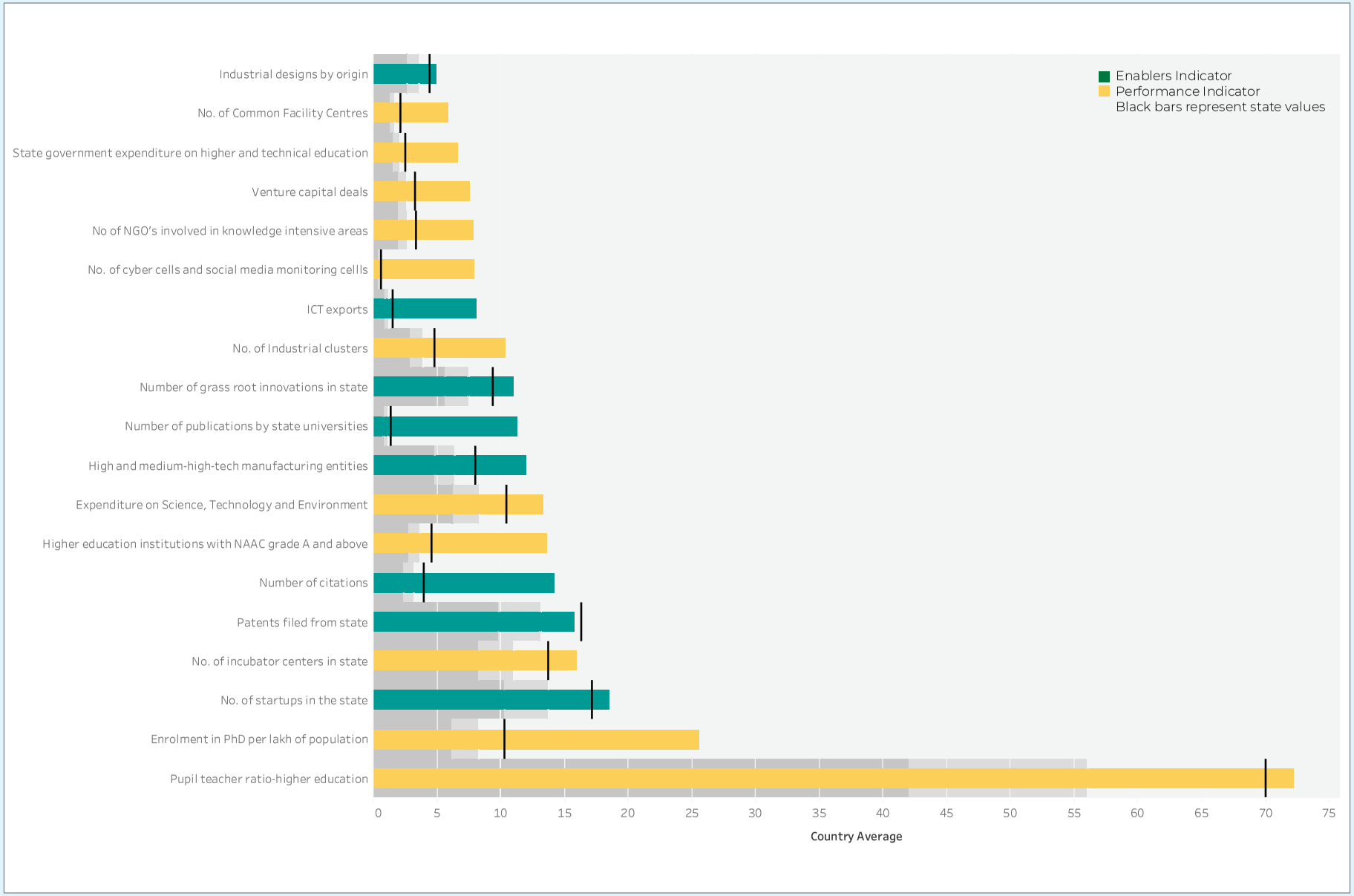
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Expenditure on Science, Technology and Environment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of startups in the state
Enrolment in PhD per lakh of population
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
5
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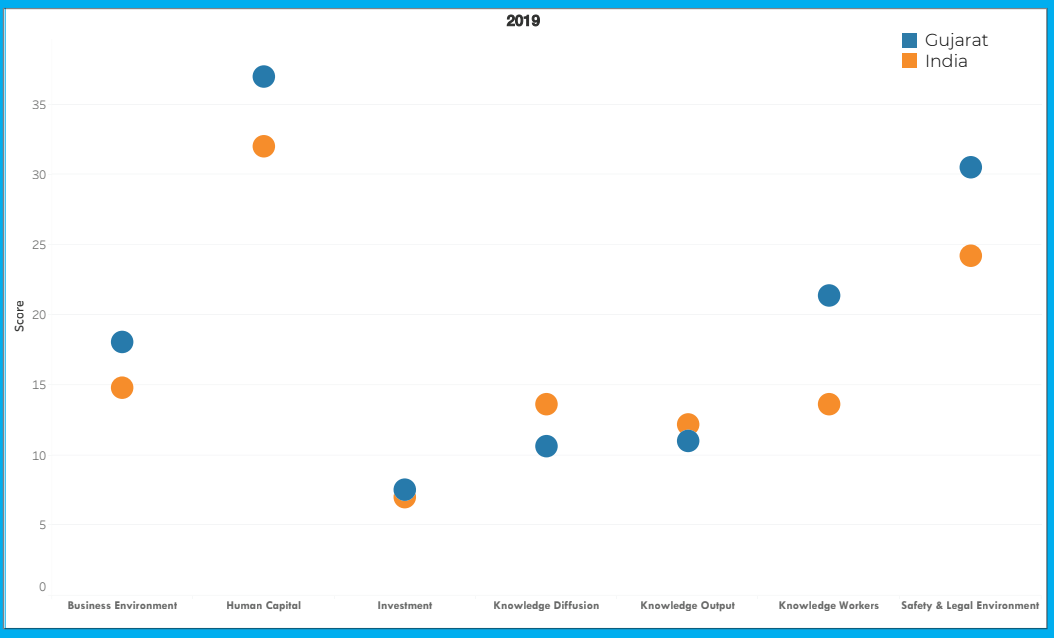
60
65
70
75
Country Average

Distance to Frontier

Comparative Analysis



HARYANA

Rank: 5
Efficiency Ratio: 0.64
Category: Major States

Scorecard

HARYANA

India Innovation Index 2019

Innovation 20.55

Enablers 25.1

Human Capital 35.39

Enrolment in Ph.D	14.68
Higher education institutions with NAAC grade A and above	7.15
Number of students in engineering and technology	46.53
Percentage colleges connected through NMEICT	50.87
Percentage of schools with ICT labs	53.23
Pupil teacher ratio-higher education	72

Investment 12.81

Expenditure on Science, Technology & Environment	2.74
FDI inflow	0.06
State govt. expenditure on higher & technical education	3.65
Venture capital deals	43.62

Safety & Legal Environment 39.96

Information Technology/Intellectual Property Acts	34.62
Number of cyber cells and social media monitoring cells	36.78
Pendency of court cases	45.78

Knowledge Workers 15.4

Knowledge-intensive employment	12.09
Number of NGO's involved in knowledge intensive areas	2.67
Number of R&D institutions funded by state	14.34
Private R&D units in state	37.99

Business Environment 21.94

Ease of Doing Business-Implementation Score	98.14
Internet subscribers in the state	19.21
Number of Common Facility Centers	7.22
Number of incubator centers in state	19.58
Number of Industrial clusters	34.52
Total number of online services transaction	10.18

Performance 16.01

Knowledge Output 15.95

Industrial designs by origin	2.56
Number of grass root innovations in state	8.73
Number of publications by state universities	0.93
Number of startups in the state	29.55
Patents filed from state	27.35
Trademark application filed	14.75

Knowledge Diffusion 16.07

High and medium-high-tech manufacturing entities	43.2
ICT exports	29.95
Number of citations	0.31
Number of registered GI	2.56

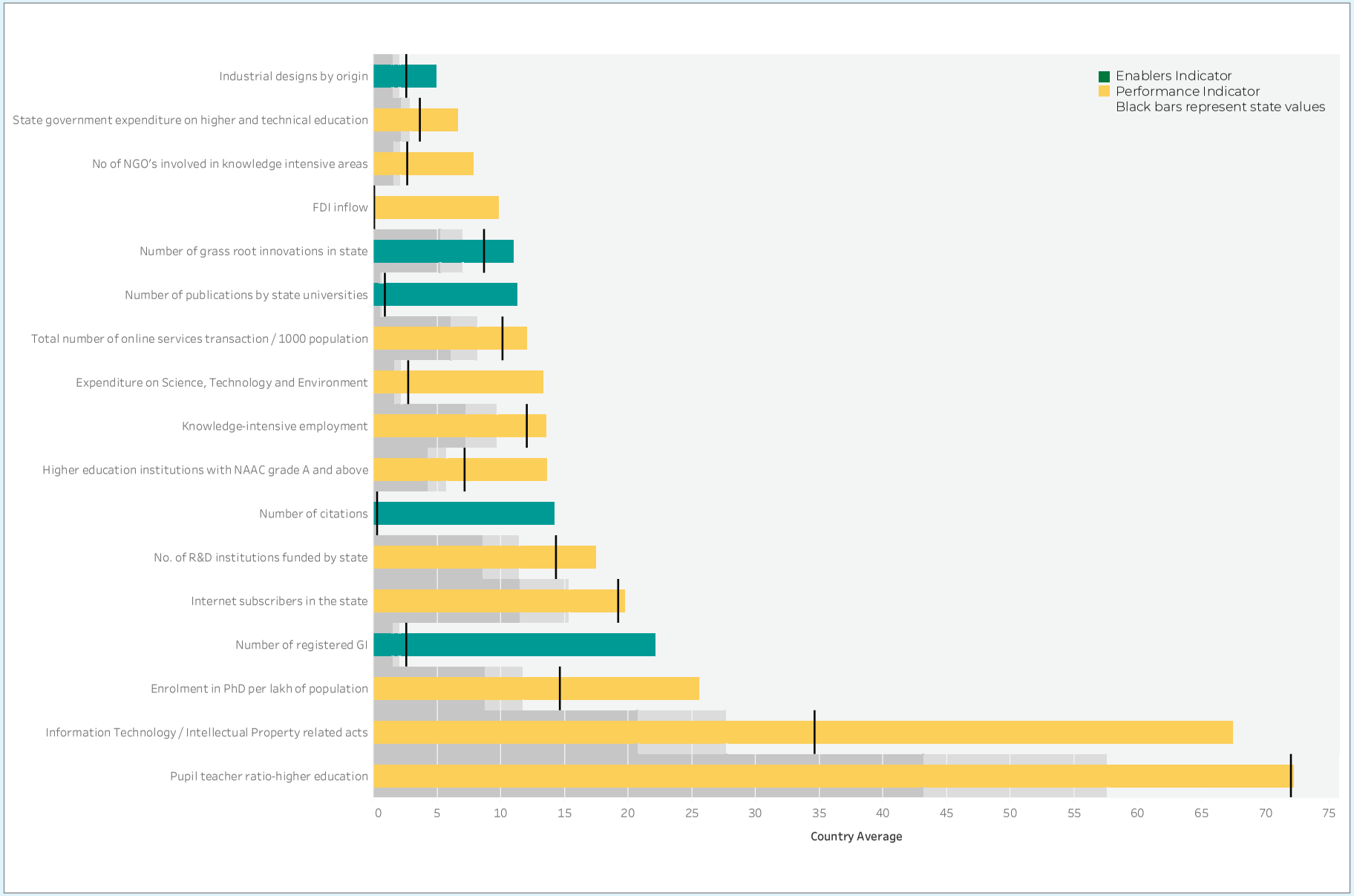
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

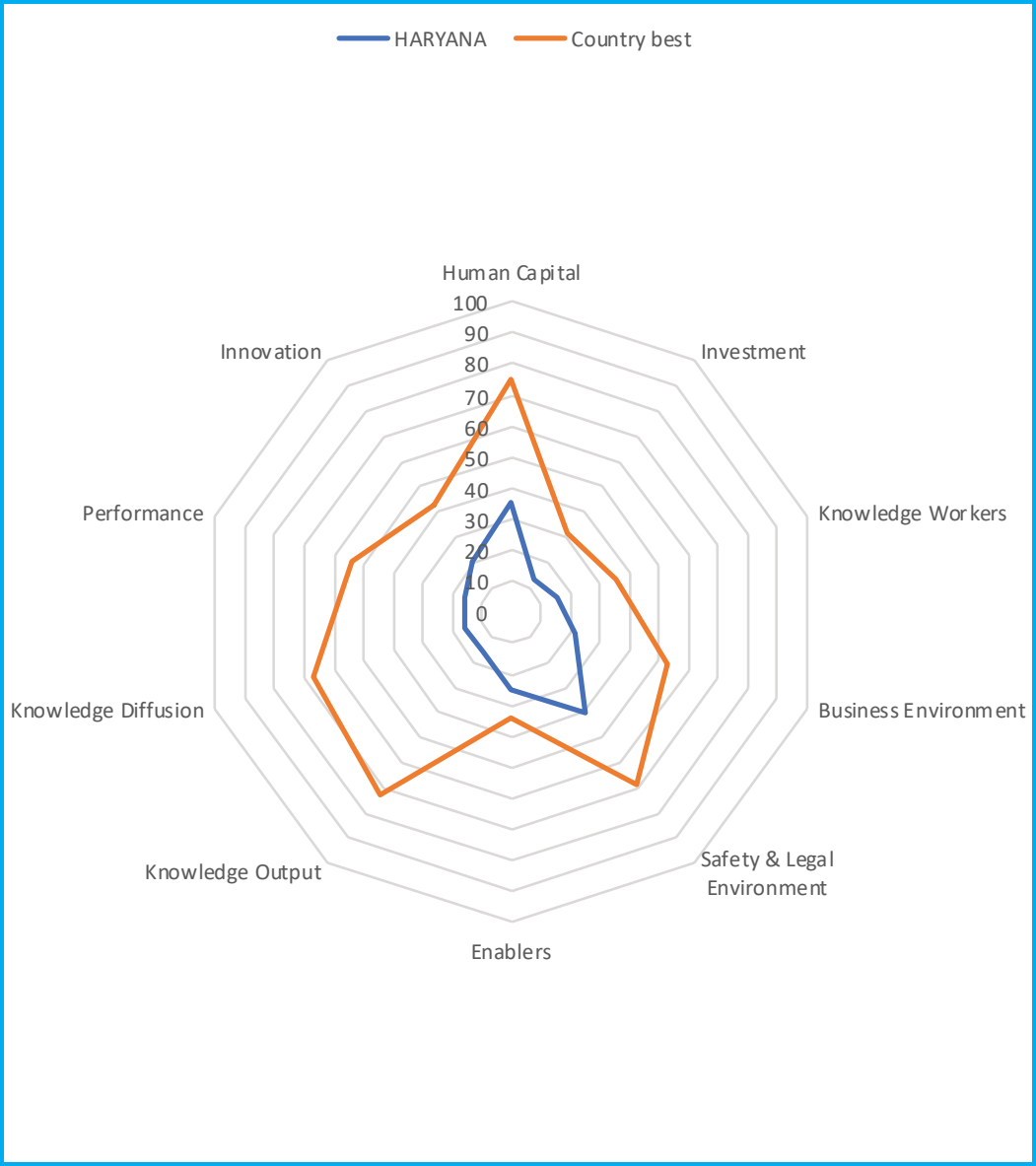
How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas

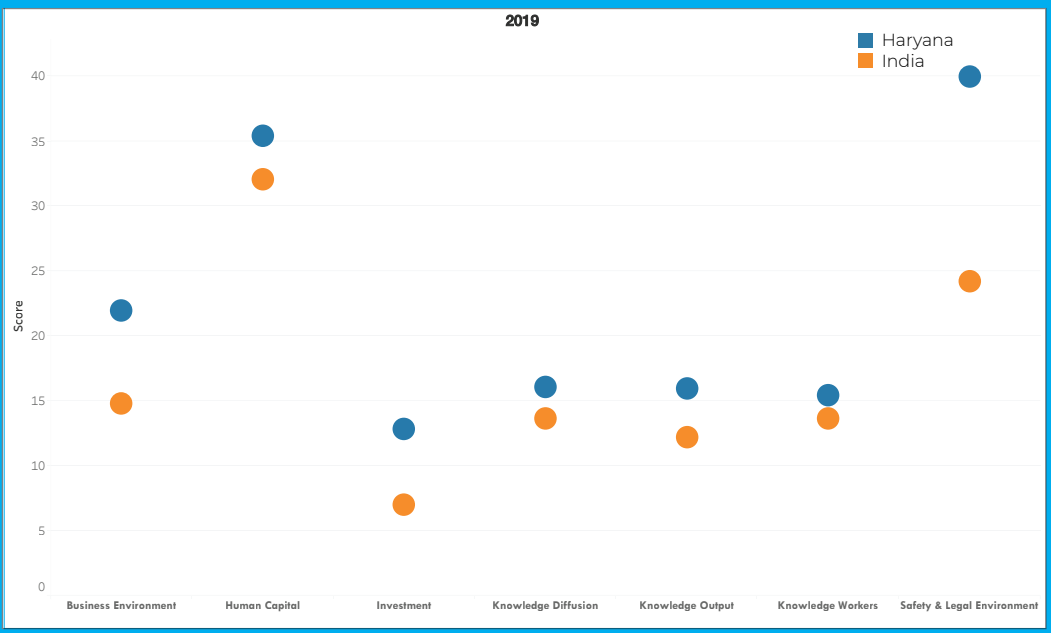

Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
FDI inflow
Number of grass root innovations in state
Number of publications by state universities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
No. of R&D institutions funded by state
Internet subscribers in the state
Number of registered GI
Enrolment in PhD per lakh of population
Information Technology / Intellectual Property related acts
Pupil teacher ratio-higher education
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
Country Average

Rank: 5 | **Efficiency Ratio:** 0.64 | **Category:** Major States

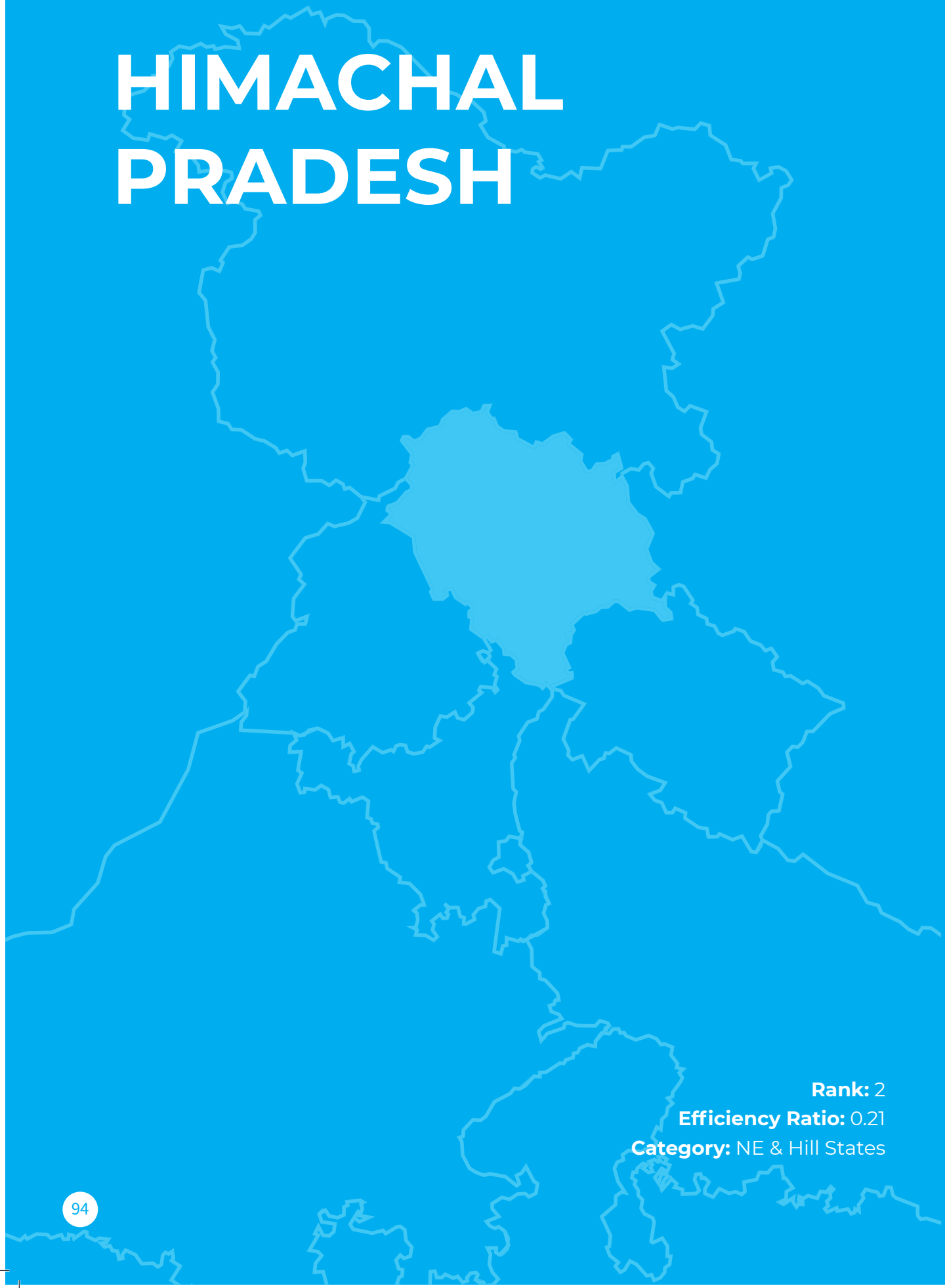
Distance to Frontier



Comparative Analysis



HIMACHAL PRADESH



Rank: 2
Efficiency Ratio: 0.21
Category: NE & Hill States

Scorecard

HIMACHAL PRADESH

India Innovation Index 2019

Innovation 13.76

Enablers	22.68			**Performance**	4.84
Human Capital	33.18	**Knowledge Workers**	35.24	**Knowledge Output**	5.72
Enrolment in Ph.D	29.46	Knowledge-intensive employment	39.74	Industrial designs by origin	0.79
Higher education institutions with NAAC grade A and above	2.61	Number of NGO's involved in knowledge intensive areas	3.86	Number of grass root innovations in state	18.14
Number of students in engineering and technology	25.43	Number of R&D institutions funded by state	100	Number of publications by state universities	0
Percentage colleges connected through NMEICT	42.78	Private R&D units in state	5.13	Number of startups in the state	9.63
Percentage of schools with ICT labs	56.93			Patents filed from state	9.1
Pupil teacher ratio-higher education	76			Trademark application filed	3.84
Investment	1.67	**Business Environment**	21.44	**Knowledge Diffusion**	3.97
Expenditure on Science, Technology & Environment	4	Ease of Doing Business-Implementation Score	66.19	High and medium-high-tech manufacturing entities	2.41
FDI inflow	0.05	Internet subscribers in the state	34.2	ICT exports	0.04
State govt. expenditure on higher & technical education	4.53	Number of Common Facility Centers	0	Number of citations	0
Venture capital deals	0	Number of incubator centers in state	23	Number of registered GI	15.38
Safety & Legal Environment	21.88	Number of Industrial clusters	0		
Information Technology/Intellectual Property Acts	69.23	Total number of online services transaction	24.36		
Number of cyber cells and social media monitoring cells	2.77				
Pendency of court cases	22.47				

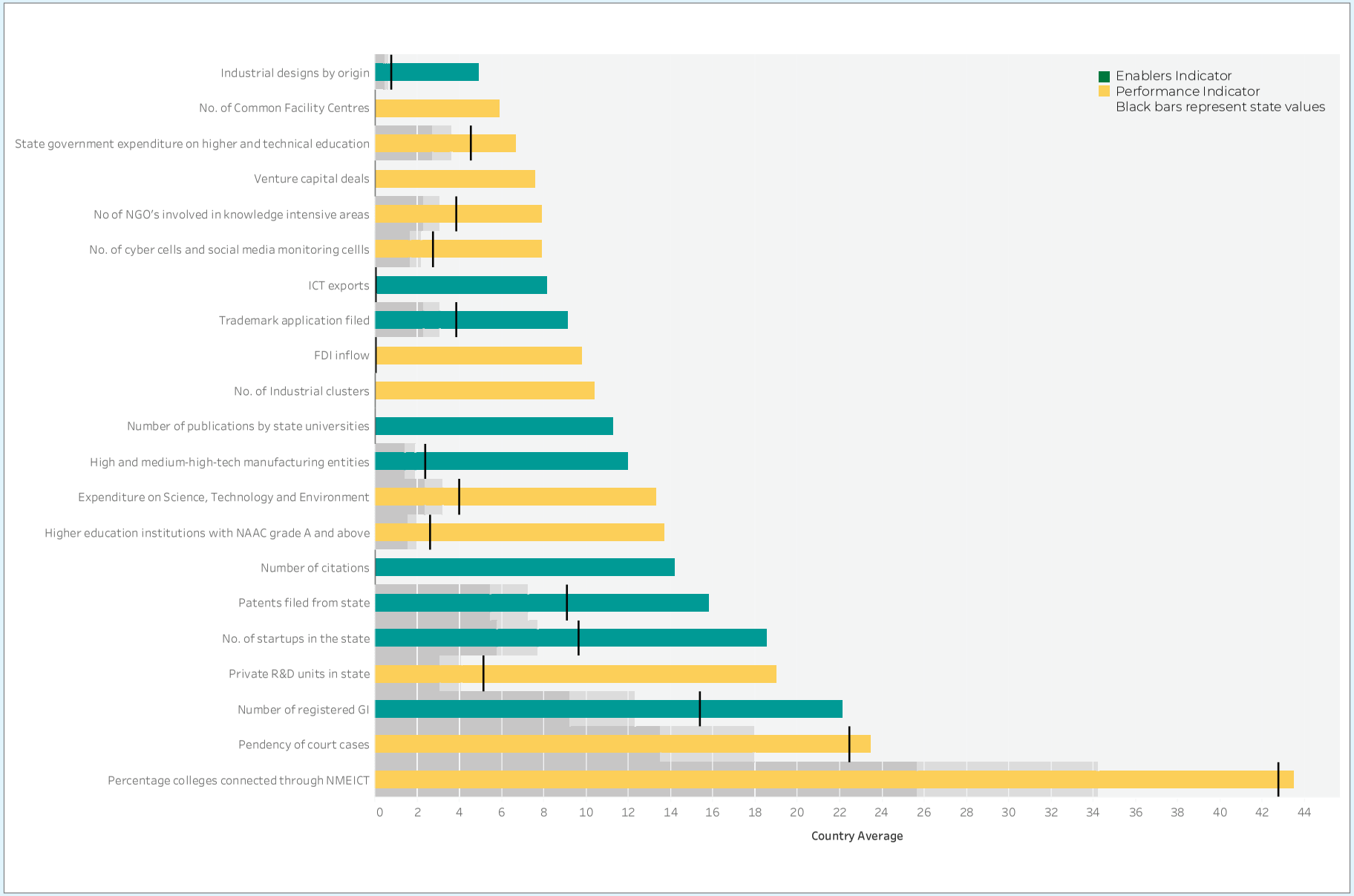
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

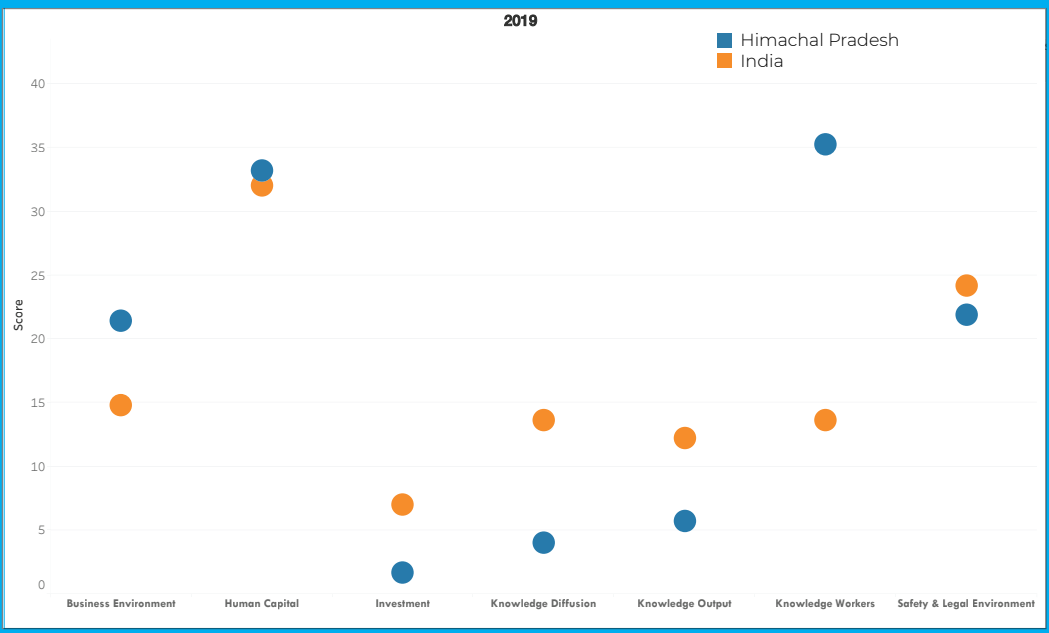
How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of publications by state universities
High and medium-high-tech manufacturing entities
Expenditure on Science, Technology and Environment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of startups in the state
Private R&D units in state
Number of registered GI
Pendency of court cases
Percentage colleges connected through NMEICT
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44
Country Average

Distance to Frontier

Comparative Analysis



JAMMU & KASHMIR

Rank: 5
Efficiency Ratio: 0.35
Category: NE & Hill States

JAMMU & KASHMIR

India Innovation Index 2019

Innovation 11.07

Enablers 16.45

Human Capital	**25.89**
Enrolment in Ph.D	23.68
Higher education institutions with NAAC grade A and above	8.29
Number of students in engineering and technology	8.87
Percentage colleges connected through NMEICT	41.93
Percentage of schools with ICT labs	13.8
Pupil teacher ratio-higher education	70
Investment	**2.20**
Expenditure on Science, Technology & Environment	14.62
FDI inflow	0.02
State govt. expenditure on higher & technical education	0.43
Venture capital deals	0
Safety & Legal Environment	**27.68**
Information Technology/Intellectual Property Acts	92.31
Number of cyber cells and social media monitoring cells	6.07
Pendency of court cases	23.55

Knowledge Workers	**15.48**
Knowledge-intensive employment	12.47
Number of NGO's involved in knowledge intensive areas	10.21
Number of R&D institutions funded by state	45.08
Private R&D units in state	0.35
Business Environment	**11.01**
Ease of Doing Business-Implementation Score	0
Internet subscribers in the state	20.98
Number of Common Facility Centers	9.87
Number of incubator centers in state	11.49
Number of Industrial clusters	11.63
Total number of online services transaction	0.77

Performance 5.68

Knowledge Output	**5.8**
Industrial designs by origin	0.1
Number of grass root innovations in state	9.93
Number of publications by state universities	2.14
Number of startups in the state	15.48
Patents filed from state	6.1
Trademark application filed	1.45
Knowledge Diffusion	**5.56**
High and medium-high-tech manufacturing entities	0
ICT exports	0.02
Number of citations	2.35
Number of registered GI	20.51

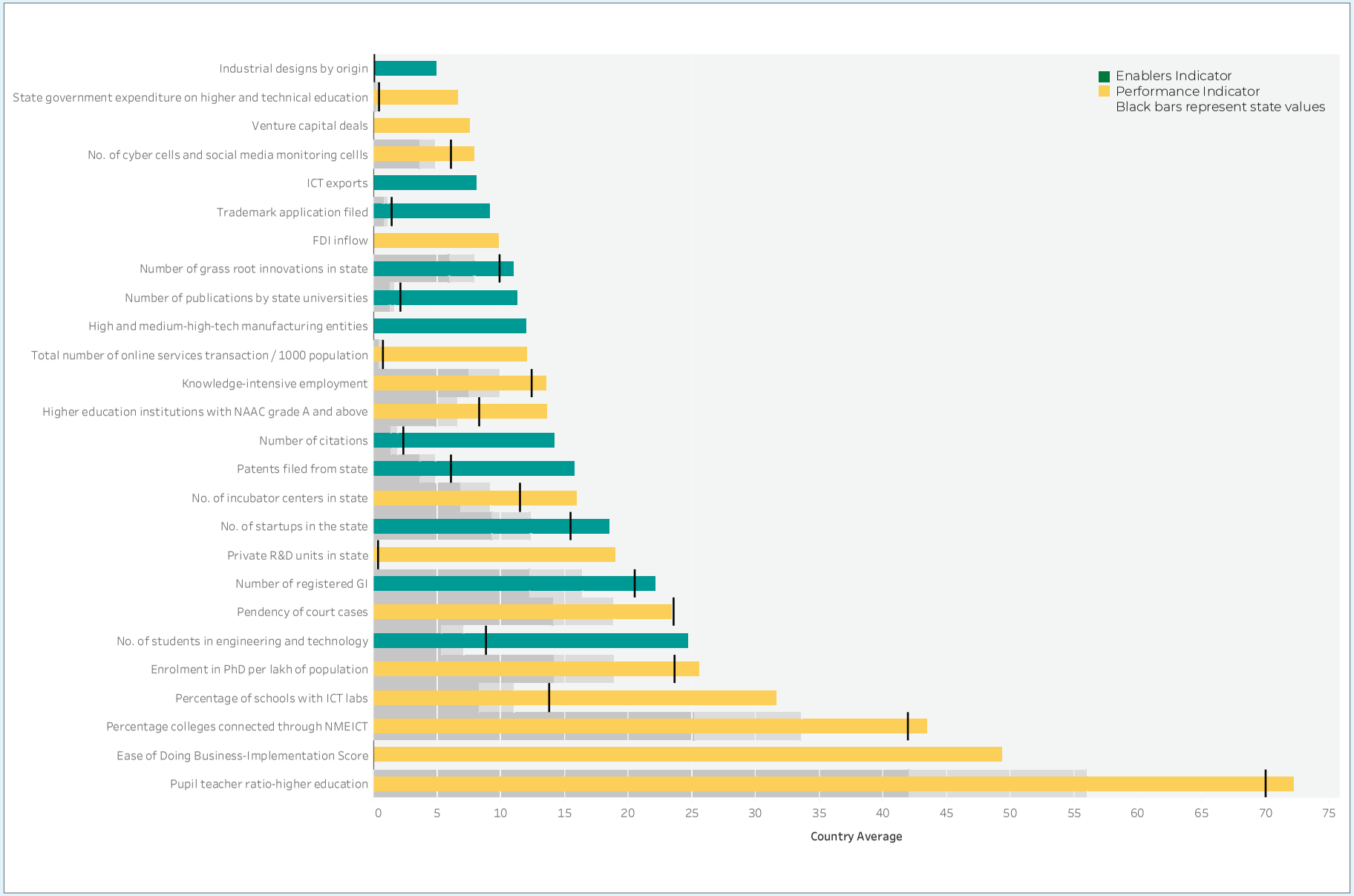
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
State government expenditure on higher and technical education
Venture capital deals
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of startups in the state
Private R&D units in state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
5
10
15
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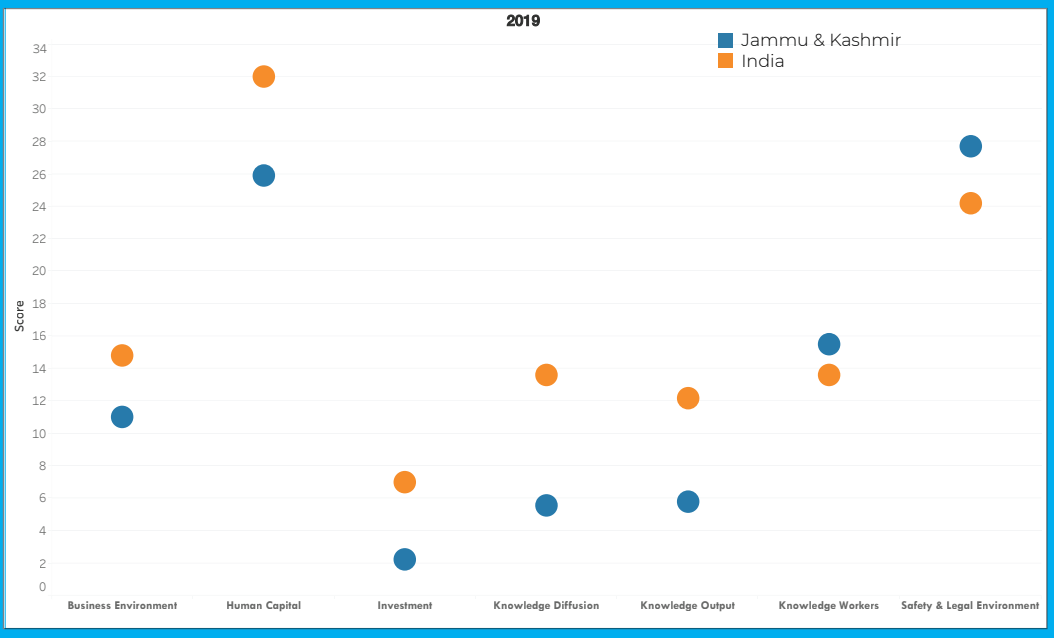
25
30
35
40
45
50
55
60
65
70
75
Country Average

Rank: 5 | **Efficiency Ratio:** 0.35 | **Category:** NE & Hill States

Distance to Frontier

Comparative Analysis



JHARKHAND

Rank: 17
Efficiency Ratio: 0.6
Category: Major States

Scorecard

JHARKHAND

India Innovation Index 2019

Innovation 6.2

Enablers 7.75

Human Capital 11.24

Enrolment in Ph.D	6.48
Higher education institutions with NAAC grade A and above	2.77
Number of students in engineering and technology	6.65
Percentage colleges connected through NMEICT	29.32
Percentage of schools with ICT labs	10.7
Pupil teacher ratio-higher education	10

Investment 0.51

Expenditure on Science, Technology & Environment	0
FDI inflow	0.16
State govt. expenditure on higher & technical education	2
Venture capital deals	0

Safety & Legal Environment 16.69

Information Technology/Intellectual Property Acts	65.38
Number of cyber cells and social media monitoring cells	0.58
Pendency of court cases	13.4

Knowledge Workers 2.73

Knowledge-intensive employment	4.36
Number of NGO's involved in knowledge intensive areas	2.9
Number of R&D institutions funded by state	2.45
Private R&D units in state	1.07

Business Environment 7.6

Ease of Doing Business-Implementation Score	97.76
Internet subscribers in the state	0
Number of Common Facility Centers	0
Number of incubator centers in state	11.32
Number of Industrial clusters	0
Total number of online services transaction	0.38

Performance 4.65

Knowledge Output 6.25

Industrial designs by origin	0.04
Number of grass root innovations in state	2.52
Number of publications by state universities	9.11
Number of startups in the state	14.13
Patents filed from state	6.82
Trademark application filed	0.68

Knowledge Diffusion 3.06

High and medium-high-tech manufacturing entities	1.98
ICT exports	0.01
Number of citations	9.78
Number of registered GI	0

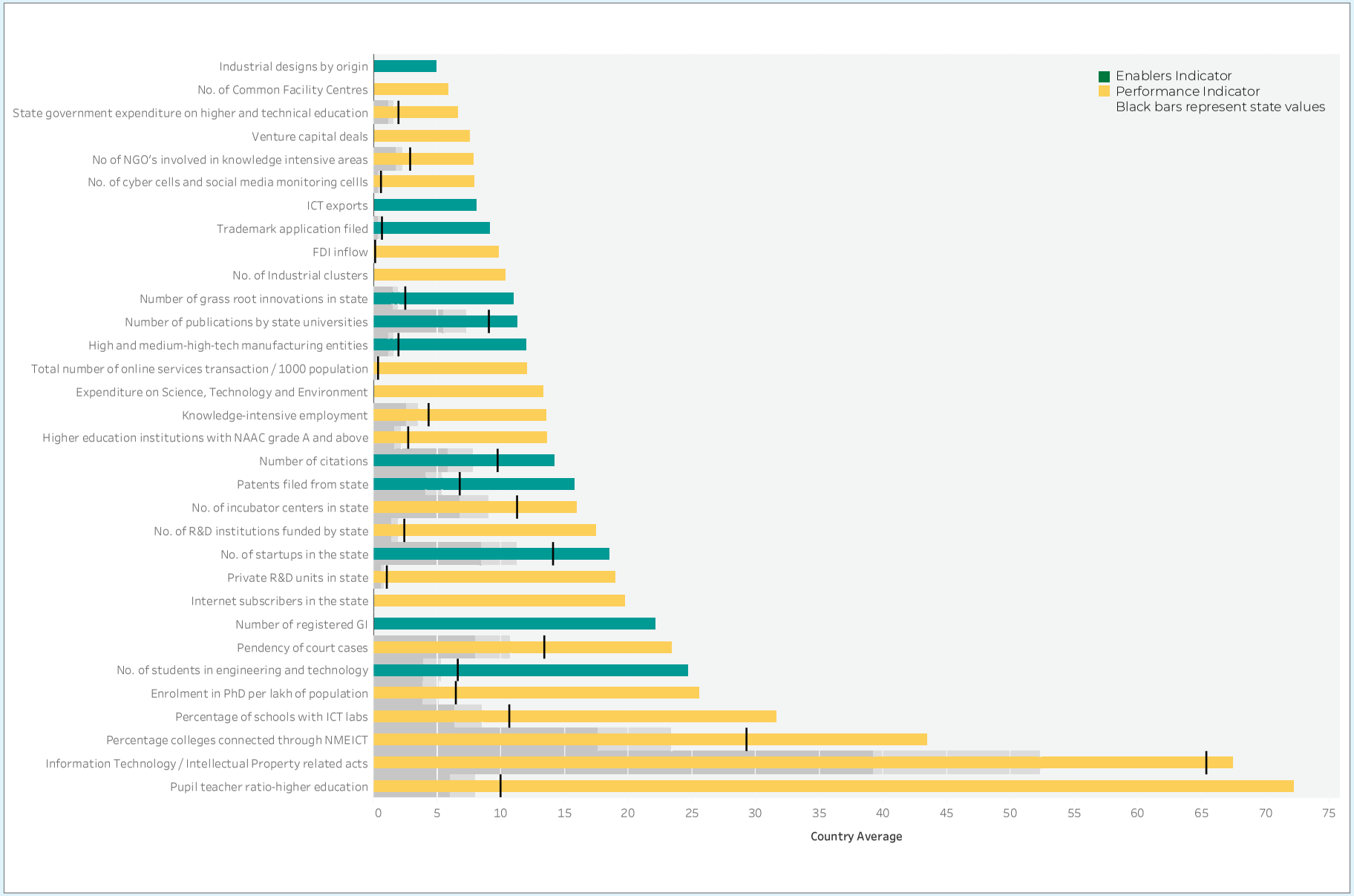
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Information Technology / Intellectual Property related acts
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
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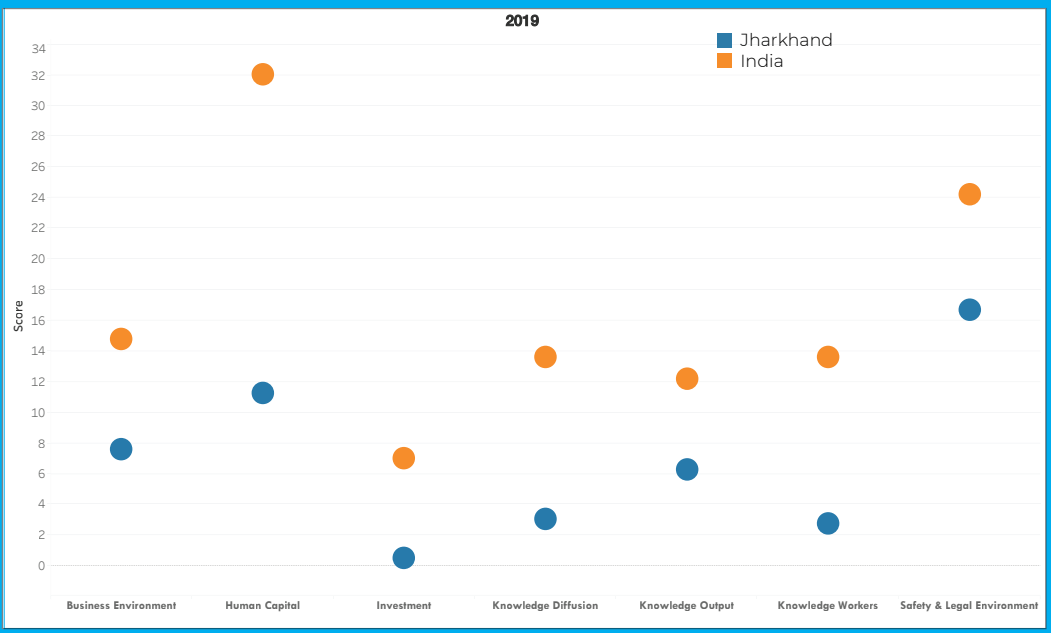
70
75
Country Average

Distance to Frontier

Comparative Analysis



KARNATAKA

Rank: 1
Efficiency Ratio: 1.86
Category: Major States

Scorecard

KARNATAKA

India Innovation Index 2019

Innovation 35.65

Enablers 24.96

Human Capital 38

Enrolment in Ph.D	27.63
Higher education institutions with NAAC grade A and above	10.1
Number of students in engineering and technology	39.4
Percentage colleges connected through NMEICT	57.35
Percentage of schools with ICT labs	30.26
Pupil teacher ratio-higher education	90

Investment 31.31

Expenditure on Science, Technology & Environment	4.11
FDI inflow	21.11
State govt. expenditure on higher & technical education	4.59
Venture capital deals	100

Safety & Legal Environment 10.99

Information Technology/Intellectual Property Acts	19.23
Number of cyber cells and social media monitoring cells	1.87
Pendency of court cases	17.5

Knowledge Workers 21.17

Knowledge-intensive employment	15.03
Number of NGO's involved in knowledge intensive areas	3.66
Number of R&D institutions funded by state	43.95
Private R&D units in state	30.95

Business Environment 23.3

Ease of Doing Business-Implementation Score	89.29
Internet subscribers in the state	21.76
Number of Common Facility Centers	7.3
Number of incubator centers in state	42.6
Number of Industrial clusters	23.87
Total number of online services transaction	3.91

Performance 46.35

Knowledge Output 25.63

Industrial designs by origin	1.27
Number of grass root innovations in state	5.89
Number of publications by state universities	32.39
Number of startups in the state	41.3
Patents filed from state	46.39
Trademark application filed	7.66

Knowledge Diffusion 67.06

High and medium-high-tech manufacturing entities	15.56
ICT exports	100
Number of citations	38.61
Number of registered GI	100

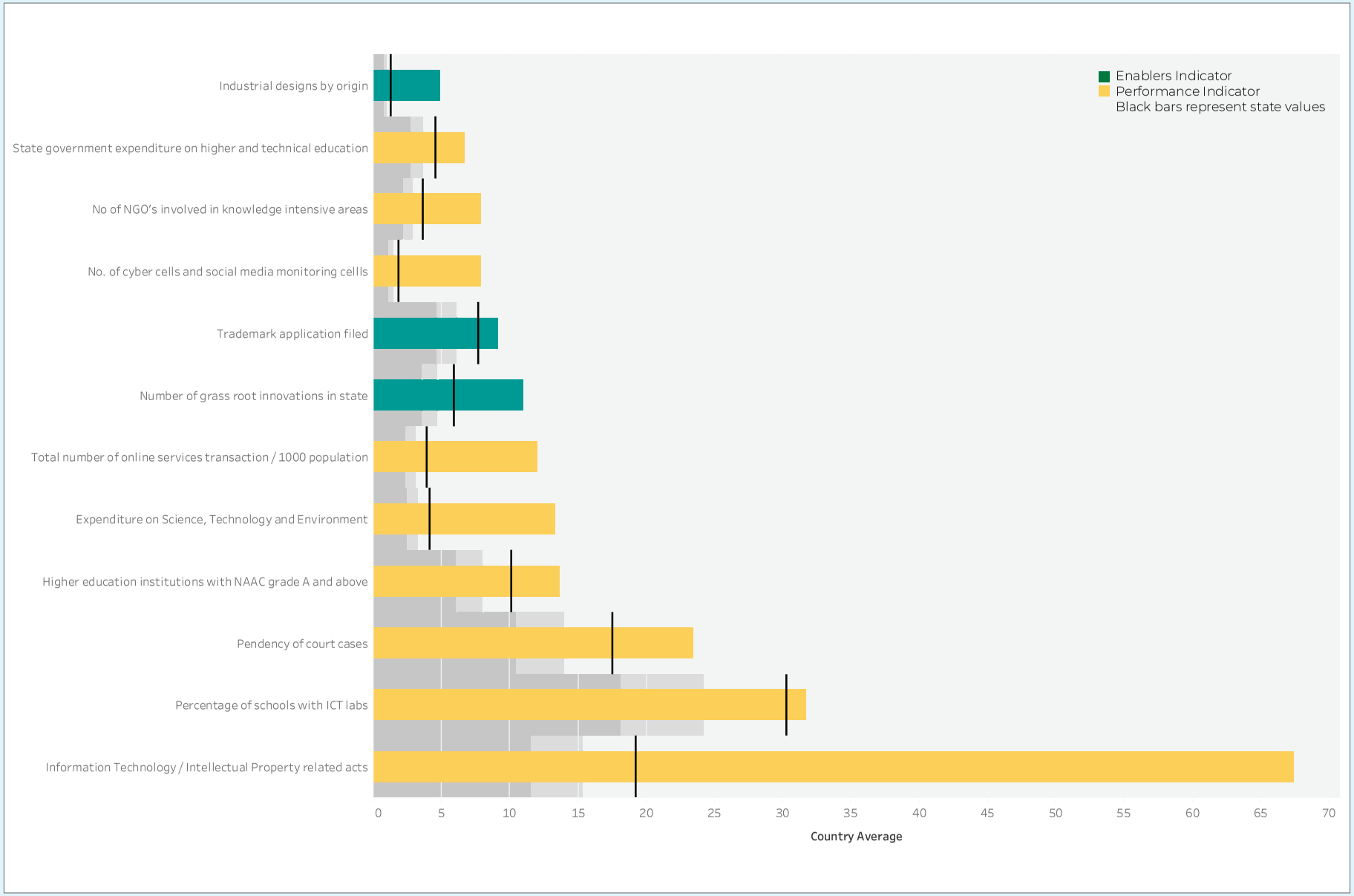
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

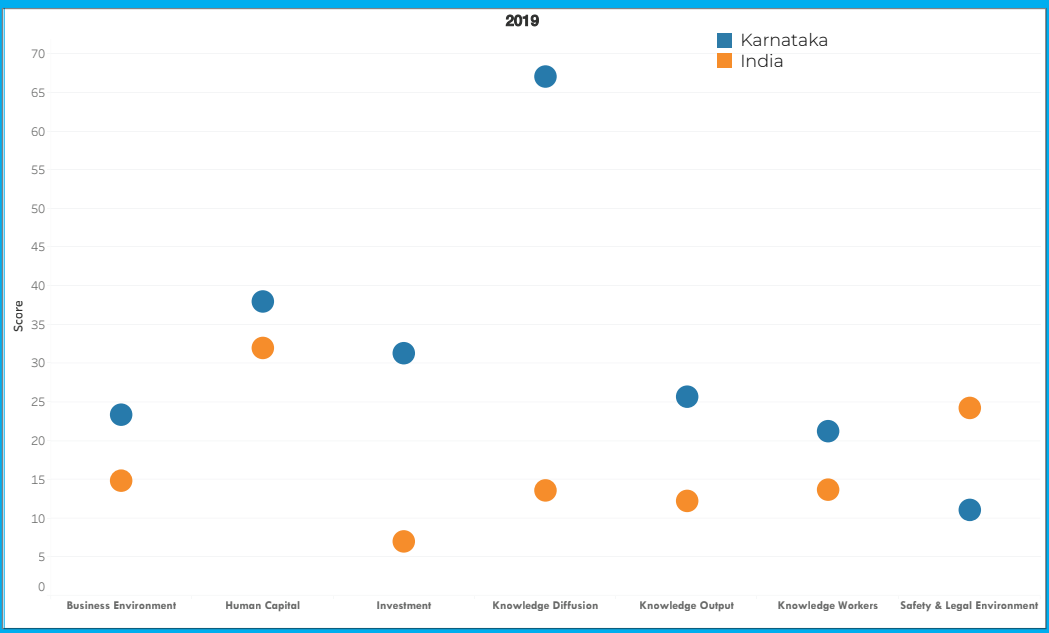
Focus Areas


Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
Trademark application filed
Number of grass root innovations in state
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Higher education institutions with NAAC grade A and above
Pendency of court cases
Percentage of schools with ICT labs
Information Technology / Intellectual Property related acts
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Country Average

Rank: 1 | **Efficiency Ratio:** 1.86 | **Category:** Major States

Distance to Frontier

Comparative Analysis



KERALA

Rank: 6
Efficiency Ratio: 0.64
Category: Major States

Scorecard

KERALA

India Innovation Index 2019

Innovation 19.58

Enablers 23.88

Human Capital 46.17

Enrolment in Ph.D	21.05
Higher education institutions with NAAC grade A and above	19.55
Number of students in engineering and technology	40.18
Percentage colleges connected through NMEICT	65.03
Percentage of schools with ICT labs	76.68
Pupil teacher ratio-higher education	92

Investment 9.10

Expenditure on Science, Technology & Environment	15.91
FDI inflow	8.18
State govt. expenditure on higher & technical education	1.84
Venture capital deals	19.47

Safety & Legal Environment 22.21

Information Technology/Intellectual Property Acts	57.69
Number of cyber cells and social media monitoring cells	11.39
Pendency of court cases	18.8

Knowledge Workers 14.45

Knowledge-intensive employment	8.85
Number of NGO's involved in knowledge intensive areas	1.76
Number of R&D institutions funded by state	44.72
Private R&D units in state	9.61

Business Environment 27.45

Ease of Doing Business-Implementation Score	27.08
Internet subscribers in the state	32.64
Number of Common Facility Centers	26.48
Number of incubator centers in state	32.46
Number of Industrial clusters	56.76
Total number of online services transaction	23.14

Performance 15.29

Knowledge Output 9.83

Industrial designs by origin	0.79
Number of grass root innovations in state	17.81
Number of publications by state universities	6.12
Number of startups in the state	17.03
Patents filed from state	12.9
Trademark application filed	7.34

Knowledge Diffusion 20.75

High and medium-high-tech manufacturing entities	0.17
ICT exports	4.53
Number of citations	10.02
Number of registered GI	69.23

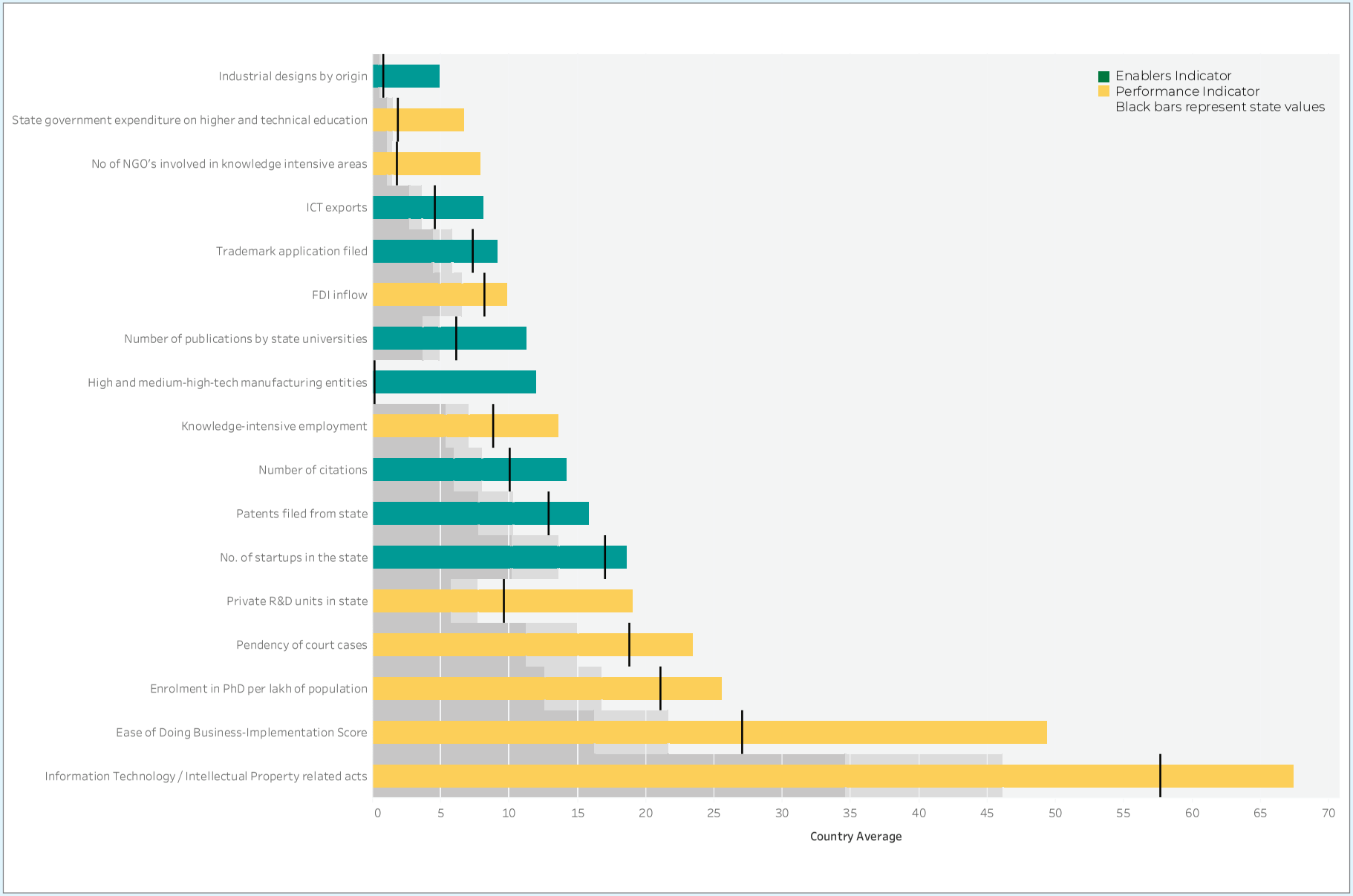
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

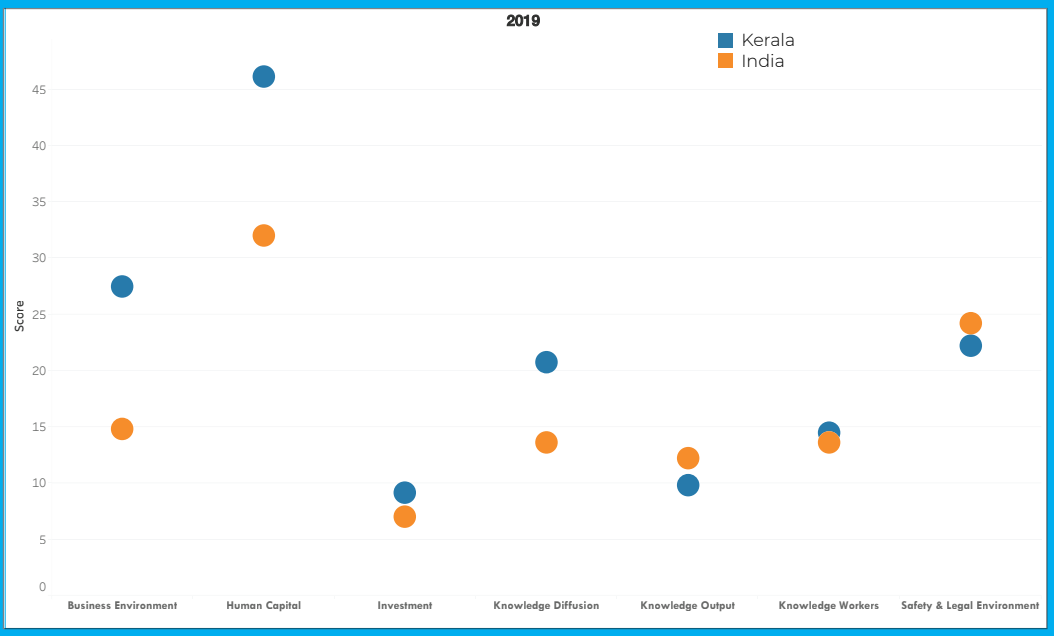
Focus Areas


Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
ICT exports
Trademark application filed
FDI inflow
Number of publications by state universities
High and medium-high-tech manufacturing entities
Knowledge-intensive employment
Number of citations
Patents filed from state
No. of startups in the state
Private R&D units in state
Pendency of court cases
Enrolment in PhD per lakh of population
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Country Average

Rank: 6 | **Efficiency Ratio:** 0.64 | **Category:** Major States

Distance to Frontier

Comparative Analysis



MADHYA PRADESH

Rank: 14
Efficiency Ratio: 0.54
Category: Major States

Scorecard

MADHYA PRADESH

India Innovation Index 2019

Innovation 9.7

Enablers 12.61

Human Capital 23.24

Enrolment in Ph.D	6.53
Higher education institutions with NAAC grade A and above	4.63
Number of students in engineering and technology	20.33
Percentage colleges connected through NMEICT	42.91
Percentage of schools with ICT labs	16.62
Pupil teacher ratio-higher education	60

Investment 3.07

Expenditure on Science, Technology & Environment	19.5
FDI inflow	1.02
State govt. expenditure on higher & technical education	0.49
Venture capital deals	0

Safety & Legal Environment 15.78

Information Technology/Intellectual Property Acts	88.46
Number of cyber cells and social media monitoring cells	1.57
Pendency of court cases	0

Knowledge Workers 7.77

Knowledge-intensive employment	11.95
Number of NGO's involved in knowledge intensive areas	4.42
Number of R&D institutions funded by state	11.4
Private R&D units in state	3.15

Business Environment 13.19

Ease of Doing Business-Implementation Score	98.2
Internet subscribers in the state	4.56
Number of Common Facility Centers	0
Number of incubator centers in state	10.96
Number of Industrial clusters	2.01
Total number of online services transaction	7.74

Performance 6.79

Knowledge Output 6.43

Industrial designs by origin	0.32
Number of grass root innovations in state	3.05
Number of publications by state universities	1.32
Number of startups in the state	21.77
Patents filed from state	3.03
Trademark application filed	2.69

Knowledge Diffusion 7.15

High and medium-high-tech manufacturing entities	8.04
ICT exports	0.73
Number of citations	3.5
Number of registered GI	23.08

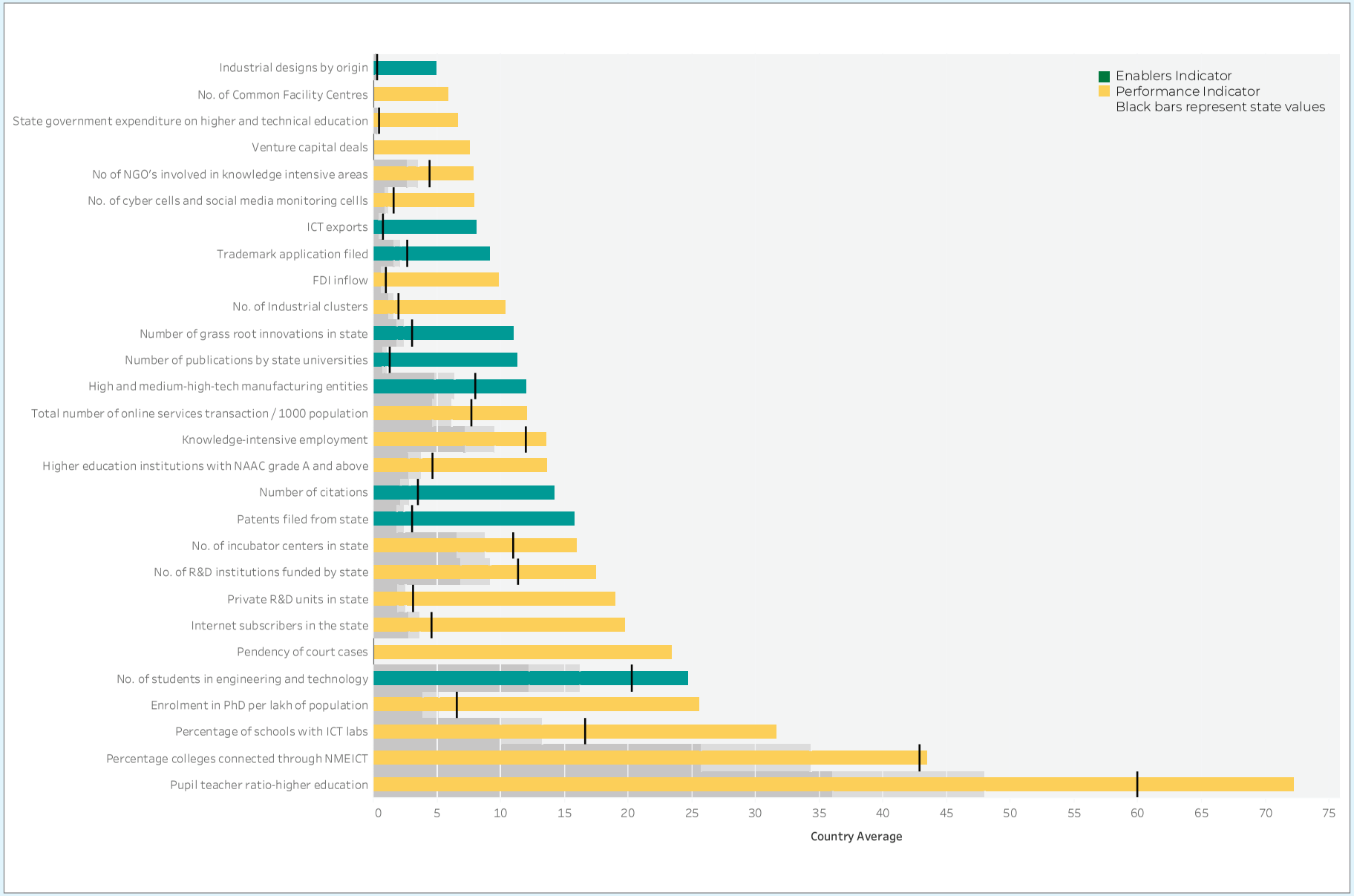
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

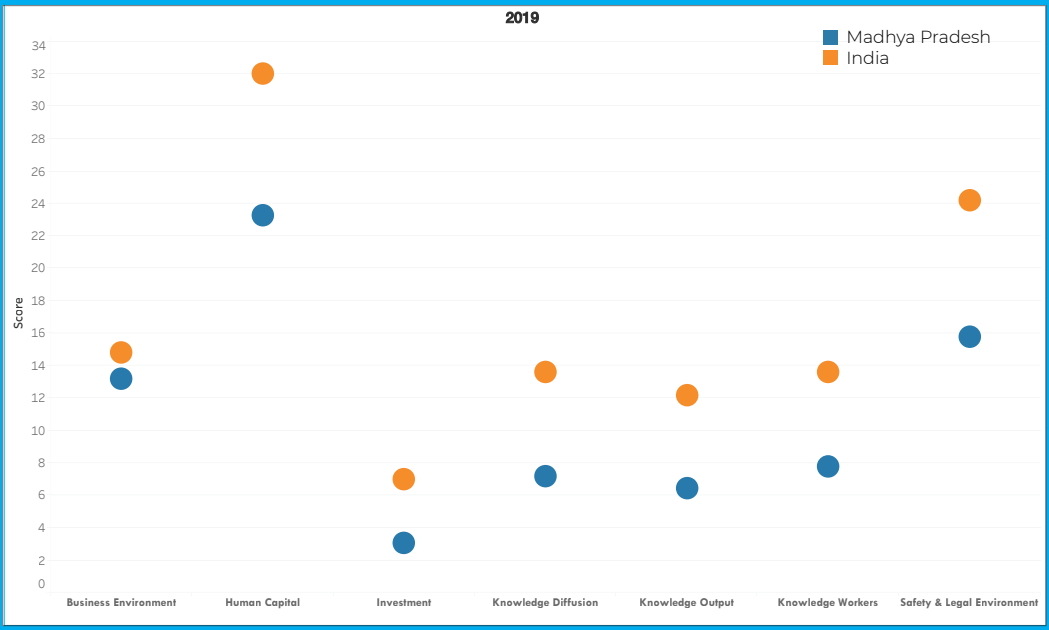
Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
Private R&D units in state
Internet subscribers in the state
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
Country Average

Rank: 14 | **Efficiency Ratio:** 0.54 | **Category:** Major States

Distance to Frontier

Comparative Analysis



MAHARASHTRA

Rank: 3
Efficiency Ratio: 1.33
Category: Major States

Scorecard

MAHARASHTRA

India Innovation Index 2019

Innovation 29.93

Enablers 25.64

Human Capital 34.45

Enrolment in Ph.D	9.75
Higher education institutions with NAAC grade A and above	17.36
Number of students in engineering and technology	31.84
Percentage colleges connected through NMEICT	45.03
Percentage of schools with ICT labs	47.9
Pupil teacher ratio-higher education	78

Investment 22.00

Expenditure on Science, Technology & Environment	6.74
FDI inflow	95.48
State govt. expenditure on higher & technical education	0.59
Venture capital deals	24.51

Safety & Legal Environment 22.97

Information Technology/Intellectual Property Acts	76.92
Number of cyber cells and social media monitoring cells	7.28
Pendency of court cases	16.93

Knowledge Workers 21.6

Knowledge-intensive employment	21.49
Number of NGO's involved in knowledge intensive areas	5.76
Number of R&D institutions funded by state	18.87
Private R&D units in state	45.59

Business Environment 27.2

Ease of Doing Business-Implementation Score	93.99
Internet subscribers in the state	27.46
Number of Common Facility Centers	14.65
Number of incubator centers in state	12.8
Number of Industrial clusters	22.06
Total number of online services transaction	1.94

Performance 34.22

Knowledge Output 26.26

Industrial designs by origin	4.37
Number of grass root innovations in state	2.22
Number of publications by state universities	32.96
Number of startups in the state	29.69
Patents filed from state	49.96
Trademark application filed	18.1

Knowledge Diffusion 42.17

High and medium-high-tech manufacturing entities	18.69
ICT exports	23.85
Number of citations	47.41
Number of registered GI	76.92

All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

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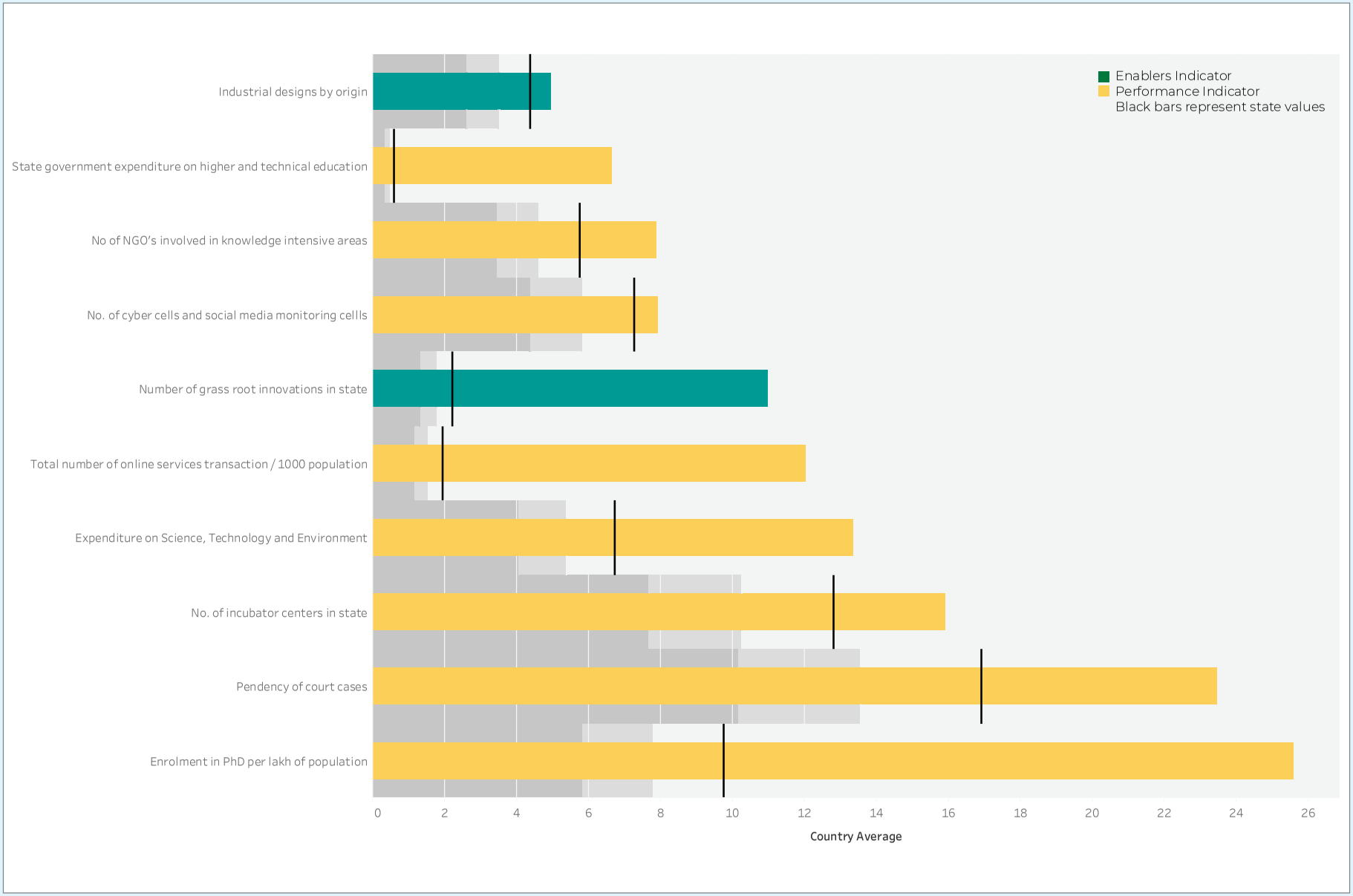
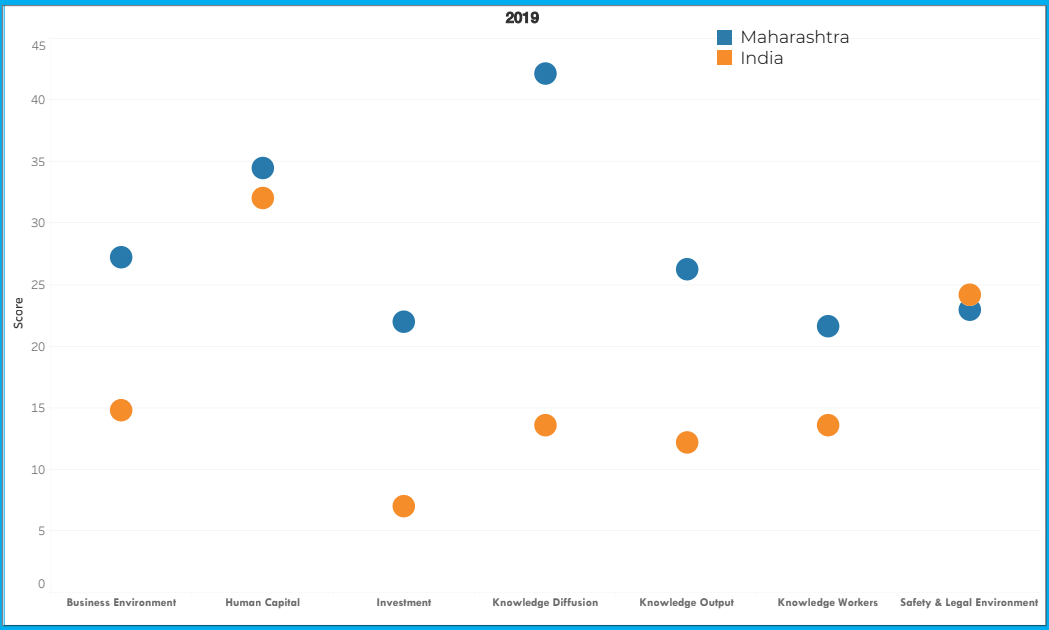
Focus Areas


Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
Number of grass root innovations in state
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
No. of incubator centers in state
Pendency of court cases
Enrolment in PhD per lakh of population
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Country Average

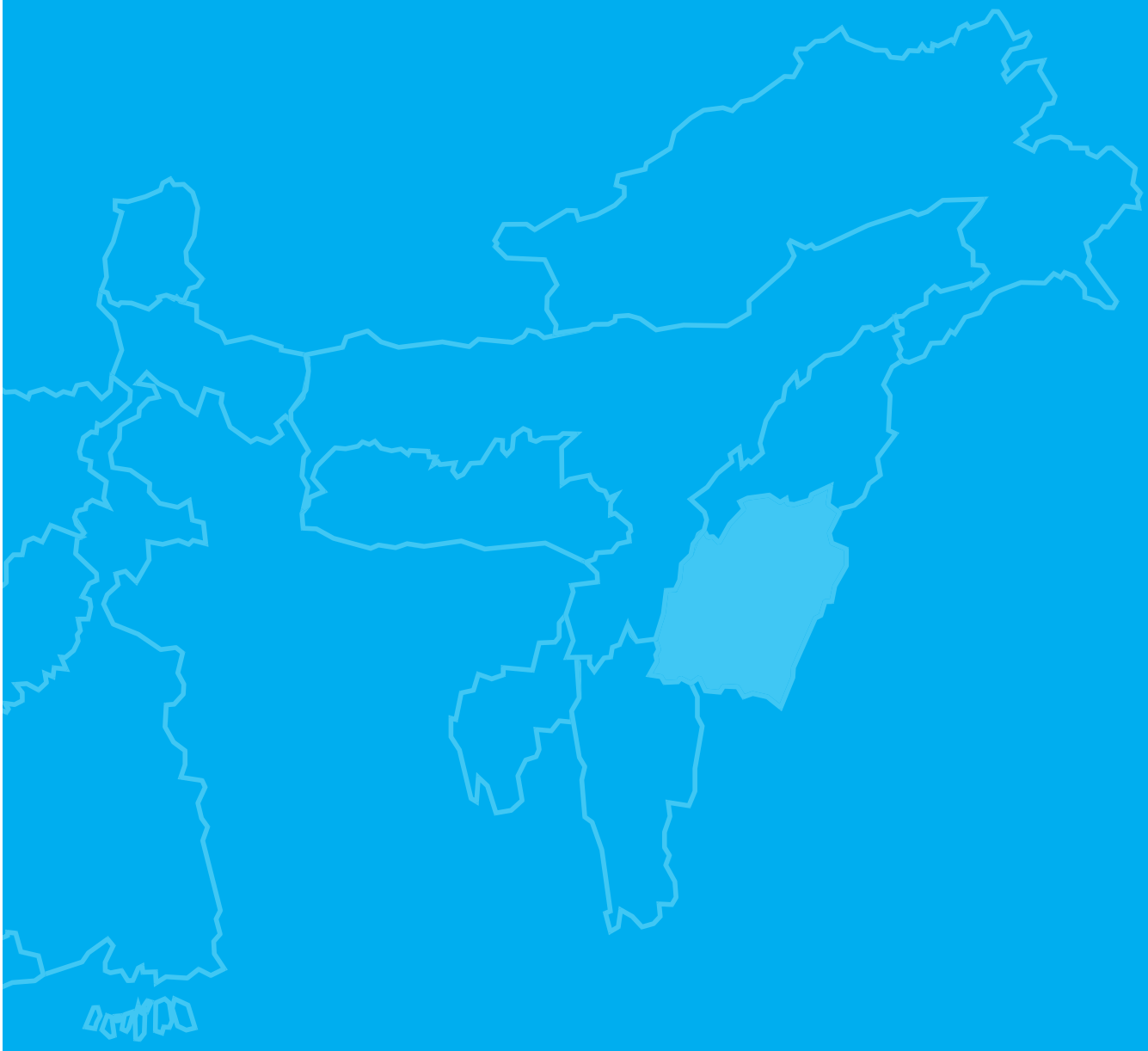
Rank: 3 | **Efficiency Ratio:** 1.33 | **Category:** Major States

Distance to Frontier

Comparative Analysis



MANIPUR



Rank: 4
Efficiency Ratio: 0.26
Category: NE & Hill States

Scorecard

MANIPUR

India Innovation Index 2019

Innovation 11.69

Enablers 18.5

Human Capital 24.36

Enrolment in Ph.D	26.91
Higher education institutions with NAAC grade A and above	2.61
Number of students in engineering and technology	2.55
Percentage colleges connected through NMEICT	40.23
Percentage of schools with ICT labs	25.6
Pupil teacher ratio-higher education	64

Investment 14.54

Expenditure on Science, Technology & Environment	100
FDI inflow	0.06
State govt. expenditure on higher & technical education	0.8
Venture capital deals	0

Safety & Legal Environment 24.42

Information Technology/Intellectual Property Acts	92.31
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	21.99

Knowledge Workers 24.82

Knowledge-intensive employment	0.55
Number of NGO's involved in knowledge intensive areas	100
Number of R&D institutions funded by state	14.14
Private R&D units in state	4.62

Business Environment 4.38

Ease of Doing Business-Implementation Score	0.9
Internet subscribers in the state	18.05
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	0

Performance 4.87

Knowledge Output 7.33

Industrial designs by origin	0
Number of grass root innovations in state	62.99
Number of publications by state universities	0
Number of startups in the state	18.24
Patents filed from state	1.09
Trademark application filed	0.09

Knowledge Diffusion 2.42

High and medium-high-tech manufacturing entities	0
ICT exports	0
Number of citations	0
Number of registered GI	10.26

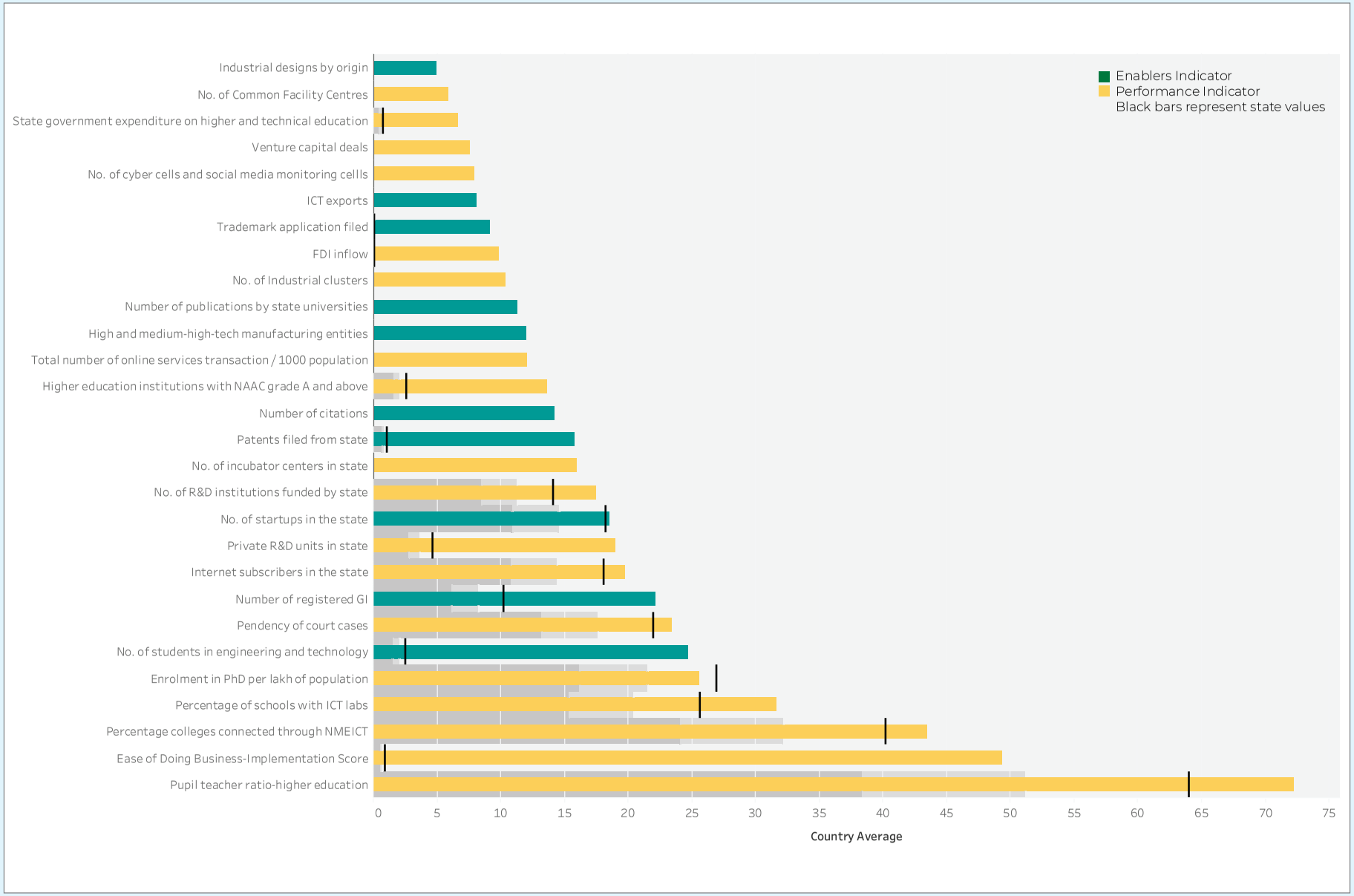
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
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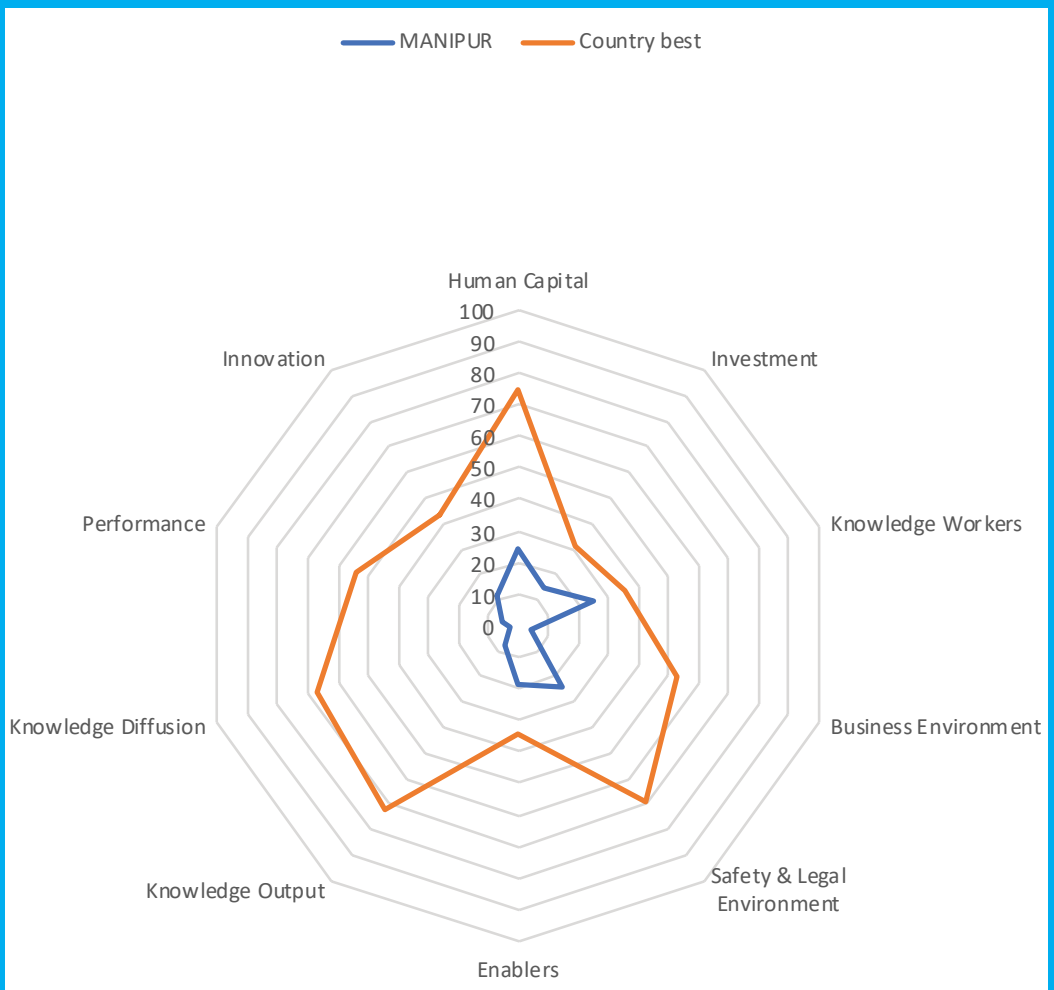
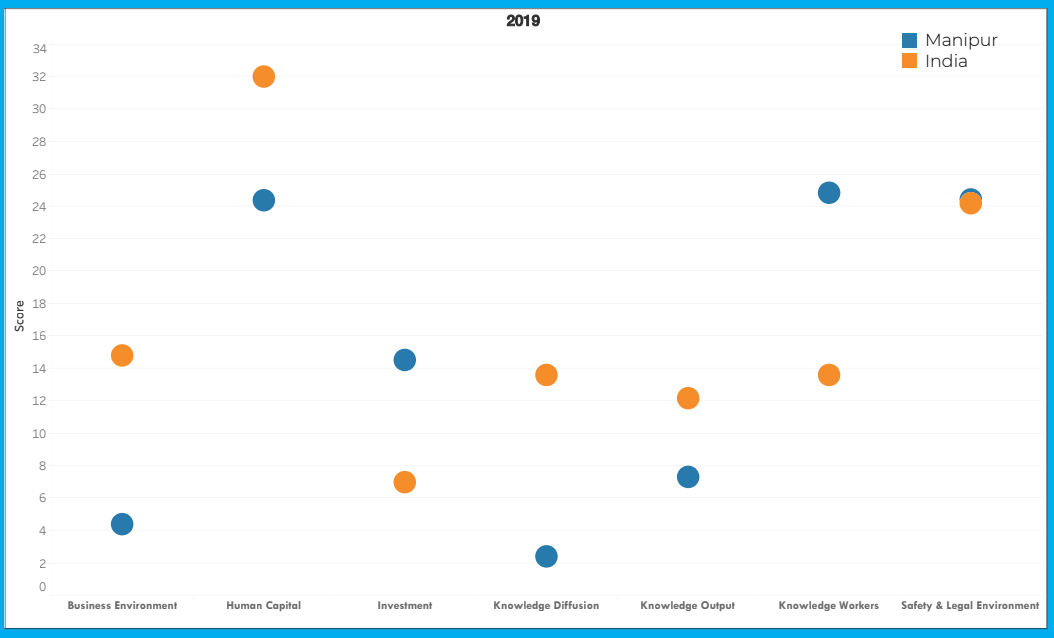
Country Average

Rank: 4 | **Efficiency Ratio:** 0.26 | **Category:** NE & Hill States

Distance to Frontier



Comparative Analysis



MEGHALAYA

Rank: 11
Efficiency Ratio: 0.15
Category: NE & Hill States

Scorecard

MEGHALAYA

India Innovation Index 2019

Innovation 6.38

Enablers 11.09

Human Capital 27.79

Enrolment in Ph.D	39.25
Higher education institutions with NAAC grade A and above	18.04
Number of students in engineering and technology	3.76
Percentage colleges connected through NMEICT	39.68
Percentage of schools with ICT labs	2.51
Pupil teacher ratio-higher education	68

Investment 0.21

Expenditure on Science, Technology & Environment	1.21
FDI inflow	0.07
State govt. expenditure on higher & technical education	0.09
Venture capital deals	0

Safety & Legal Environment 12.46

Information Technology/Intellectual Property Acts	46.15
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	11.63

Knowledge Workers 9.76

Knowledge-intensive employment	0
Number of NGO's involved in knowledge intensive areas	3.47
Number of R&D institutions funded by state	40.83
Private R&D units in state	2.96

Business Environment 5.23

Ease of Doing Business-Implementation Score	0
Internet subscribers in the state	18.05
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	7.49

Performance 1.66

Knowledge Output 1.73

Industrial designs by origin	0
Number of grass root innovations in state	13.99
Number of publications by state universities	1.39
Number of startups in the state	3.52
Patents filed from state	0
Trademark application filed	0.14

Knowledge Diffusion 1.6

High and medium-high-tech manufacturing entities	0
ICT exports	0.2
Number of citations	1.07
Number of registered GI	5.13

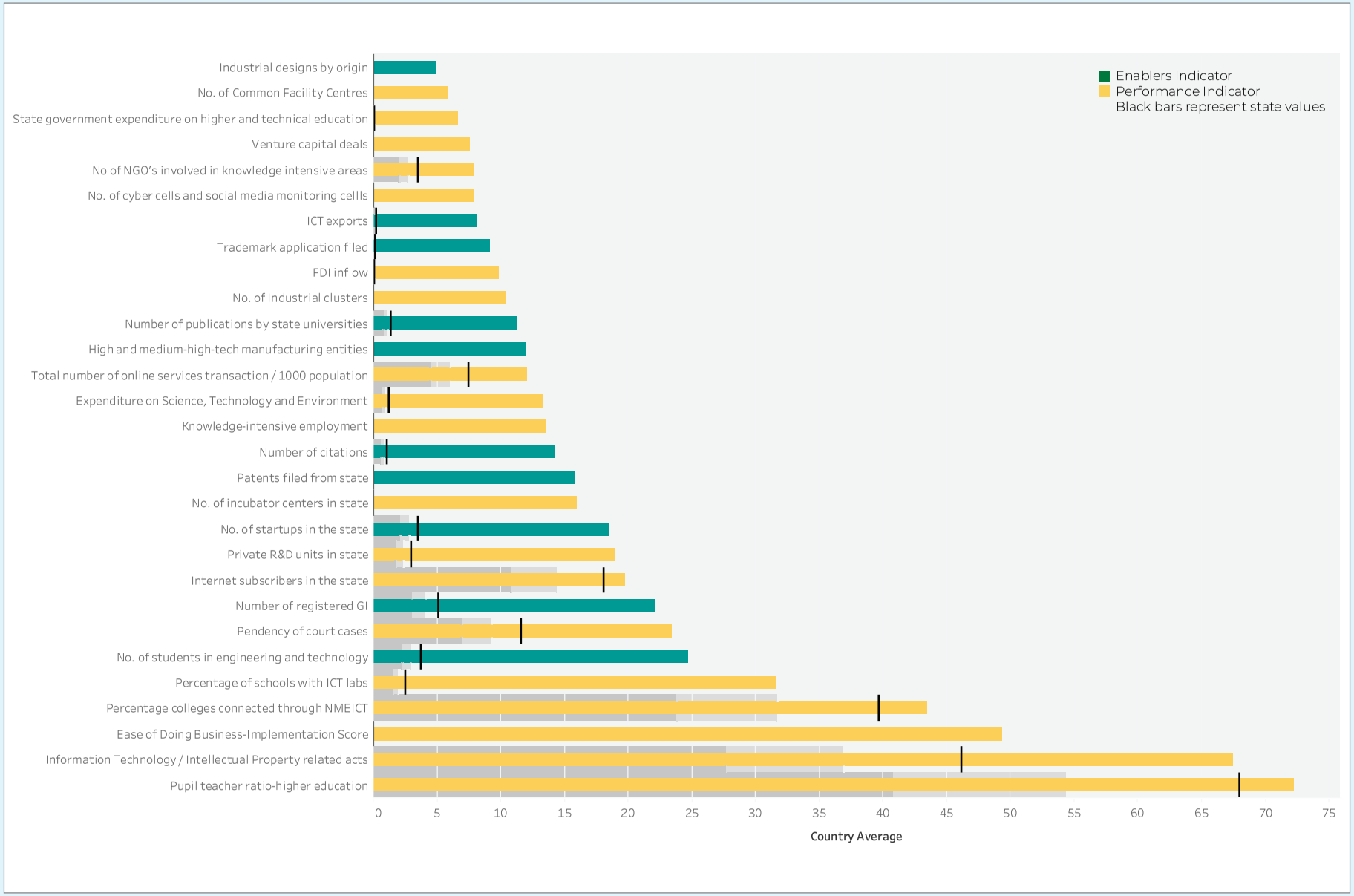
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Number of citations
Patents filed from state
No. of incubator centers in state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
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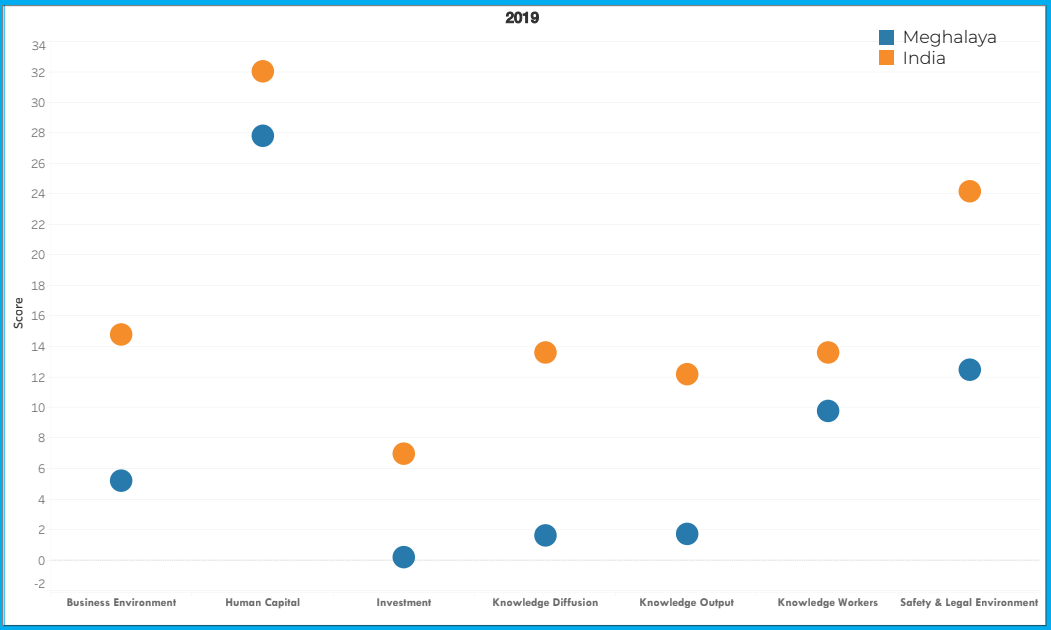
Country Average

Distance to Frontier

Comparative Analysis



MIZORAM

Rank: 10
Efficiency Ratio: 0.12
Category: NE & Hill States

Scorecard

MIZORAM

India Innovation Index 2019

Innovation 6.88

Enablers 12.31

Human Capital 33.36

Enrolment in Ph.D	69.72
Higher education institutions with NAAC grade A and above	15.67
Number of students in engineering and technology	2.03
Percentage colleges connected through NMEICT	33.33
Percentage of schools with ICT labs	0
Pupil teacher ratio-higher education	94

Investment 5.25

Expenditure on Science, Technology & Environment	29.19
FDI inflow	0.06
State govt. expenditure on higher & technical education	4.41
Venture capital deals	0

Safety & Legal Environment 17.01

Information Technology/Intellectual Property Acts	84.62
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	6.54

Knowledge Workers 1.11

Knowledge-intensive employment	0
Number of NGO's involved in knowledge intensive areas	5.37
Number of R&D institutions funded by state	0
Private R&D units in state	0

Business Environment 4.8

Ease of Doing Business-Implementation Score	0.6
Internet subscribers in the state	18.05
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	3.61

Performance 1.46

Knowledge Output 2.31

Industrial designs by origin	5.2
Number of grass root innovations in state	0
Number of publications by state universities	0
Number of startups in the state	3.41
Patents filed from state	4.27
Trademark application filed	0

Knowledge Diffusion 0.61

High and medium-high-tech manufacturing entities	0
ICT exports	0
Number of citations	0
Number of registered GI	2.56

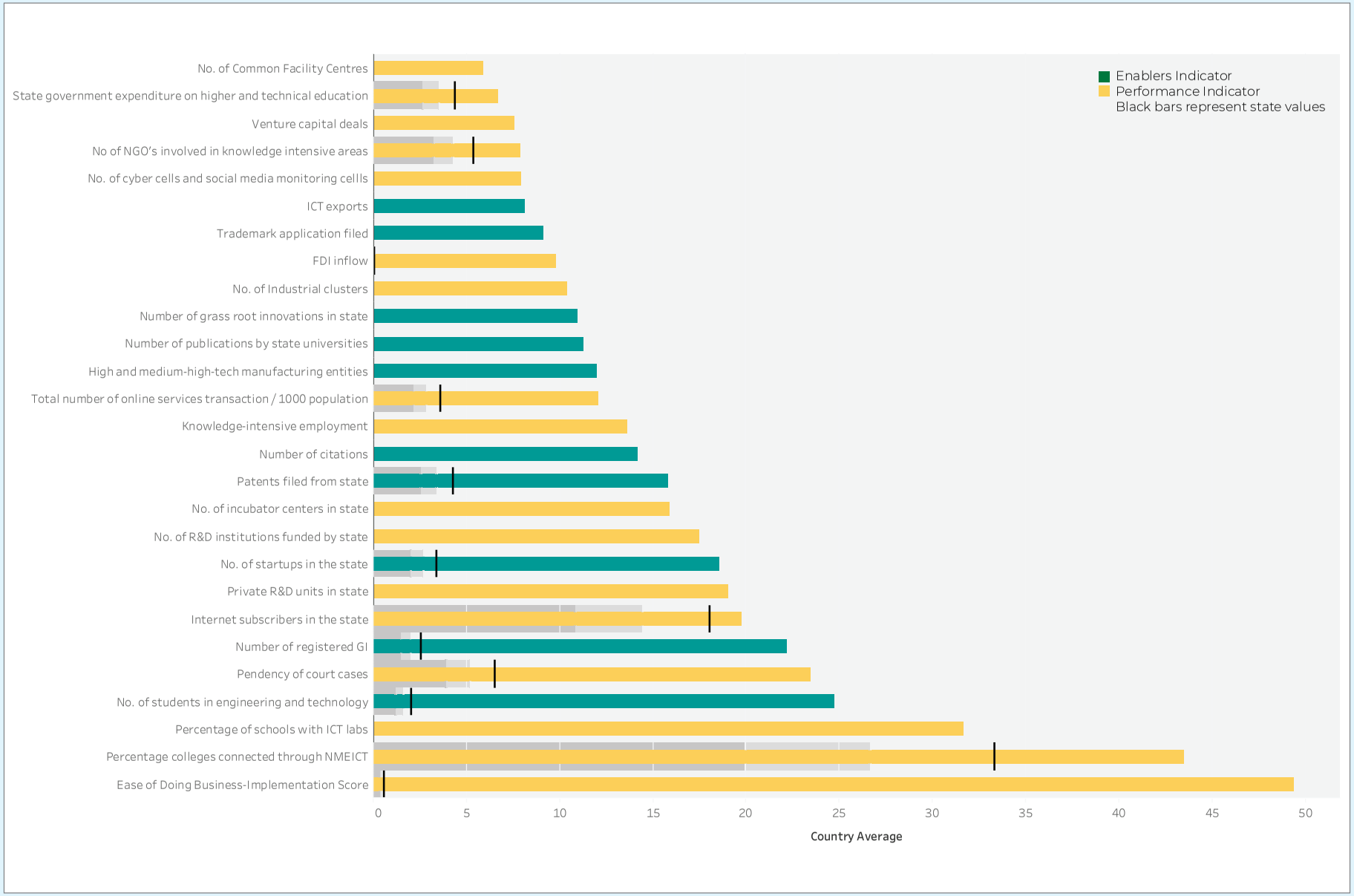
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Knowledge-intensive employment
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Enablers Indicator
Performance Indicator
Black bars represent state values
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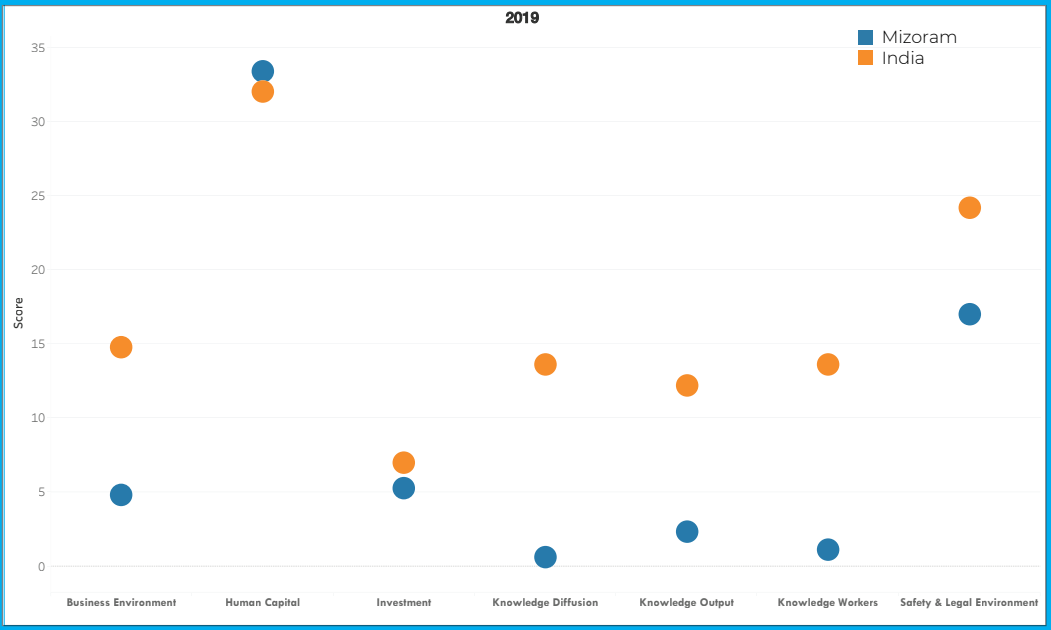
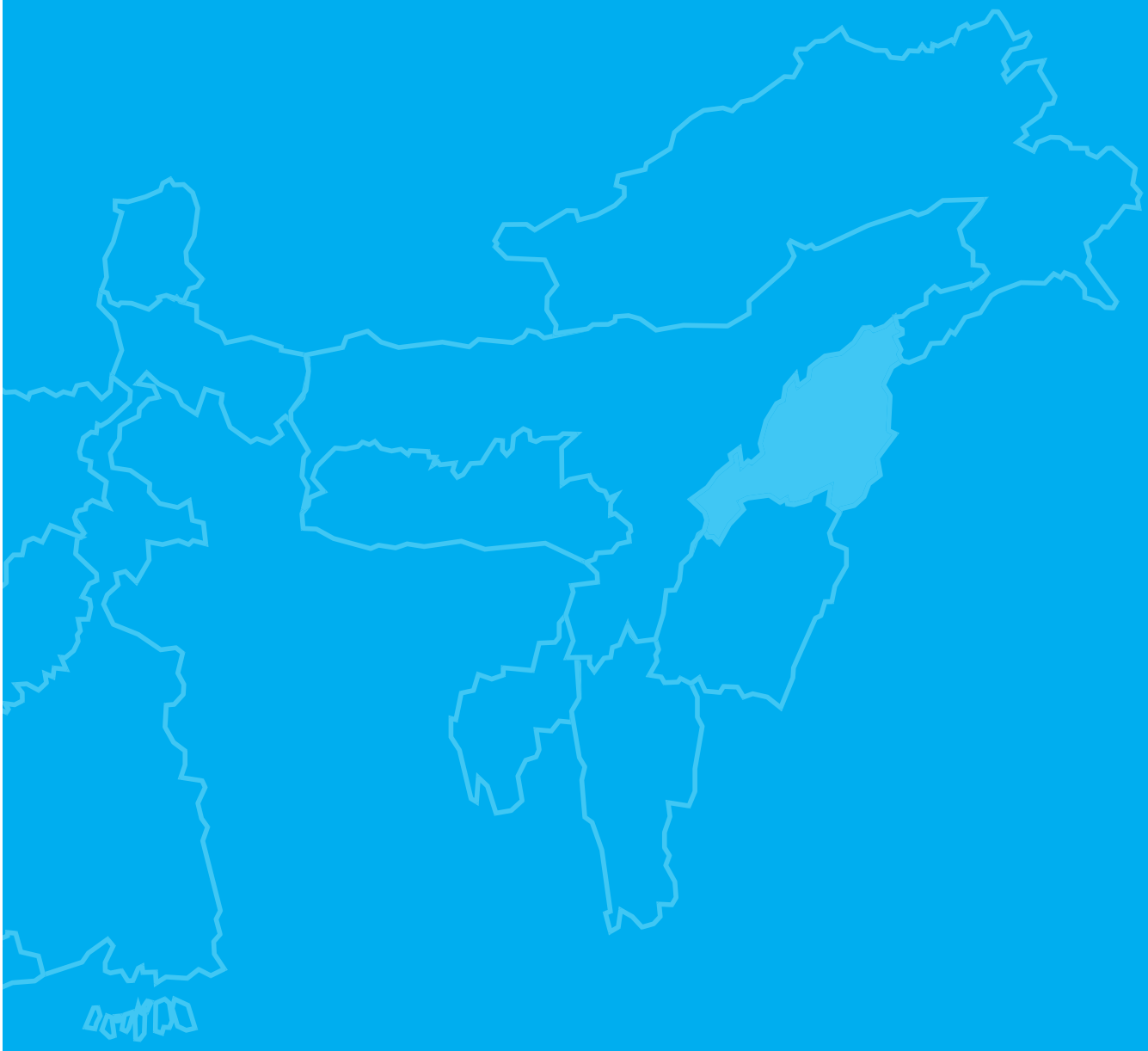
Country Average

Distance to Frontier

Comparative Analysis



NAGALAND



Rank: 9
Efficiency Ratio: 0.27
Category: NE & Hill States

Scorecard

NAGALAND

India Innovation Index 2019

Innovation 7.49

Enablers 11.76

Human Capital 24.2

Enrolment in Ph.D	25.43
Higher education institutions with NAAC grade A and above	10.49
Number of students in engineering and technology	3.61
Percentage colleges connected through NMEICT	15.38
Percentage of schools with ICT labs	15.17
Pupil teacher ratio-higher education	90

Investment 3.63

Expenditure on Science, Technology & Environment	22.79
FDI inflow	0.06
State govt. expenditure on higher & technical education	1.47
Venture capital deals	0

Safety & Legal Environment 20.59

Information Technology/Intellectual Property Acts	96.15
Number of cyber cells and social media monitoring cells	9.62
Pendency of court cases	0

Knowledge Workers 5.81

Knowledge-intensive employment	0
Number of NGO's involved in knowledge intensive areas	15.62
Number of R&D institutions funded by state	10.2
Private R&D units in state	2.22

Business Environment 4.55

Ease of Doing Business-Implementation Score	1.21
Internet subscribers in the state	18.05
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	1.28

Performance 3.21

Knowledge Output 4.61

Industrial designs by origin	0
Number of grass root innovations in state	48.96
Number of publications by state universities	0
Number of startups in the state	9.17
Patents filed from state	0.79
Trademark application filed	0.27

Knowledge Diffusion 1.82

High and medium-high-tech manufacturing entities	0
ICT exports	0
Number of citations	0
Number of registered GI	7.69

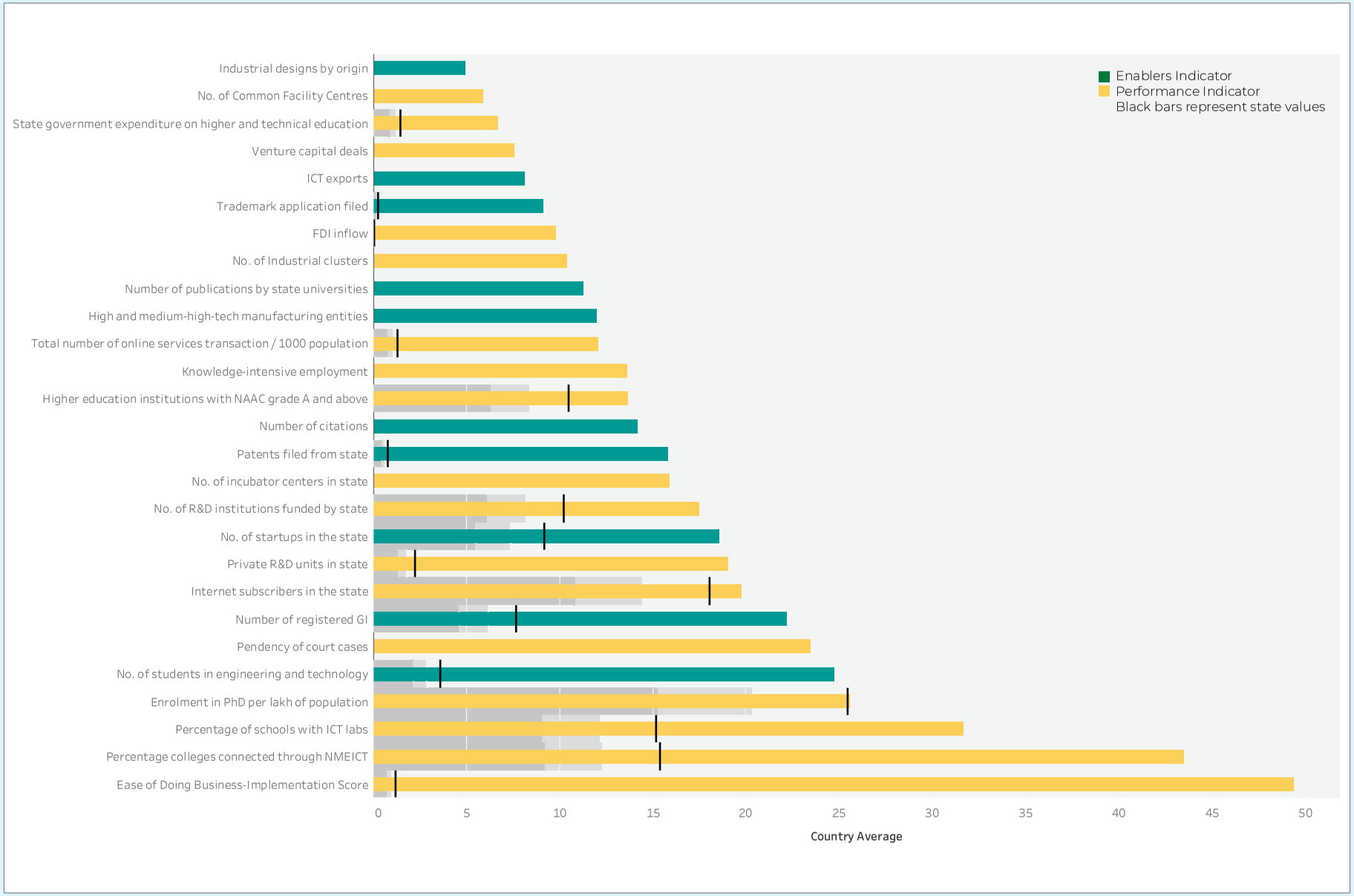
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Enablers Indicator
Performance Indicator
Black bars represent state values
0
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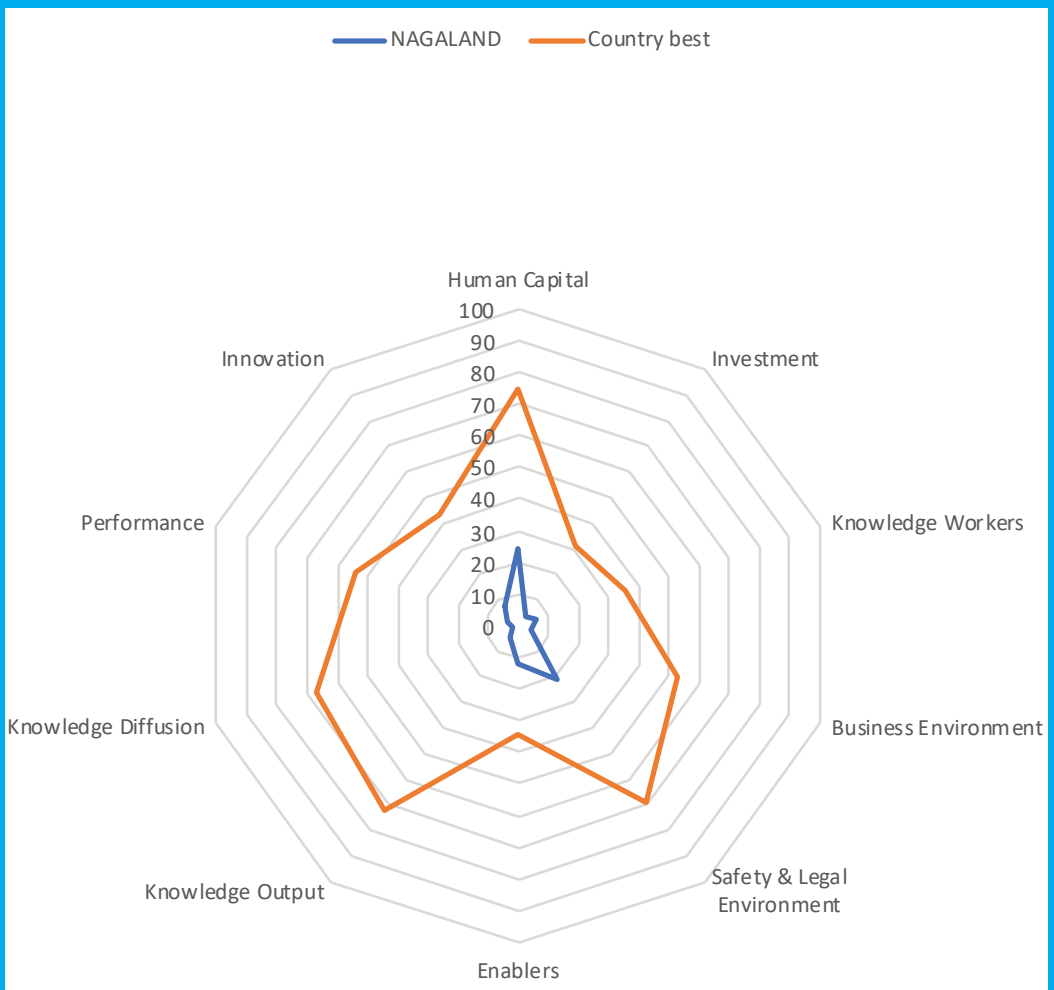
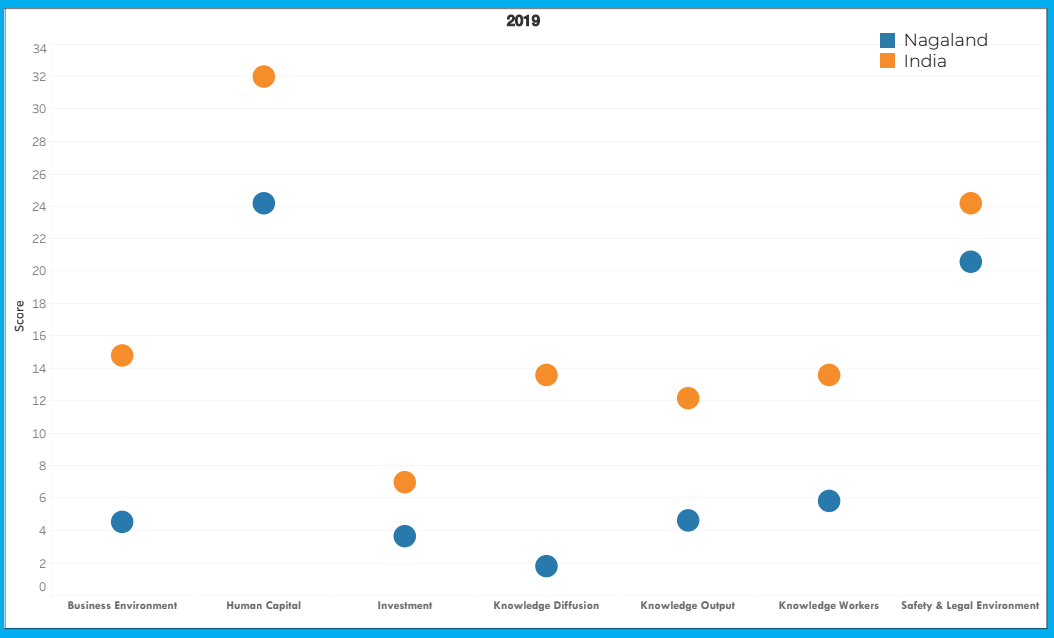
Country Average

Rank: 9 | **Efficiency Ratio:** 0.27 | **Category:** NE & Hill States

Distance to Frontier



Comparative Analysis



ODISHA

Rank: 12
Efficiency Ratio: 0.66
Category: Major States

Scorecard

ODISHA

India Innovation Index 2019

Innovation 12.66

Enablers	**15.25**		
Human Capital	**28.42**	**Knowledge Workers**	**5.14**
Enrolment in Ph.D	8.45	Knowledge-intensive employment	1.49
Higher education institutions with NAAC grade A and above	4.22	Number of NGO's involved in knowledge intensive areas	5.79
Number of students in engineering and technology	26.88	Number of R&D institutions funded by state	13.47
Percentage colleges connected through NMEICT	42.64	Private R&D units in state	3.25
Percentage of schools with ICT labs	42.51		
Pupil teacher ratio-higher education	70		
Investment	**1.69**	**Business Environment**	**12.63**
Expenditure on Science, Technology & Environment	8.32	Ease of Doing Business-Implementation Score	93.86
FDI inflow	0.34	Internet subscribers in the state	6.79
State govt. expenditure on higher & technical education	1.86	Number of Common Facility Centers	3.53
Venture capital deals	0	Number of incubator centers in state	15.27
Safety & Legal Environment	**28.36**	Number of Industrial clusters	13.9
Information Technology/Intellectual Property Acts	96.15	Total number of online services transaction	3.23
Number of cyber cells and social media monitoring cells	0.91		
Pendency of court cases	29.31		

Performance	**10.08**		
Knowledge Output	**4.99**	**Knowledge Diffusion**	**15.16**
Industrial designs by origin	0.24	High and medium-high-tech manufacturing entities	4.27
Number of grass root innovations in state	4.94	ICT exports	4.88
Number of publications by state universities	13.24	Number of citations	14.41
Number of startups in the state	7.32	Number of registered GI	38.46
Patents filed from state	3.83		
Trademark application filed	0.76		

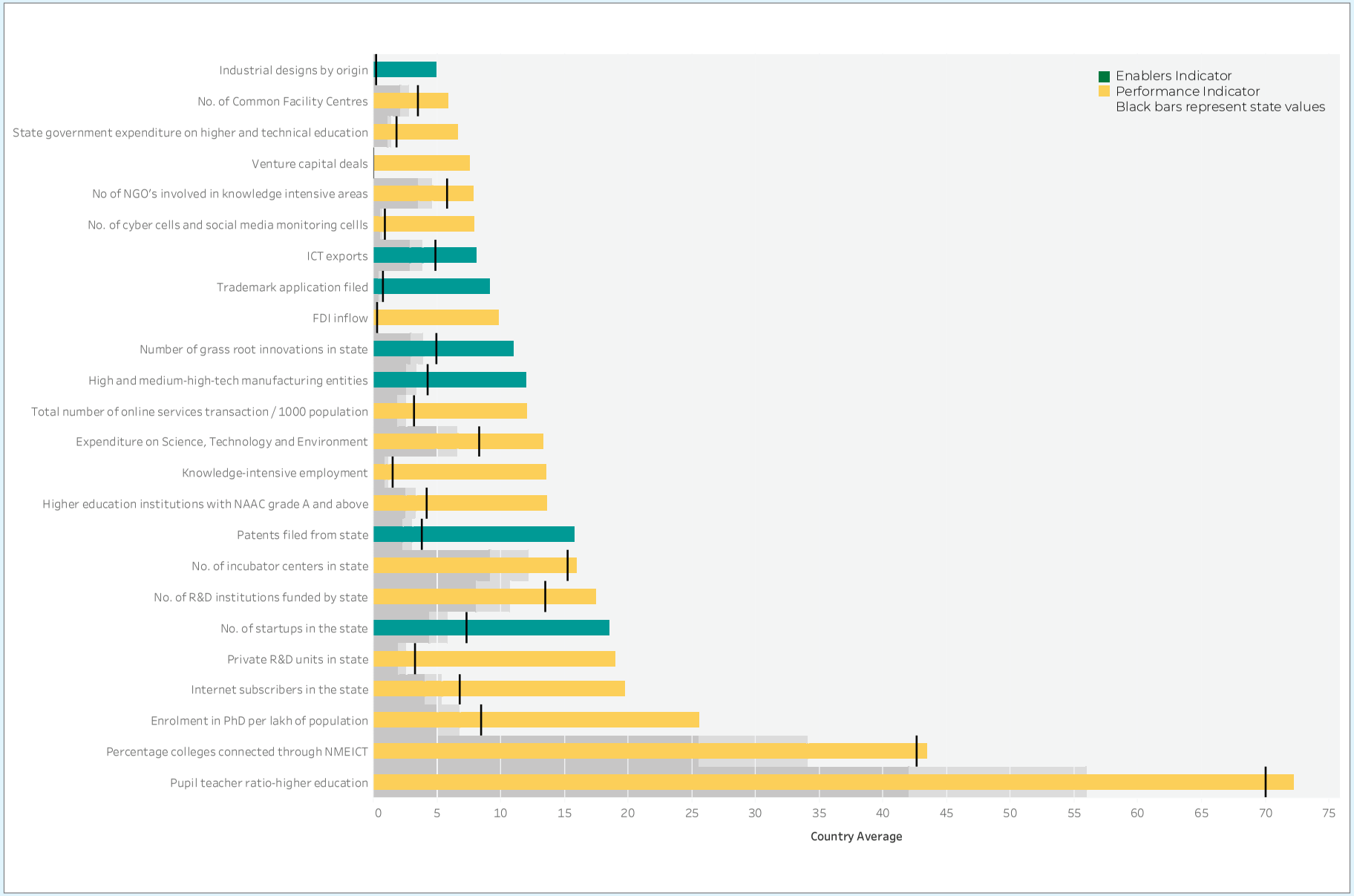
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
Number of grass root innovations in state
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Enrolment in PhD per lakh of population
Percentage colleges connected through NMEICT
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
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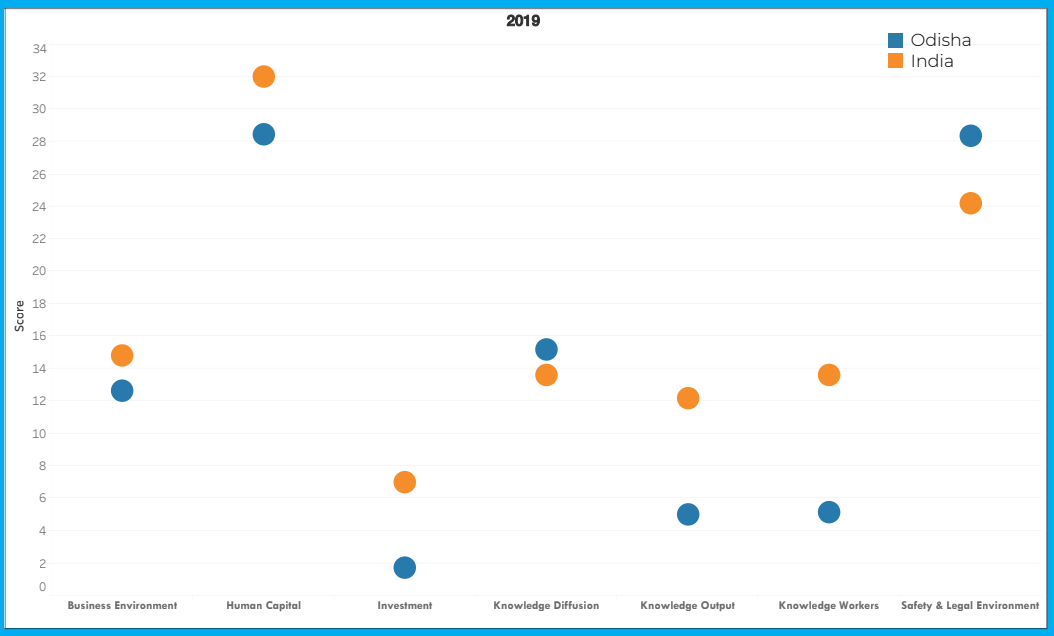
Country Average

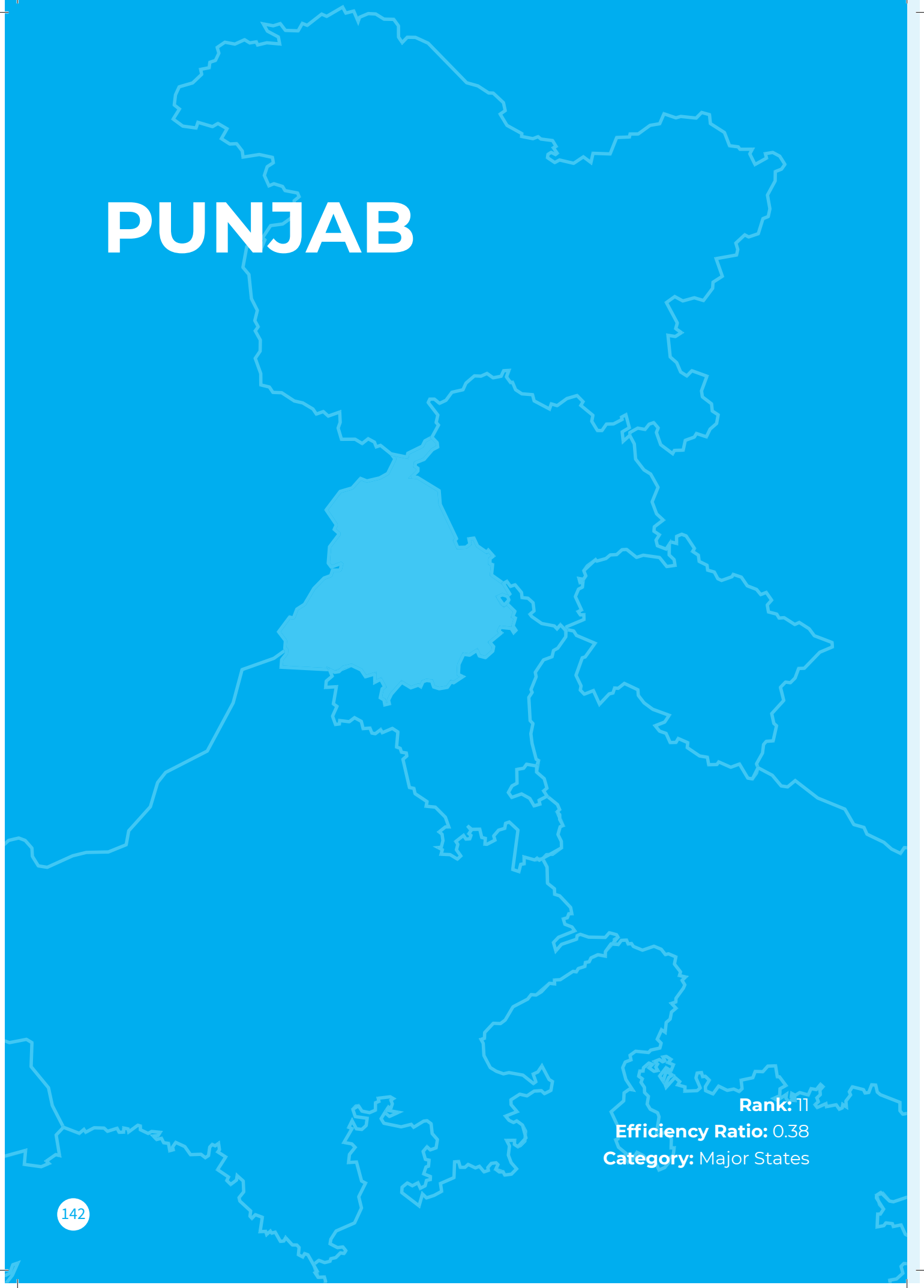
Rank: 12 | **Efficiency Ratio:** 0.66 | **Category:** Major States

Distance to Frontier

Comparative Analysis



PUNJAB



Rank: 11
Efficiency Ratio: 0.38
Category: Major States

Scorecard

PUNJAB

India Innovation Index 2019

Innovation 13.67

Enablers 19.8

Human Capital 40.88

Enrolment in Ph.D	29.49
Higher education institutions with NAAC grade A and above	15.15
Number of students in engineering and technology	43.79
Percentage colleges connected through NMEICT	50.33
Percentage of schools with ICT labs	58.99
Pupil teacher ratio-higher education	82

Investment 0.91

Expenditure on Science, Technology & Environment	3.64
FDI inflow	0.05
State govt. expenditure on higher & technical education	1.59
Venture capital deals	0

Safety & Legal Environment 33.87

Information Technology/Intellectual Property Acts	73.08
Number of cyber cells and social media monitoring cells	1.37
Pendency of court cases	52.77

Knowledge Workers 8.81

Knowledge-intensive employment	8.4
Number of NGO's involved in knowledge intensive areas	1.33
Number of R&D institutions funded by state	17.47
Private R&D units in state	10.62

Business Environment 14.5

Ease of Doing Business-Implementation Score	92.17
Internet subscribers in the state	34.86
Number of Common Facility Centers	0
Number of incubator centers in state	10.16
Number of Industrial clusters	5.26
Total number of online services transaction	4.12

Performance 7.55

Knowledge Output 9.19

Industrial designs by origin	2.92
Number of grass root innovations in state	7.48
Number of publications by state universities	11.16
Number of startups in the state	7.65
Patents filed from state	11.65
Trademark application filed	12.47

Knowledge Diffusion 5.91

High and medium-high-tech manufacturing entities	3.55
ICT exports	0.64
Number of citations	13.67
Number of registered GI	5.13

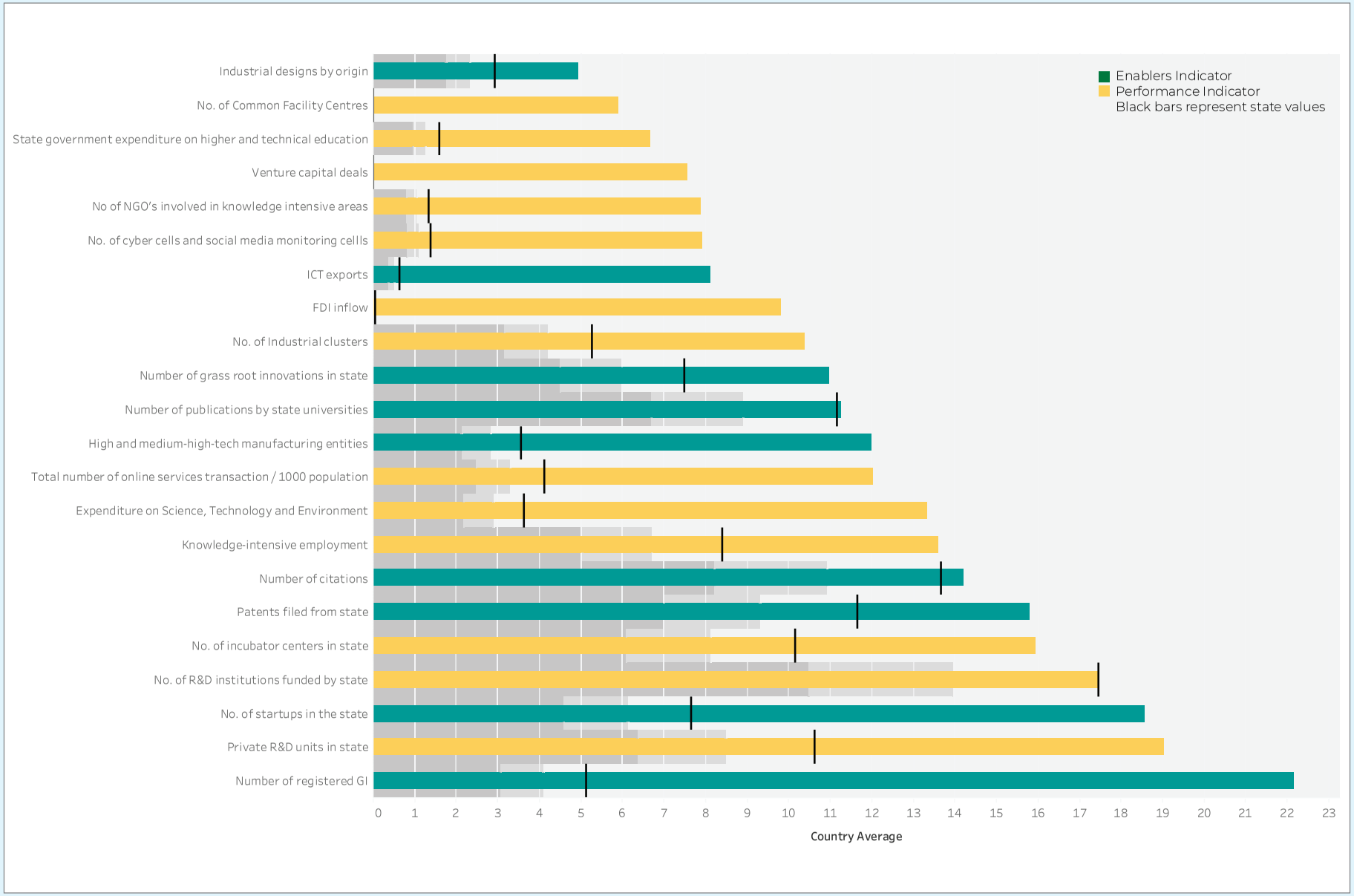
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

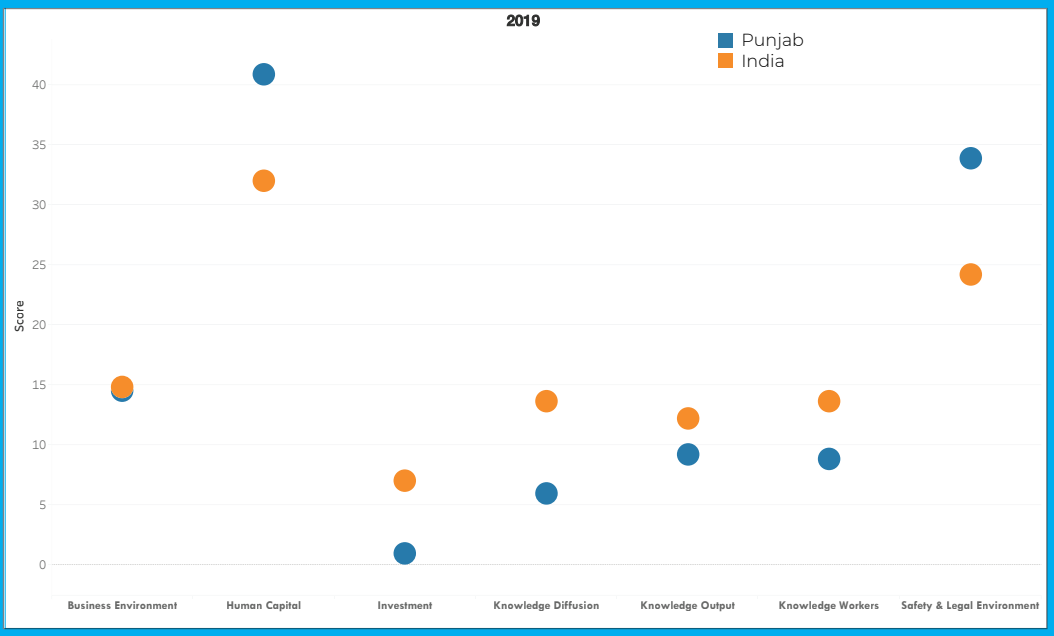
Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Number of registered GI
Enablers Indicator
Performance Indicator
Black bars represent state values
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Country Average

Rank: 11 | **Efficiency Ratio:** 0.38 | **Category:** Major States

Distance to Frontier

Comparative Analysis



RAJASTHAN

Rank: 13
Efficiency Ratio: 0.68
Category: Major States

Scorecard

RAJASTHAN

India Innovation Index 2019

Innovation 11

Enablers 13.06

Performance 8.93

Human Capital 25.9

Enrolment in Ph.D	13.85
Higher education institutions with NAAC grade A and above	1.34
Number of students in engineering and technology	15.97
Percentage colleges connected through NMEICT	43.47
Percentage of schools with ICT labs	40.38
Pupil teacher ratio-higher education	62

Investment 5.12

Expenditure on Science, Technology & Environment	3.94
FDI inflow	2.39
State govt. expenditure on higher & technical education	0.28
Venture capital deals	15.62

Safety & Legal Environment 14.24

Information Technology/Intellectual Property Acts	53.85
Number of cyber cells and social media monitoring cells	0.28
Pendency of court cases	12.5

Knowledge Workers 7.23

Knowledge-intensive employment	8.04
Number of NGO's involved in knowledge intensive areas	3.01
Number of R&D institutions funded by state	14.43
Private R&D units in state	5

Business Environment 12.83

Ease of Doing Business-Implementation Score	97.61
Internet subscribers in the state	13.4
Number of Common Facility Centers	0
Number of incubator centers in state	8.01
Number of Industrial clusters	2.13
Total number of online services transaction	8.94

Knowledge Output 6.26

Industrial designs by origin	0.33
Number of grass root innovations in state	5.05
Number of publications by state universities	6.89
Number of startups in the state	13.87
Patents filed from state	4.12
Trademark application filed	4.44

Knowledge Diffusion 11.59

High and medium-high-tech manufacturing entities	6.16
ICT exports	1.02
Number of citations	7.74
Number of registered GI	35.9

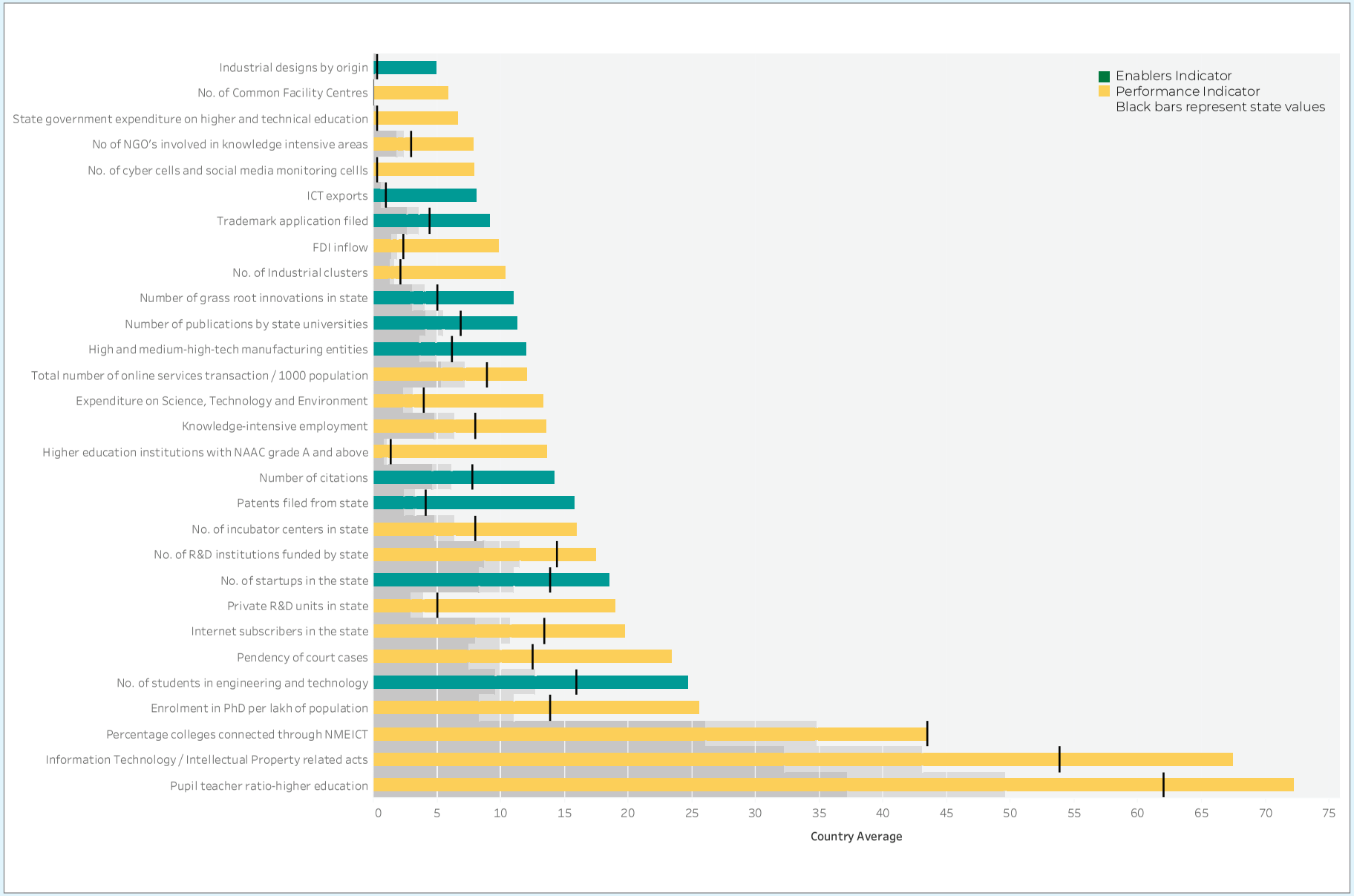
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage colleges connected through NMEICT
Information Technology / Intellectual Property related acts
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Enablers Indicator
Performance Indicator
Black bars represent state values
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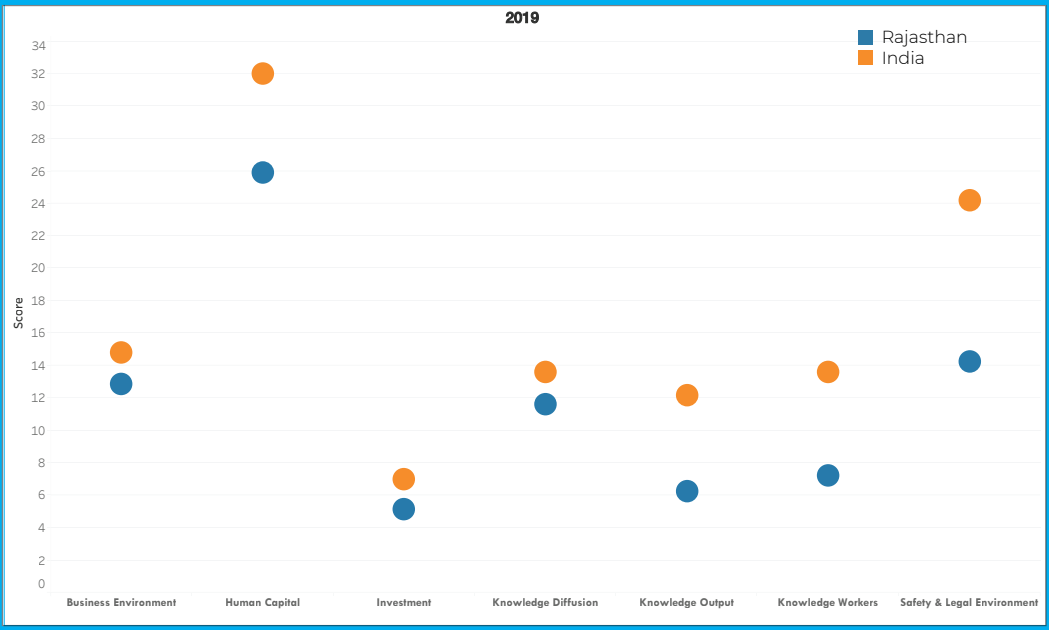
Country Average

Rank: 13 | **Efficiency Ratio:** 0.68 | **Category:** Major States

Distance to Frontier

Comparative Analysis



SIKKIM

Rank: 1
Efficiency Ratio: 0.03
Category: NE & Hill States

Scorecard

SIKKIM

India Innovation Index 2019

Innovation 15.49

Enablers	**29.98**			**Performance**	**1.01**
Human Capital	**39.34**	**Knowledge Workers**	**33.62**	**Knowledge Output**	**0.94**
Enrolment in Ph.D	25.33	Knowledge-intensive employment	100	Industrial designs by origin	0
Higher education institutions with NAAC grade A and above	14.2	Number of NGO's involved in knowledge intensive areas	0	Number of grass root innovations in state	0
Number of students in engineering and technology	22.59	Number of R&D institutions funded by state	0	Number of publications by state universities	0
Percentage colleges connected through NMEICT	73.53	Private R&D units in state	7.2	Number of startups in the state	3.02
Percentage of schools with ICT labs	25.51			Patents filed from state	0
Pupil teacher ratio-higher education	94			Trademark application filed	1.18
Investment	**4.79**	**Business Environment**	**3.41**	**Knowledge Diffusion**	**1.07**
Expenditure on Science, Technology & Environment	11.52	Ease of Doing Business-Implementation Score	0.3	High and medium-high-tech manufacturing entities	0
FDI inflow	0.89	Internet subscribers in the state	12.78	ICT exports	1.56
State govt. expenditure on higher & technical education	12.51	Number of Common Facility Centers	0	Number of citations	0
Venture capital deals	0	Number of incubator centers in state	0	Number of registered GI	2.56
Safety & Legal Environment	**68.74**	Number of Industrial clusters	0		
Information Technology/Intellectual Property Acts	92.31	Total number of online services transaction	2.19		
Number of cyber cells and social media monitoring cells	31.17				
Pendency of court cases	100				

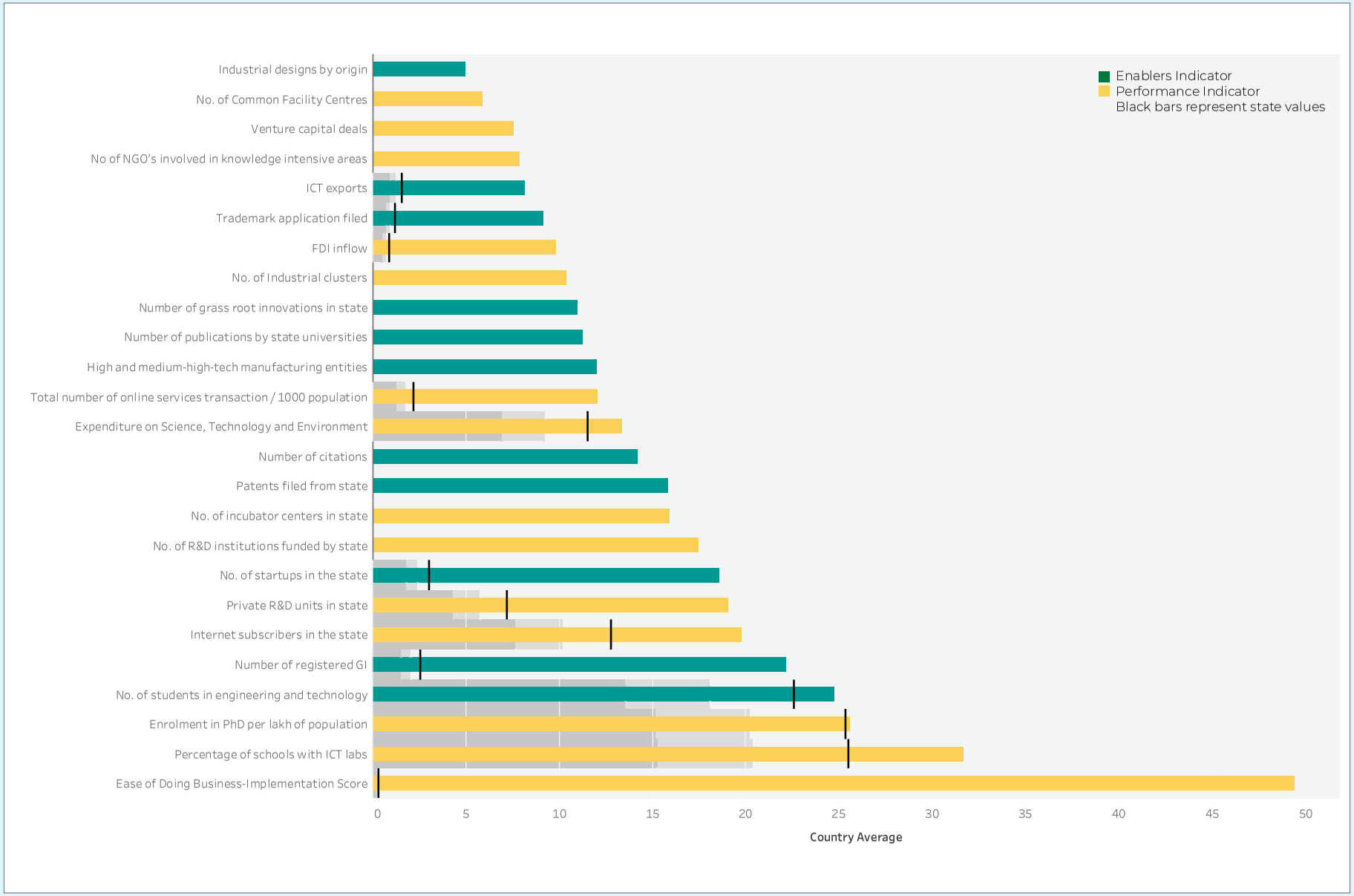
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

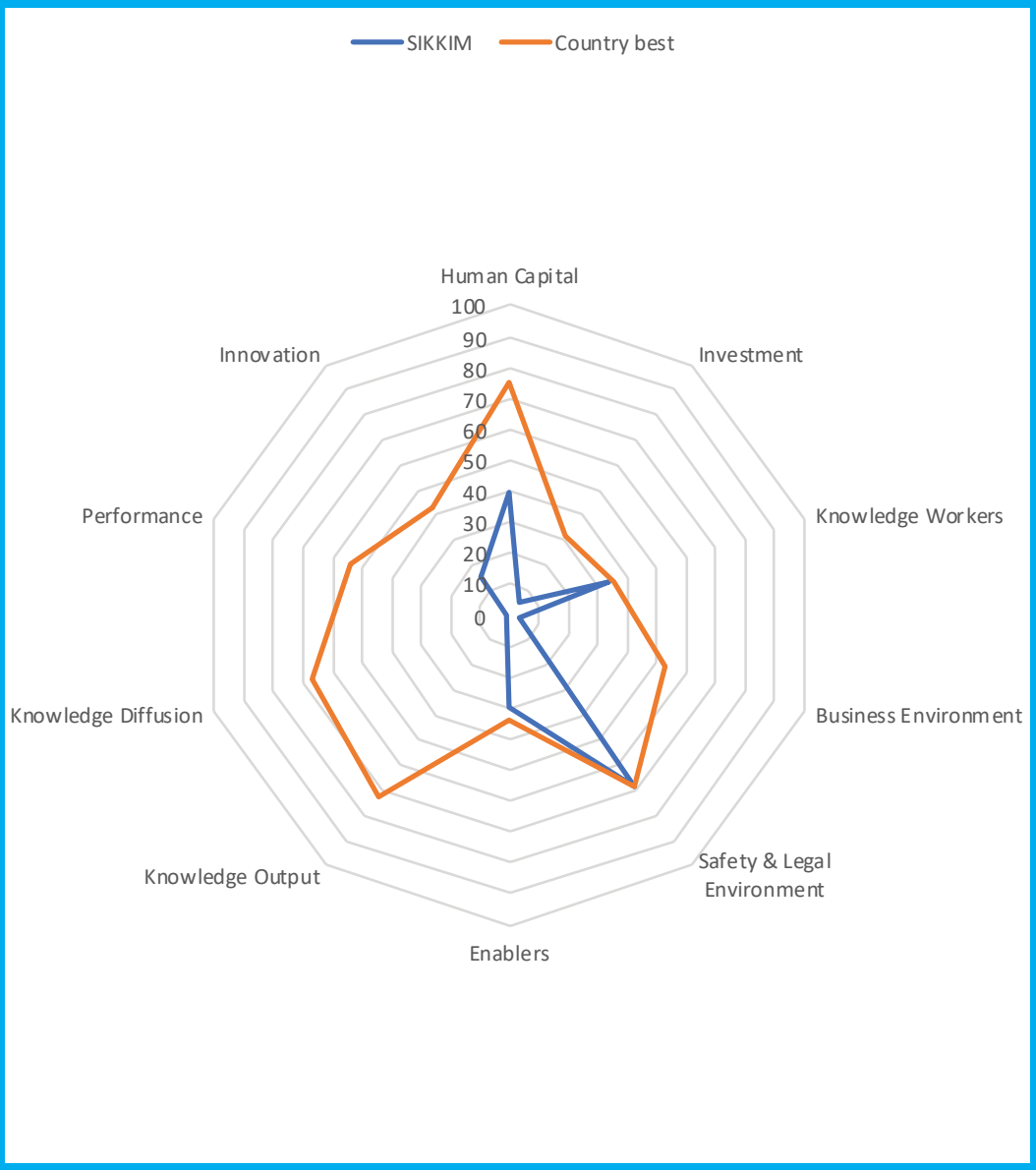
How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas

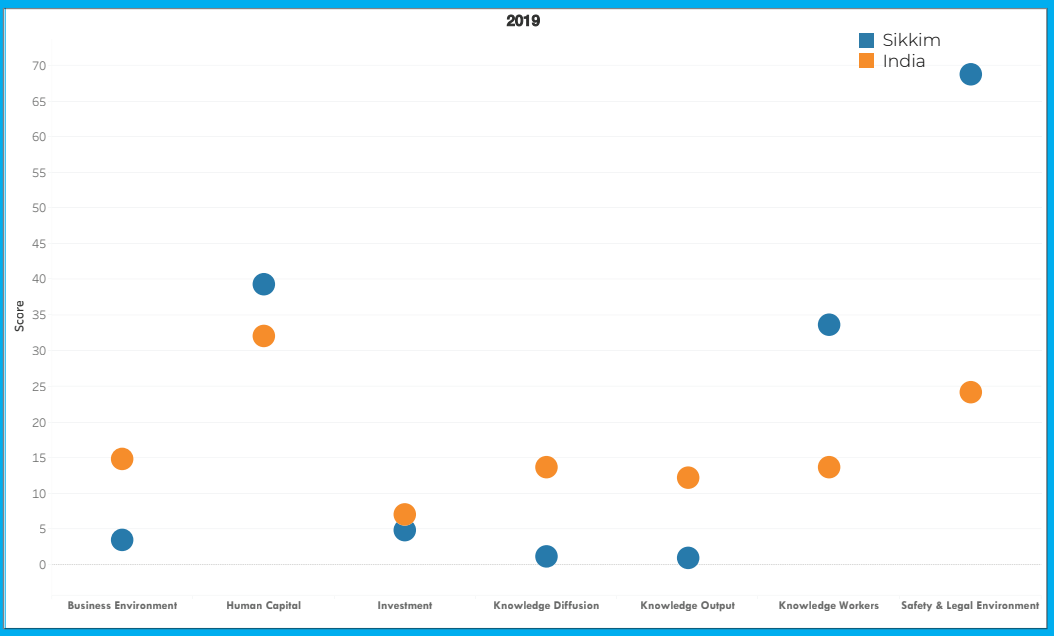

Industrial designs by origin
No. of Common Facility Centres
Venture capital deals
No of NGO's involved in knowledge intensive areas
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Ease of Doing Business-Implementation Score
Enablers Indicator
Performance Indicator
Black bars represent state values
0
5
10
15
20
25
30
35
40
45
50
Country Average

Rank: 1 | **Efficiency Ratio:** 0.03 | **Category:** NE & Hill States

Distance to Frontier



Comparative Analysis



TAMIL NADU

Rank: 2
Efficiency Ratio: 1.8
Category: Major States

Scorecard

TAMIL NADU

India Innovation Index 2019

Innovation 32.98

Enablers 23.56

Human Capital 49.2

Enrolment in Ph.D	49.1
Higher education institutions with NAAC grade A and above	20.44
Number of students in engineering and technology	93.22
Percentage colleges connected through NMEICT	55.85
Percentage of schools with ICT labs	19.89
Pupil teacher ratio-higher education	92

Investment 9.03

Expenditure on Science, Technology & Environment	0.46
FDI inflow	18.37
State govt. expenditure on higher & technical education	2.18
Venture capital deals	21.44

Safety & Legal Environment 7.08

Information Technology/Intellectual Property Acts	0
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	17.95

Knowledge Workers 15.42

Knowledge-intensive employment	9.85
Number of NGO's involved in knowledge intensive areas	3.75
Number of R&D institutions funded by state	26.31
Private R&D units in state	28.71

Business Environment 37.07

Ease of Doing Business-Implementation Score	63.46
Internet subscribers in the state	28.58
Number of Common Facility Centers	24.05
Number of incubator centers in state	45.96
Number of Industrial clusters	60.65
Total number of online services transaction	14.87

Performance 42.4

Knowledge Output 30.22

Industrial designs by origin	2.13
Number of grass root innovations in state	6.52
Number of publications by state universities	100
Number of startups in the state	15.03
Patents filed from state	43.68
Trademark application filed	6.66

Knowledge Diffusion 54.59

High and medium-high-tech manufacturing entities	10.46
ICT exports	20.89
Number of citations	100
Number of registered GI	71.79

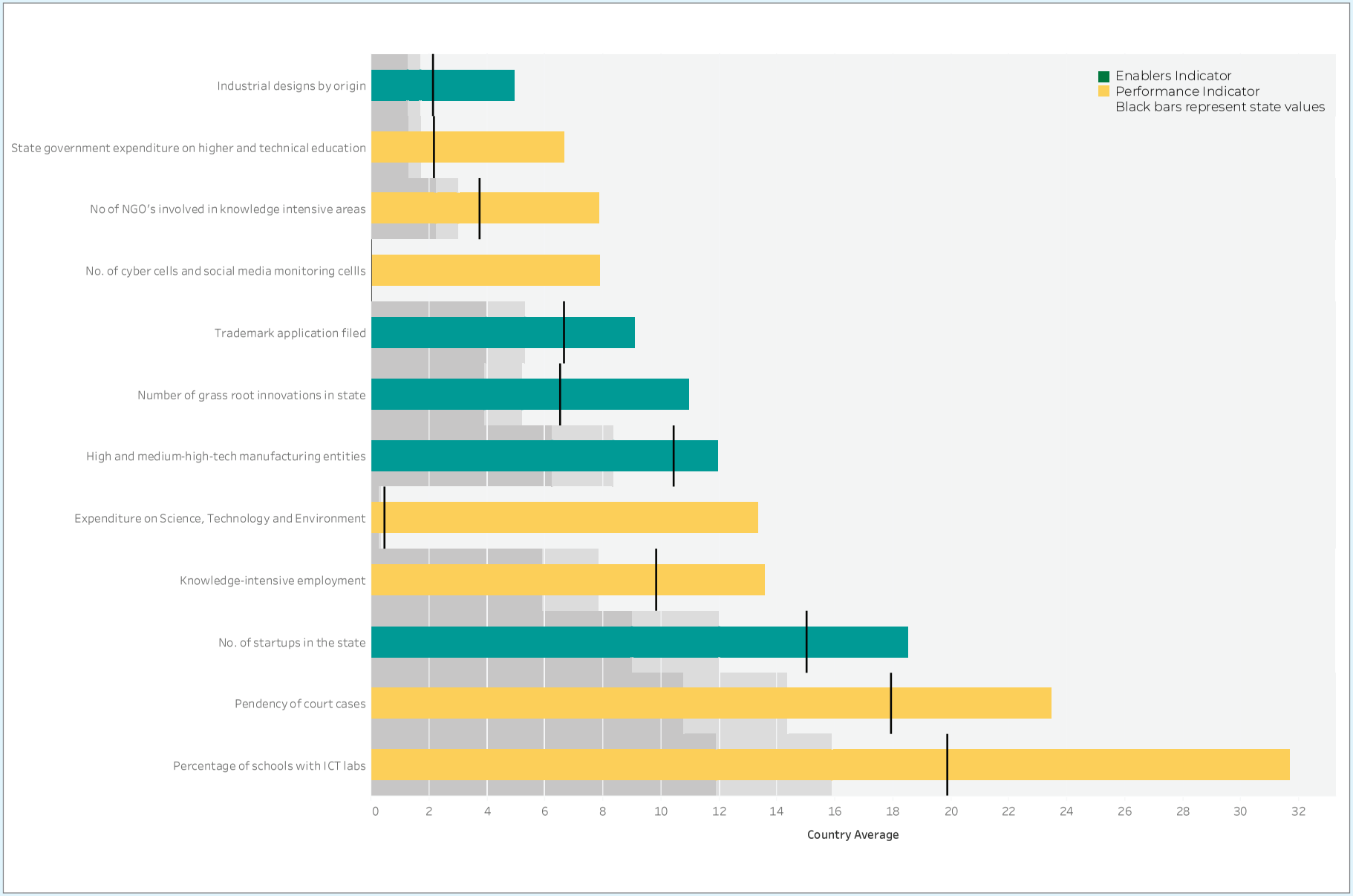
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

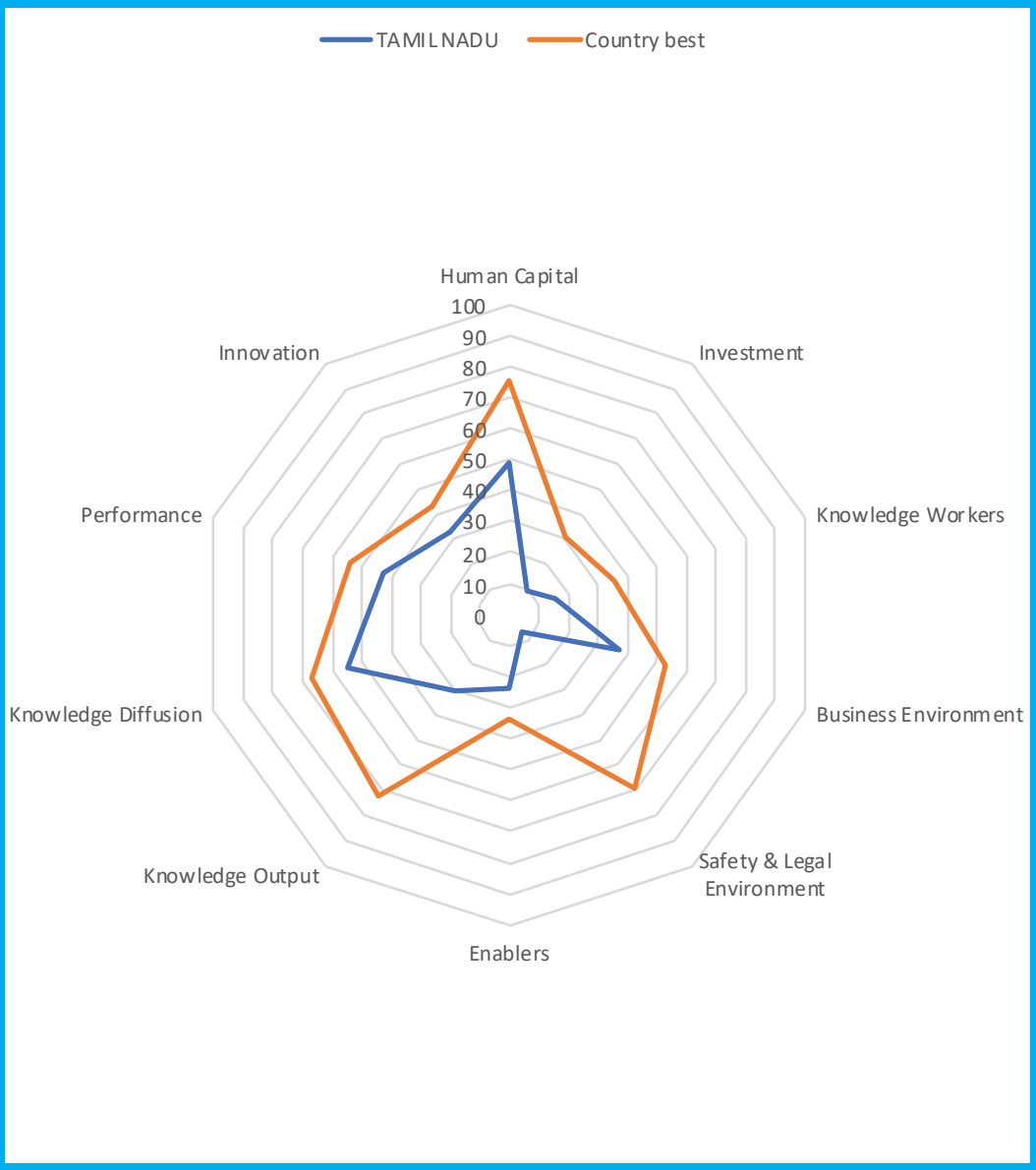
How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas

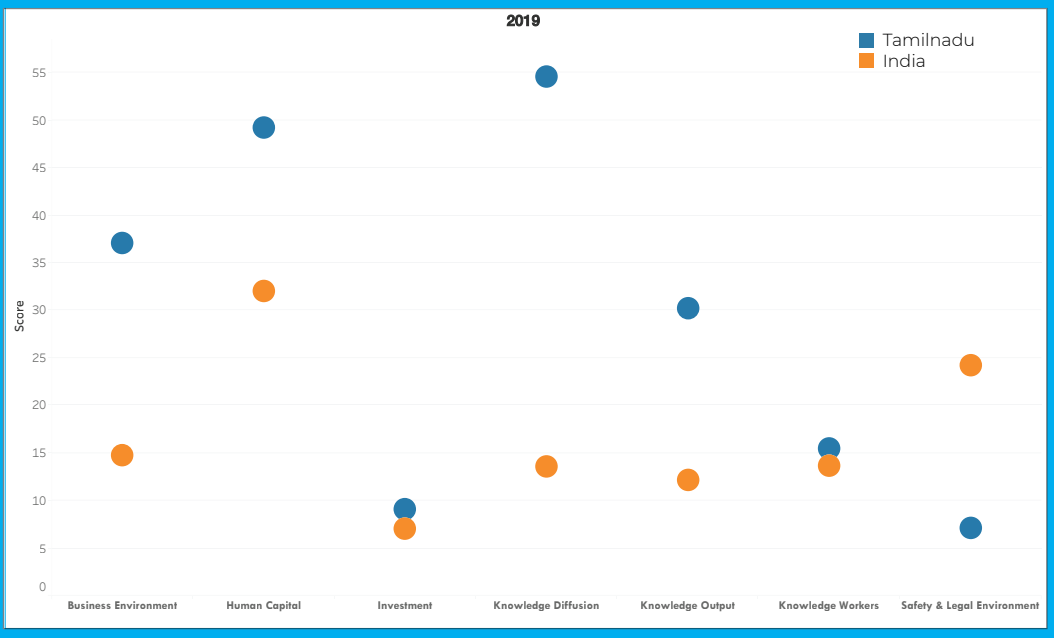

Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
Trademark application filed
Number of grass root innovations in state
High and medium-high-tech manufacturing entities
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
No. of startups in the state
Pendency of court cases
Percentage of schools with ICT labs
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
Country Average

Rank: 2 | **Efficiency Ratio:** 1.8 | **Category:** Major States

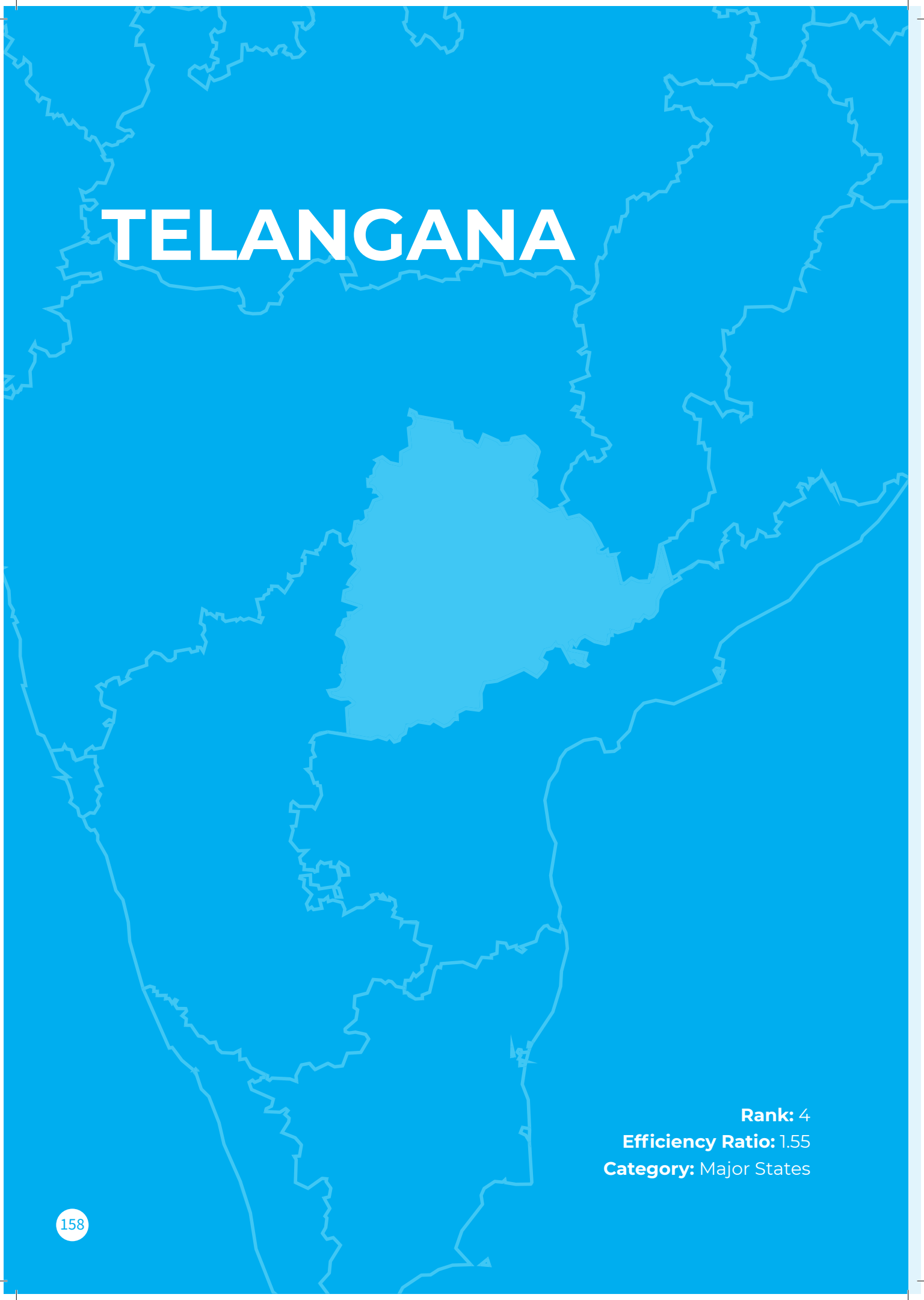
Distance to Frontier



Comparative Analysis



TELANGANA



Rank: 4
Efficiency Ratio: 1.55
Category: Major States

Scorecard

TELANGANA

India Innovation Index 2019

Innovation 22.06

Enablers 17.29

Human Capital 31.04

Enrolment in Ph.D	16.51
Higher education institutions with NAAC grade A and above	5
Number of students in engineering and technology	68.62
Percentage colleges connected through NMEICT	25.42
Percentage of schools with ICT labs	13.51
Pupil teacher ratio-higher education	86

Investment 6.55

Expenditure on Science, Technology & Environment	1.43
FDI inflow	18.69
State govt. expenditure on higher & technical education	0.53
Venture capital deals	12.85

Safety & Legal Environment 9.63

Information Technology/Intellectual Property Acts	26.92
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	12.77

Performance 26.82

Knowledge Workers 15.82

Knowledge-intensive employment	22
Number of NGO's involved in knowledge intensive areas	3.43
Number of R&D institutions funded by state	25.24
Private R&D units in state	13.5

Business Environment 23.43

Ease of Doing Business-Implementation Score	100
Internet subscribers in the state	19.67
Number of Common Facility Centers	0
Number of incubator centers in state	46.99
Number of Industrial clusters	0
Total number of online services transaction	43.92

Knowledge Output 18.76

Industrial designs by origin	0.7
Number of grass root innovations in state	5.11
Number of publications by state universities	14.35
Number of startups in the state	34.01
Patents filed from state	35.72
Trademark application filed	7.18

Knowledge Diffusion 34.89

High and medium-high-tech manufacturing entities	31.97
ICT exports	58.9
Number of citations	16.43
Number of registered GI	35.9

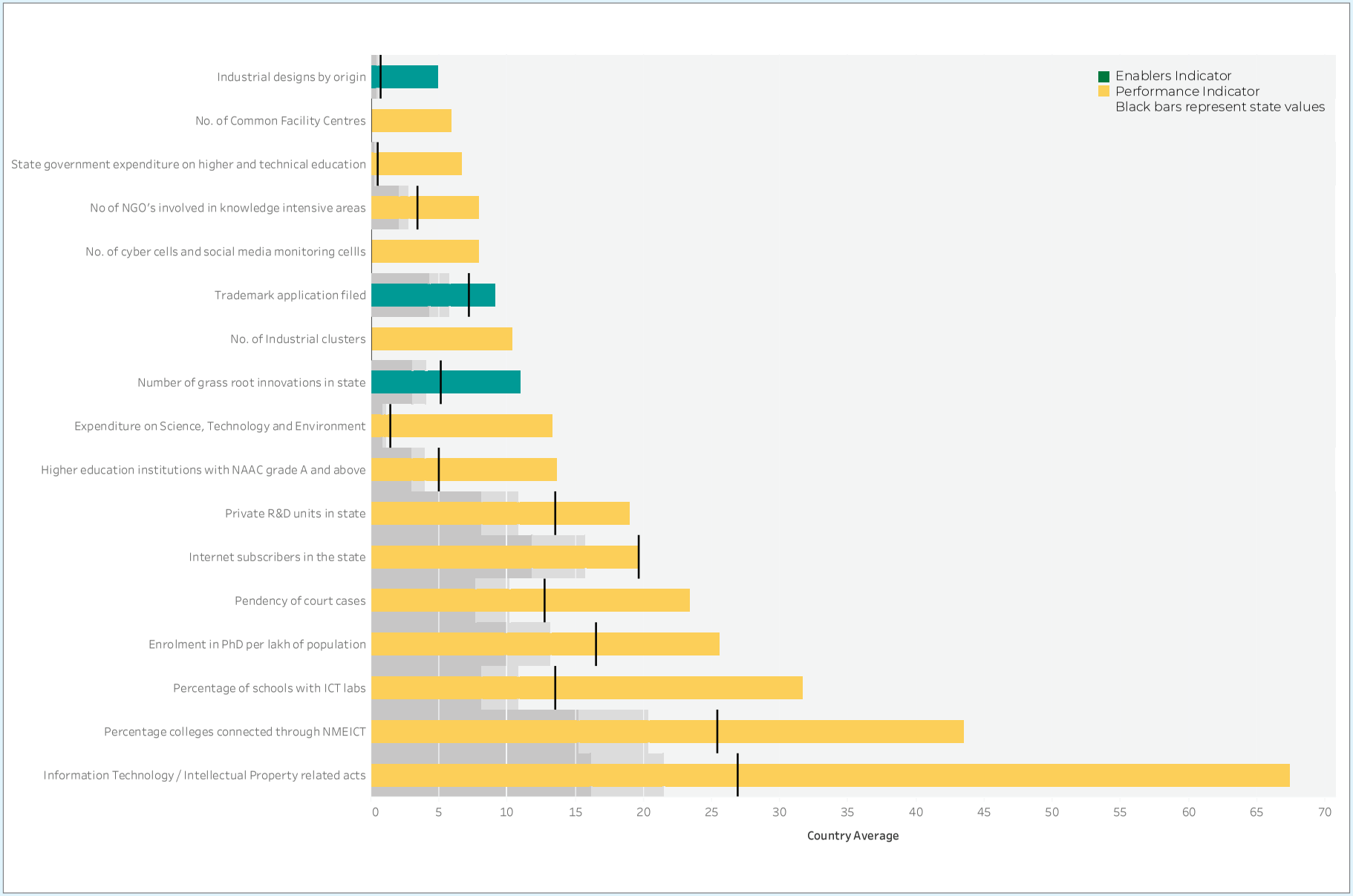
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Enablers Indicator
Performance Indicator
Black bars represent state values
Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
Trademark application filed
No. of Industrial clusters
Number of grass root innovations in state
Expenditure on Science, Technology and Environment
Higher education institutions with NAAC grade A and above
Private R&D units in state
Internet subscribers in the state
Pendency of court cases
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Information Technology / Intellectual Property related acts
0
5
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45
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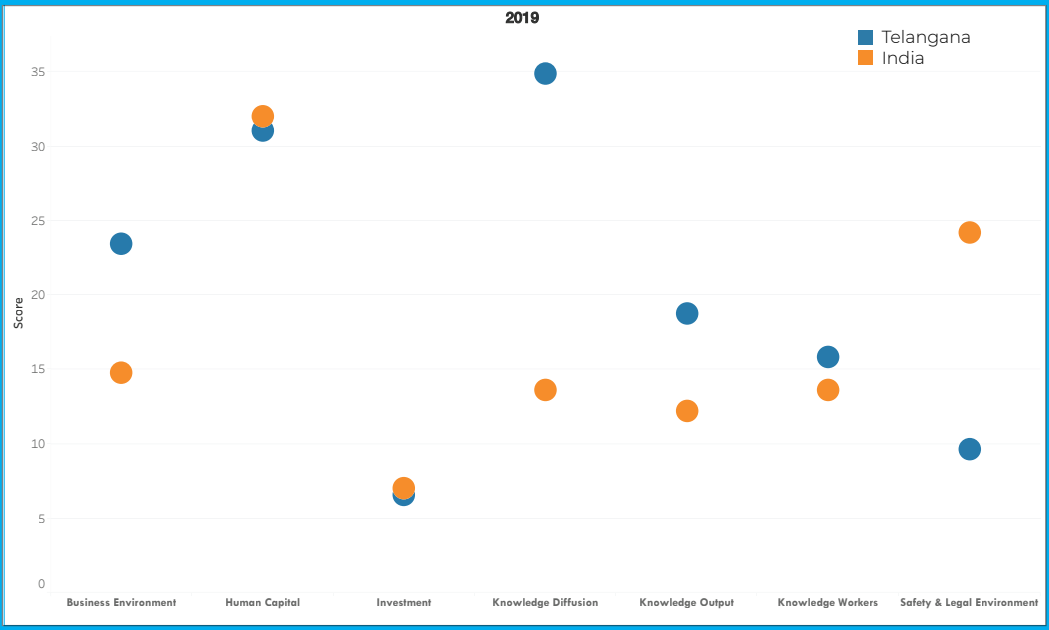
55
60
65
70
Country Average

Distance to Frontier

Comparative Analysis



TRIPURA

Rank: 6
Efficiency Ratio: 0.1
Category: NE & Hill States

Scorecard

TRIPURA

India Innovation Index 2019

Innovation 8.54

Enablers 15.51

Human Capital 30.02

Enrolment in Ph.D	3.85
Higher education institutions with NAAC grade A and above	4.46
Number of students in engineering and technology	5.52
Percentage colleges connected through NMEICT	76.92
Percentage of schools with ICT labs	37.81
Pupil teacher ratio-higher education	66

Investment 7.90

Expenditure on Science, Technology & Environment	42.23
FDI inflow	0.06
State govt. expenditure on higher & technical education	7.65
Venture capital deals	0

Safety & Legal Environment 29.05

Information Technology/Intellectual Property Acts	96.15
Number of cyber cells and social media monitoring cells	5.18
Pendency of court cases	26.36

Knowledge Workers 5.14

Knowledge-intensive employment	0
Number of NGO's involved in knowledge intensive areas	8.41
Number of R&D institutions funded by state	16.49
Private R&D units in state	0

Business Environment 5.42

Ease of Doing Business-Implementation Score	16.62
Internet subscribers in the state	18.05
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	1.01

Performance 1.56

Knowledge Output 3.13

Industrial designs by origin	0
Number of grass root innovations in state	15.07
Number of publications by state universities	0
Number of startups in the state	7.95
Patents filed from state	2.98
Trademark application filed	0.18

Knowledge Diffusion 0

High and medium-high-tech manufacturing entities	0
ICT exports	0
Number of citations	0
Number of registered GI	0

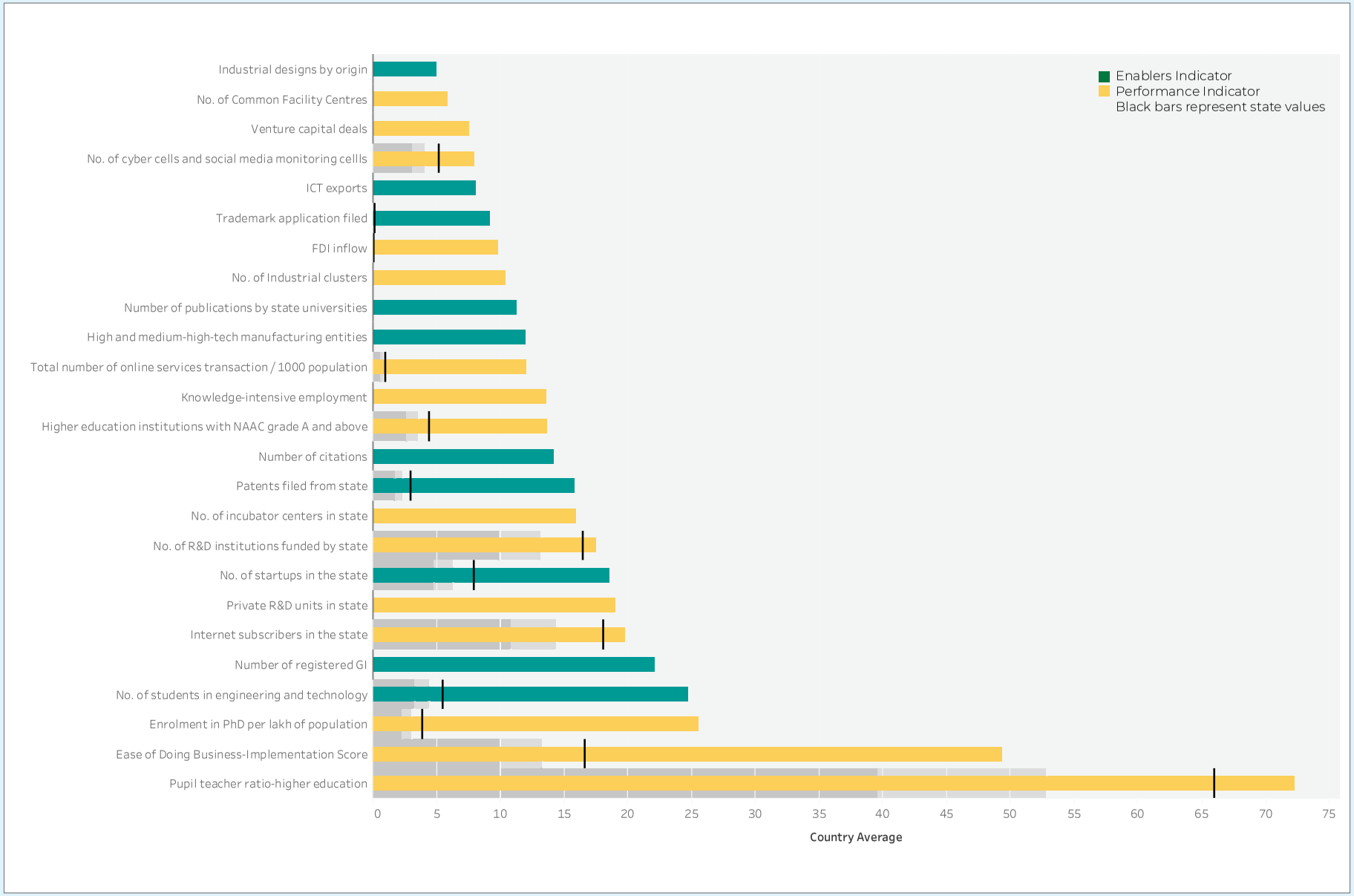
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
Venture capital deals
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Ease of Doing Business-Implementation Score
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
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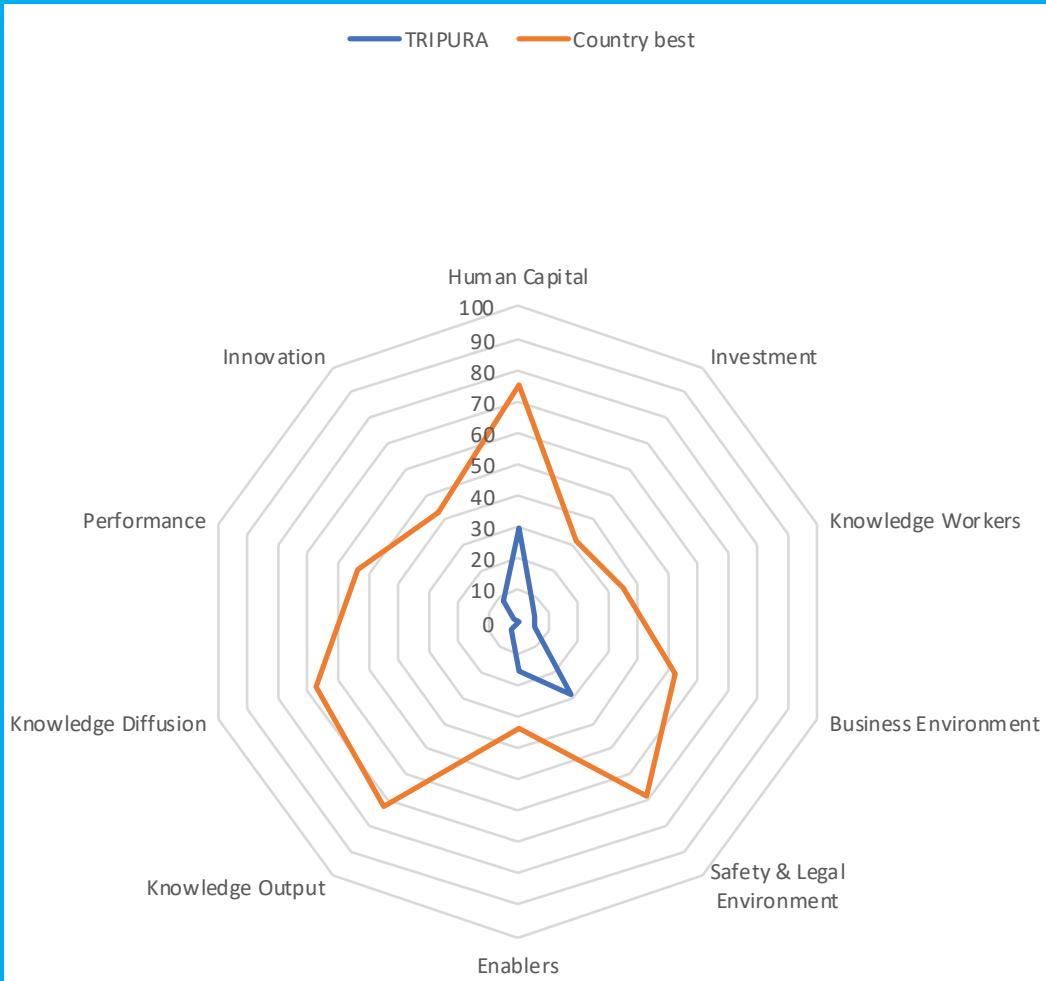
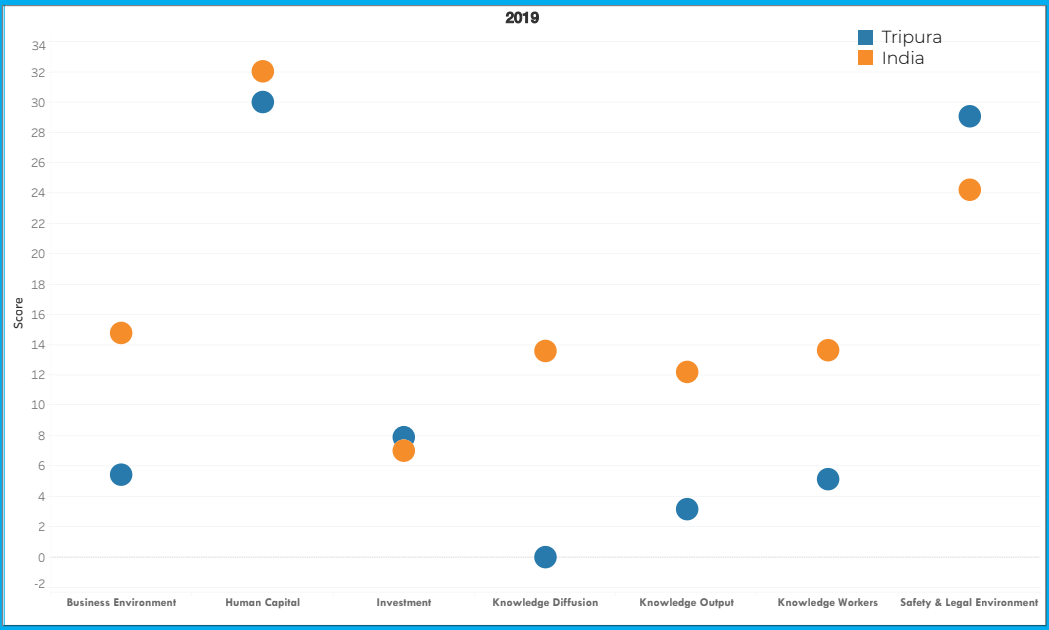
60
65
70
75
Country Average

Distance to Frontier



Comparative Analysis



UTTAR PRADESH

Rank: 7
Efficiency Ratio: 2.22
Category: Major States

Scorecard

UTTAR PRADESH

India Innovation Index 2019

Innovation 19.08

Enablers 11.85

Human Capital 14.97

Enrolment in Ph.D	9.17
Higher education institutions with NAAC grade A and above	1.58
Number of students in engineering and technology	14.53
Percentage colleges connected through NMEICT	34.39
Percentage of schools with ICT labs	31.37
Pupil teacher ratio-higher education	6

Investment 4.15

Expenditure on Science, Technology & Environment	2.64
FDI inflow	0.01
State govt. expenditure on higher & technical education	1.51
Venture capital deals	12.89

Safety & Legal Environment 20.47

Information Technology/Intellectual Property Acts	50
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	30.27

Knowledge Workers 5.83

Knowledge-intensive employment	9.3
Number of NGO's involved in knowledge intensive areas	5.28
Number of R&D institutions funded by state	4.55
Private R&D units in state	3.85

Business Environment 13.83

Ease of Doing Business-Implementation Score	85.52
Internet subscribers in the state	4.9
Number of Common Facility Centers	1.56
Number of incubator centers in state	23.56
Number of Industrial clusters	5.11
Total number of online services transaction	3.35

Performance 26.32

Knowledge Output 15.44

Industrial designs by origin	0.43
Number of grass root innovations in state	1.25
Number of publications by state universities	41.98
Number of startups in the state	31.14
Patents filed from state	4.98
Trademark application filed	2.55

Knowledge Diffusion 37.2

High and medium-high-tech manufacturing entities	7.1
ICT exports	10.96
Number of citations	57.39
Number of registered GI	69.23

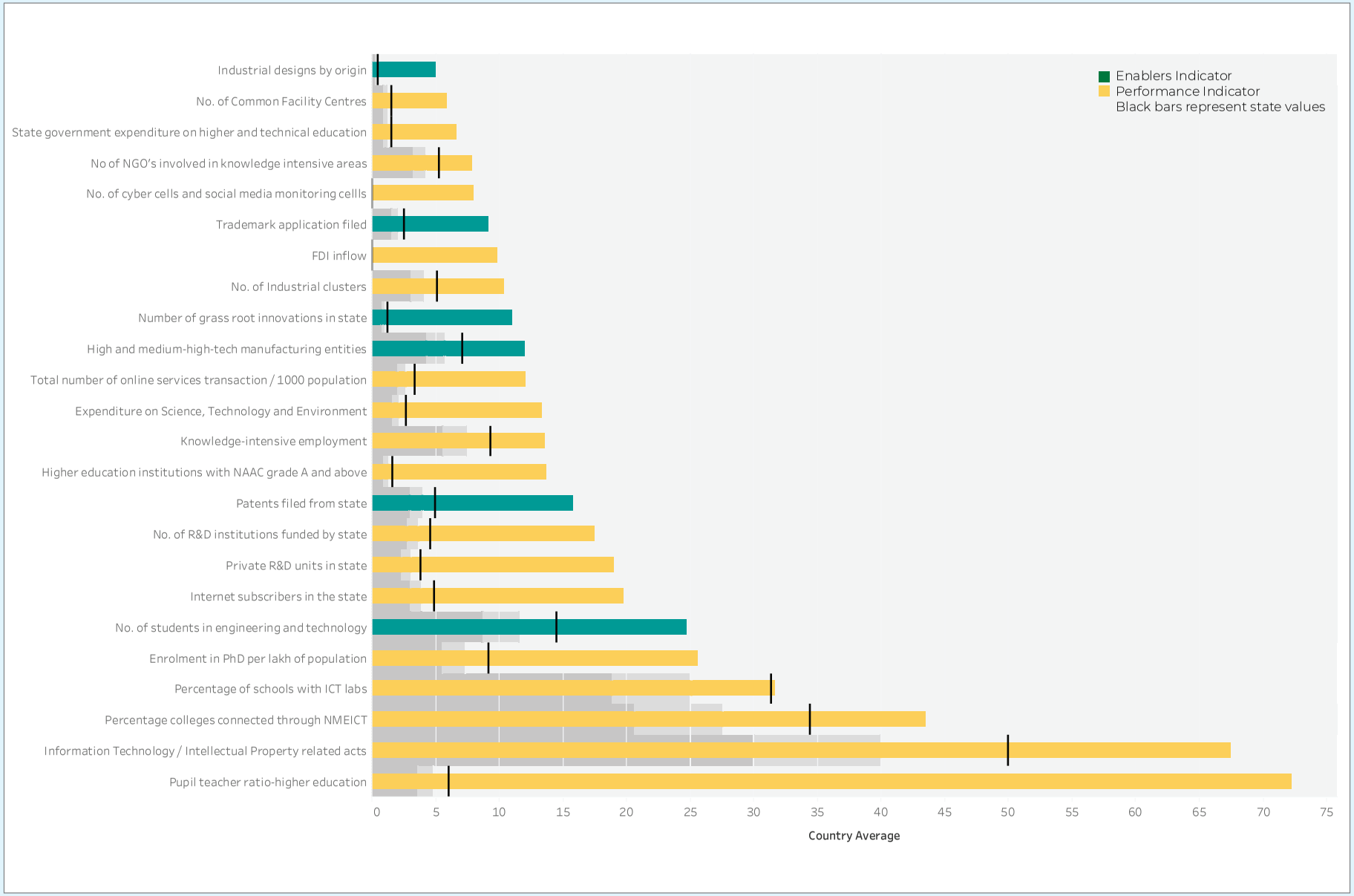
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Patents filed from state
No. of R&D institutions funded by state
Private R&D units in state
Internet subscribers in the state
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Information Technology / Intellectual Property related acts
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
5
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35
40
45
50
55
60
65
70
75
Country Average

Distance to Frontier

Comparative Analysis

UTTARAKHAND

Rank: 3
Efficiency Ratio: 0.5
Category: NE & Hill States

Scorecard

UTTARAKHAND

India Innovation Index 2019

Innovation 13.12

Enablers 17.51

Human Capital 28.37

Enrolment in Ph.D	46.09
Higher education institutions with NAAC grade A and above	1.55
Number of students in engineering and technology	34
Percentage colleges connected through NMEICT	27.78
Percentage of schools with ICT labs	10.96
Pupil teacher ratio-higher education	74

Investment 2.40

Expenditure on Science, Technology & Environment	6.18
FDI inflow	0.34
State govt. expenditure on higher & technical education	6.09
Venture capital deals	0

Safety & Legal Environment 27.47

Information Technology/Intellectual Property Acts	76.92
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	36.39

Knowledge Workers 21.77

Knowledge-intensive employment	26.91
Number of NGO's involved in knowledge intensive areas	8.9
Number of R&D institutions funded by state	44.04
Private R&D units in state	10.46

Business Environment 7.55

Ease of Doing Business-Implementation Score	97.31
Internet subscribers in the state	4.9
Number of Common Facility Centers	0
Number of incubator centers in state	14.72
Number of Industrial clusters	0
Total number of online services transaction	4.47

Performance 8.73

Knowledge Output 10.44

Industrial designs by origin	0.66
Number of grass root innovations in state	26.07
Number of publications by state universities	12.35
Number of startups in the state	15.91
Patents filed from state	9.91
Trademark application filed	7.6

Knowledge Diffusion 7.01

High and medium-high-tech manufacturing entities	6.69
ICT exports	0.34
Number of citations	17.8
Number of registered GI	2.56

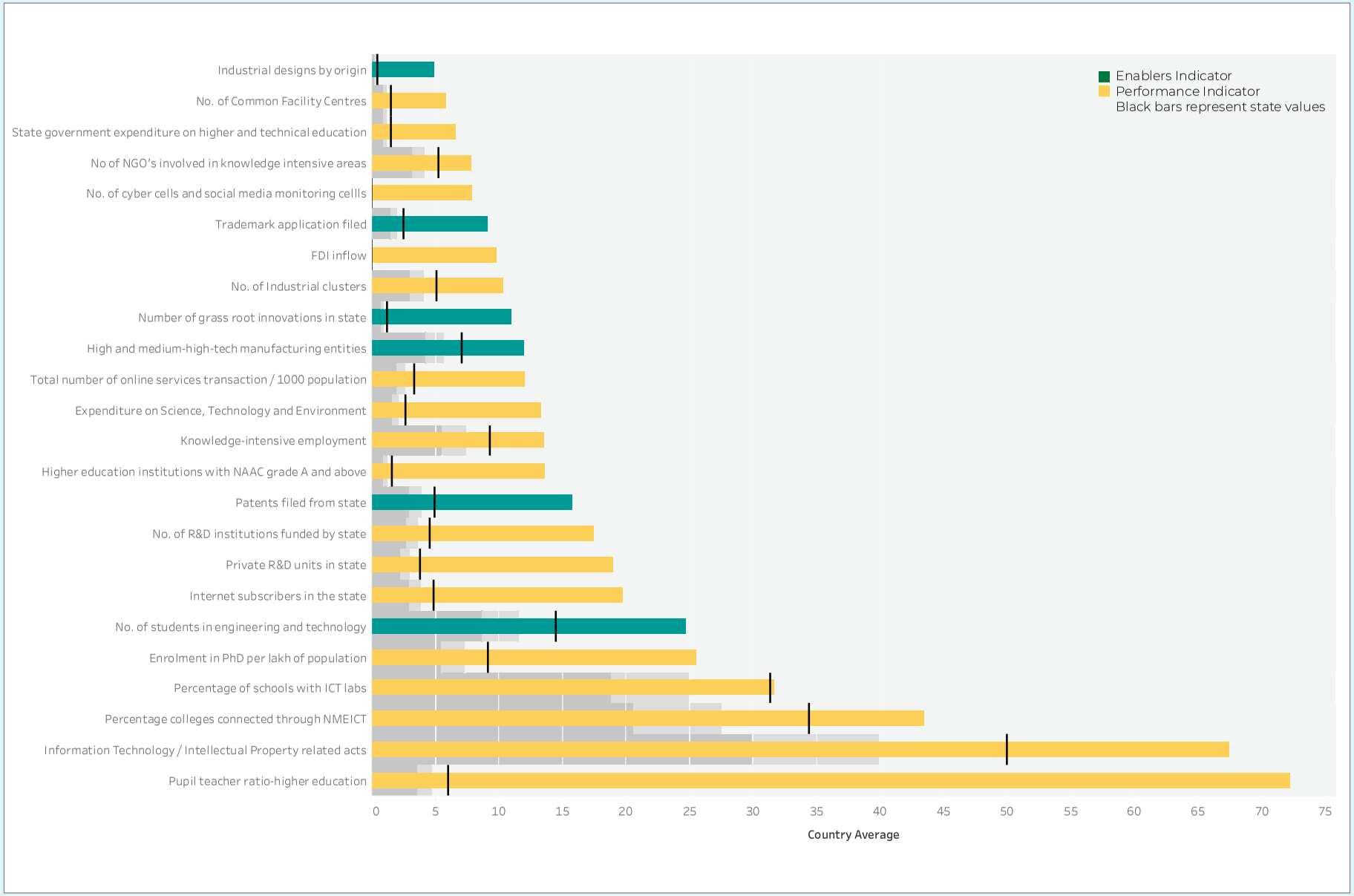
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

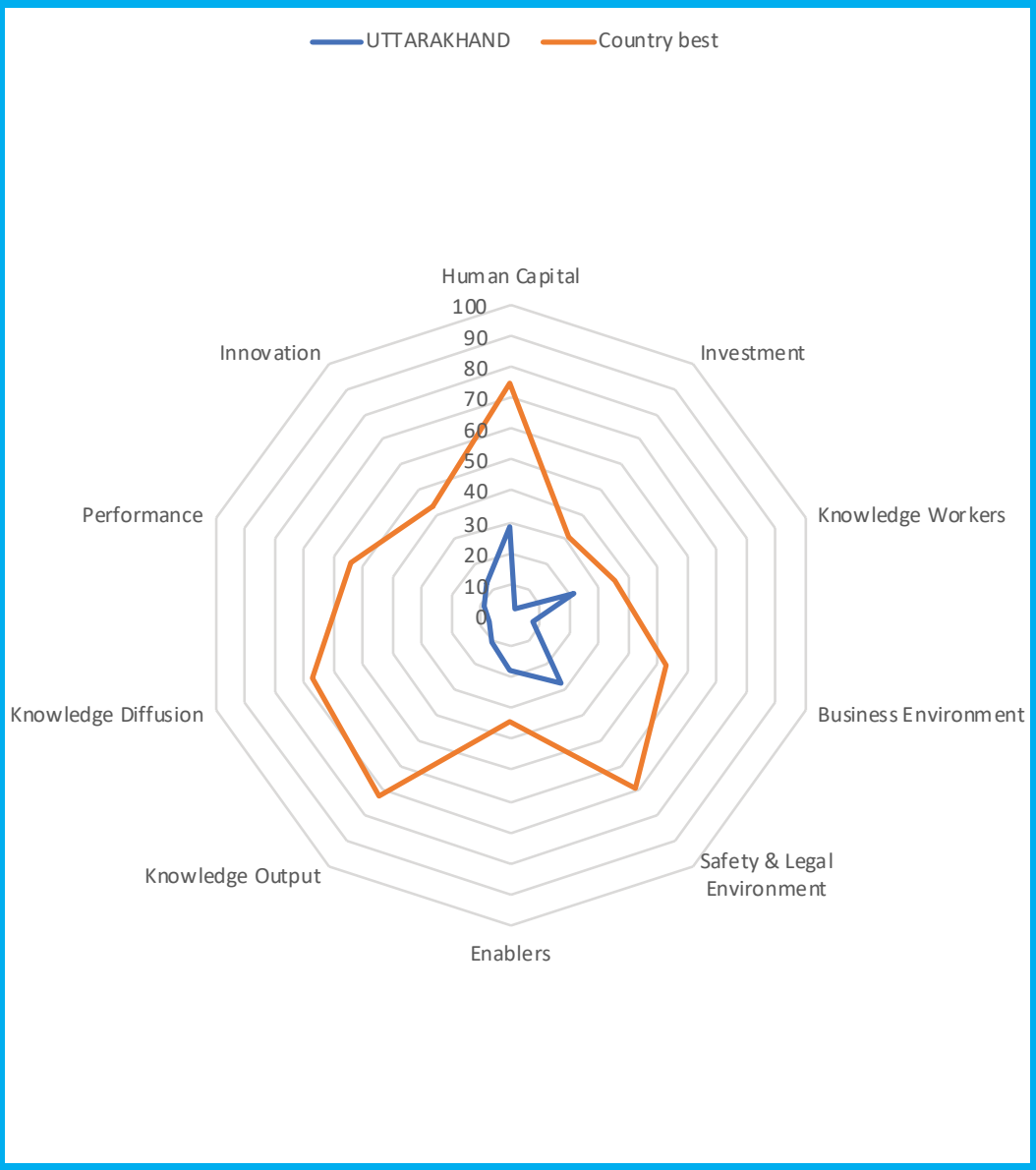
How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Patents filed from state
No. of R&D institutions funded by state
Private R&D units in state
Internet subscribers in the state
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Information Technology / Intellectual Property related acts
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
Country Average

Rank: 3 | **Efficiency Ratio:** 0.5 | **Category:** NE & Hill States

Distance to Frontier



Comparative Analysis

WEST BENGAL

Rank: 8
Efficiency Ratio: 1.52
Category: Major States

WEST BENGAL

India Innovation Index 2019

Innovation 18.21

Enablers 14.45

Human Capital 23.91

Enrolment in Ph.D	9.05
Higher education institutions with NAAC grade A and above	10.08
Number of students in engineering and technology	9.53
Percentage colleges connected through NMEICT	45.94
Percentage of schools with ICT labs	20.42
Pupil teacher ratio-higher education	56

Investment 1.15

Expenditure on Science, Technology & Environment	3.45
FDI inflow	0.37
State govt. expenditure on higher & technical education	2.49
Venture capital deals	0

Safety & Legal Environment 23.14

Information Technology/Intellectual Property Acts	73.08
Number of cyber cells and social media monitoring cells	0.21
Pendency of court cases	26.84

Knowledge Workers 7.19

Knowledge-intensive employment	9.2
Number of NGO's involved in knowledge intensive areas	4.11
Number of R&D institutions funded by state	5.53
Private R&D units in state	10.65

Business Environment 16.87

Ease of Doing Business-Implementation Score	85.23
Internet subscribers in the state	12.78
Number of Common Facility Centers	3.16
Number of incubator centers in state	6.47
Number of Industrial clusters	19.18
Total number of online services transaction	8.48

Performance 21.97

Knowledge Output 11.52

Industrial designs by origin	2
Number of grass root innovations in state	2.58
Number of publications by state universities	42.46
Number of startups in the state	8.48
Patents filed from state	8.21
Trademark application filed	3.27

Knowledge Diffusion 32.43

High and medium-high-tech manufacturing entities	5.8
ICT exports	3.95
Number of citations	59.49
Number of registered GI	53.85

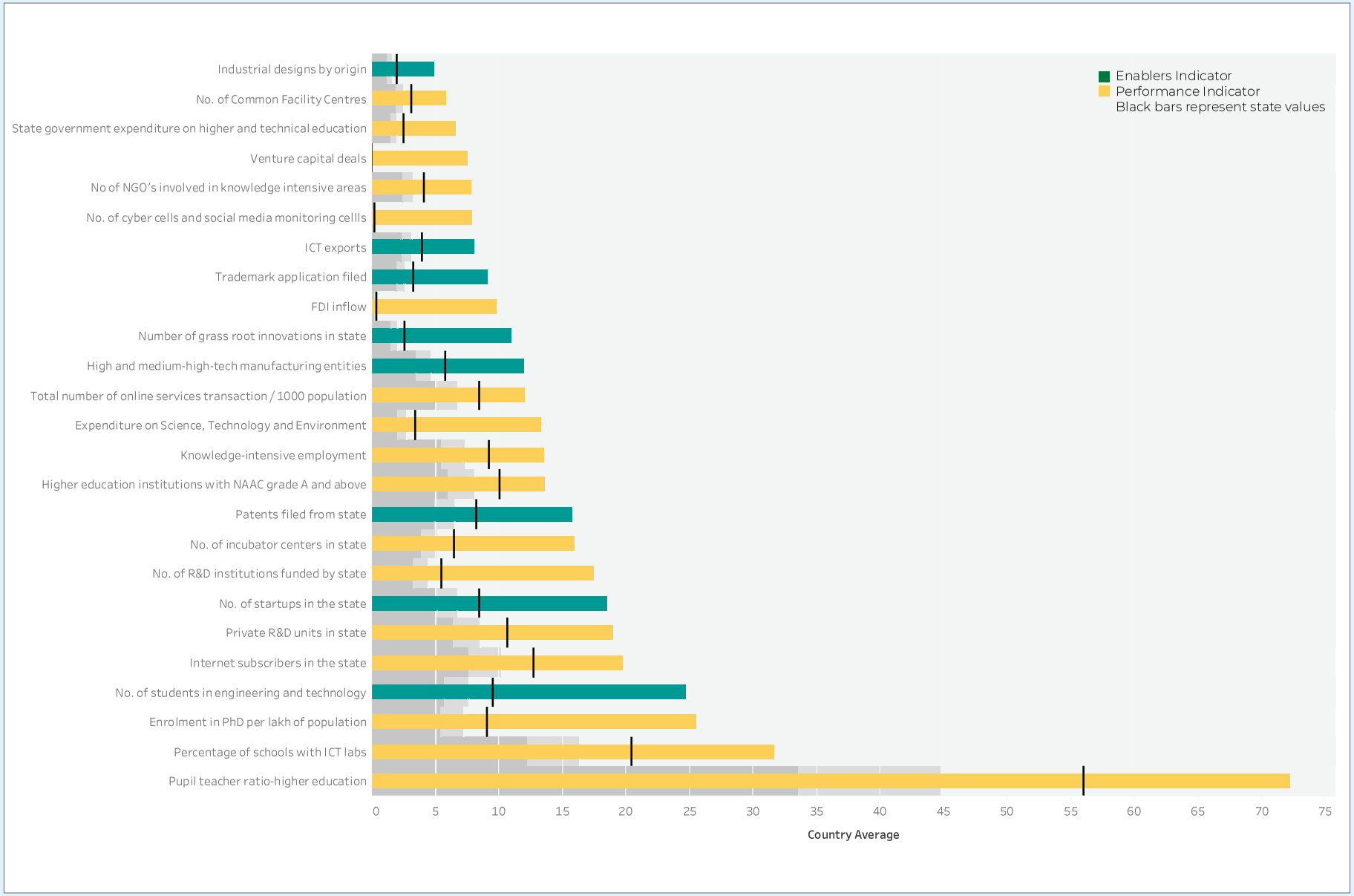
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
Number of grass root innovations in state
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
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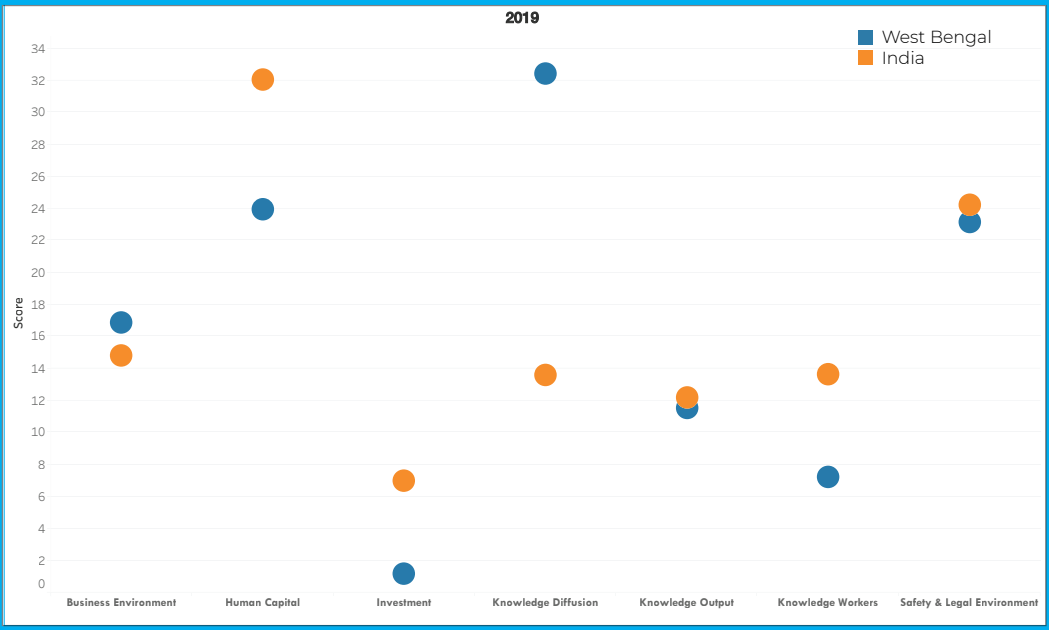
70
75
Country Average

Distance to Frontier

Comparative Analysis



ANDAMAN & NICOBAR ISLANDS

Rank: 5
Efficiency Ratio: 0.14
Category: UT / City States / Small States

Scorecard

ANDAMAN & NICOBAR ISLANDS

India Innovation Index 2019

Innovation 12.75

Enablers 22.35

Human Capital	**39.89**
Enrolment in Ph.D	21.26
Higher education institutions with NAAC grade A and above	32.47
Number of students in engineering and technology	14.07
Percentage colleges connected through NMEICT	71.43
Percentage of schools with ICT labs	19.31
Pupil teacher ratio-higher education	86
Investment	**6.86**
Expenditure on Science, Technology & Environment	0
FDI inflow	0.83
State govt. expenditure on higher & technical education	28.04
Venture capital deals	0
Safety & Legal Environment	**58.26**
Information Technology/Intellectual Property Acts	84.62
Number of cyber cells and social media monitoring cells	100
Pendency of court cases	0.81

Knowledge Workers	**0.8**
Knowledge-intensive employment	0
Number of NGO's involved in knowledge intensive areas	3.87
Number of R&D institutions funded by state	0
Private R&D units in state	0
Business Environment	**5.94**
Ease of Doing Business-Implementation Score	0
Internet subscribers in the state	19.76
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	10.17

Performance 3.14

Knowledge Output	**6.28**
Industrial designs by origin	0
Number of grass root innovations in state	0
Number of publications by state universities	0
Number of startups in the state	19.89
Patents filed from state	8.21
Trademark application filed	1.08
Knowledge Diffusion	**0**
High and medium-high-tech manufacturing entities	0
ICT exports	0
Number of citations	0
Number of registered GI	0

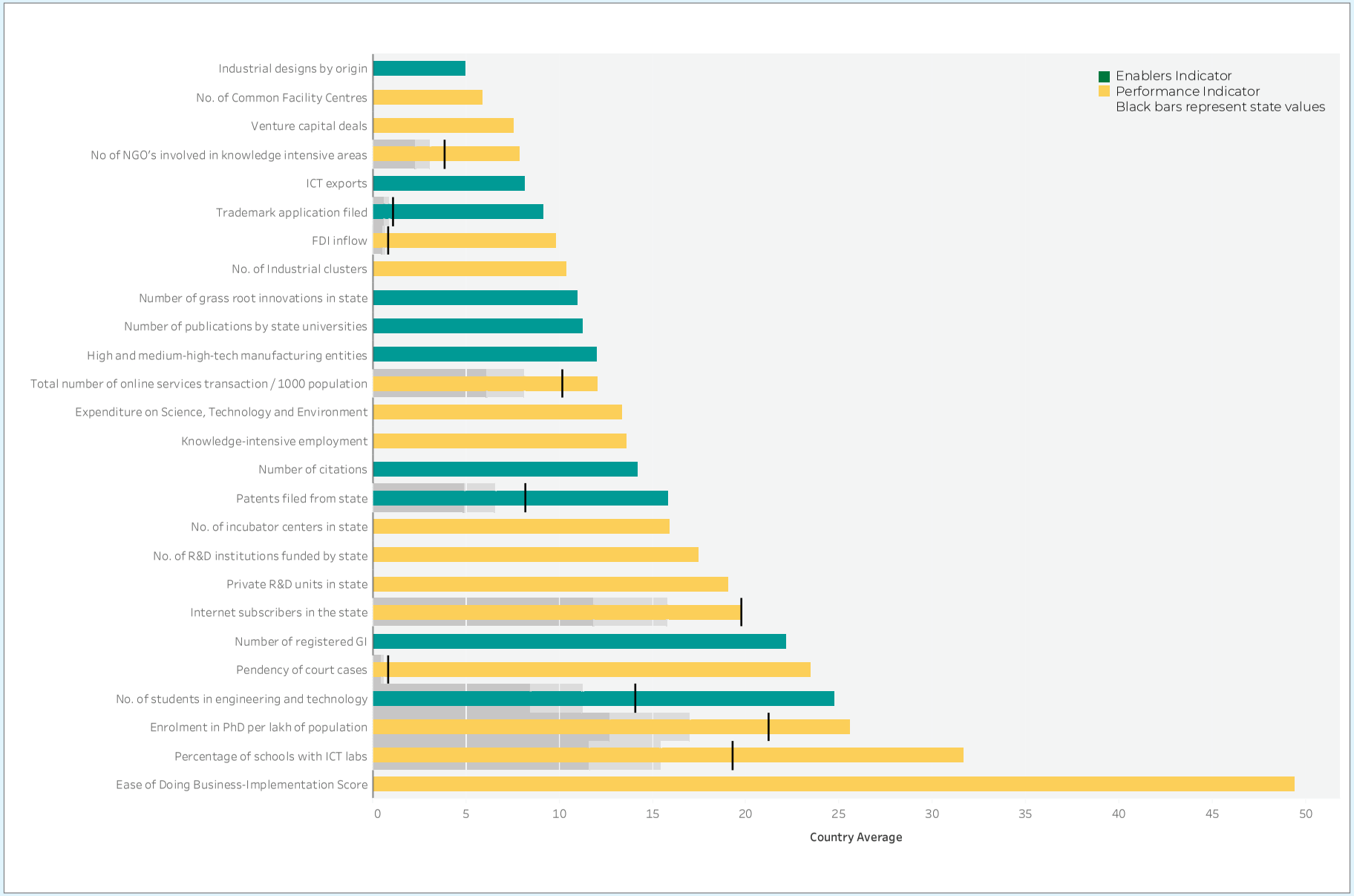
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
Venture capital deals
No of NGO's involved in knowledge intensive areas
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Ease of Doing Business-Implementation Score
Enablers Indicator
Performance Indicator
Black bars represent state values
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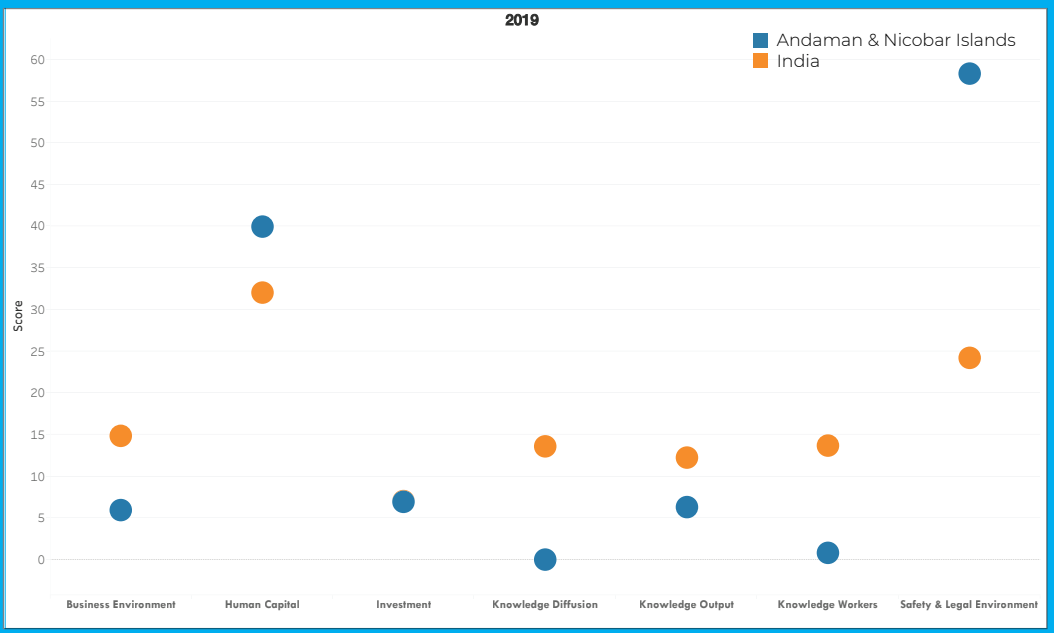
Country Average

Rank: 5 | **Efficiency Ratio:** 0.14 | **Category:** UT / City States / Small States

Distance to Frontier

Comparative Analysis



CHANDIGARH

Rank: 2
Efficiency Ratio: 0.71
Category: UT / City States / Small States

Scorecard

CHANDIGARH

India Innovation Index 2019

Innovation 27.97

Enablers 32.79

Human Capital 74.96

Enrolment in Ph.D	99.98
Higher education institutions with NAAC grade A and above	100
Number of students in engineering and technology	22.46
Percentage colleges connected through NMEICT	100
Percentage of schools with ICT labs	47.86
Pupil teacher ratio-higher education	78

Investment 2.40

Expenditure on Science, Technology & Environment	0
FDI inflow	0.06
State govt. expenditure on higher & technical education	9.97
Venture capital deals	0

Safety & Legal Environment 50.74

Information Technology/Intellectual Property Acts	50
Number of cyber cells and social media monitoring cells	36.06
Pendency of court cases	67.26

Performance 23.14

Knowledge Workers 29.56

Knowledge-intensive employment	26.36
Number of NGO's involved in knowledge intensive areas	0
Number of R&D institutions funded by state	0
Private R&D units in state	100

Business Environment 6.31

Ease of Doing Business-Implementation Score	0
Internet subscribers in the state	19.76
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	13.28

Knowledge Output 36.42

Industrial designs by origin	3.98
Number of grass root innovations in state	0
Number of publications by state universities	7.31
Number of startups in the state	56.52
Patents filed from state	51.79
Trademark application filed	57.07

Knowledge Diffusion 9.87

High and medium-high-tech manufacturing entities	0
ICT exports	17.74
Number of citations	15.21
Number of registered GI	0

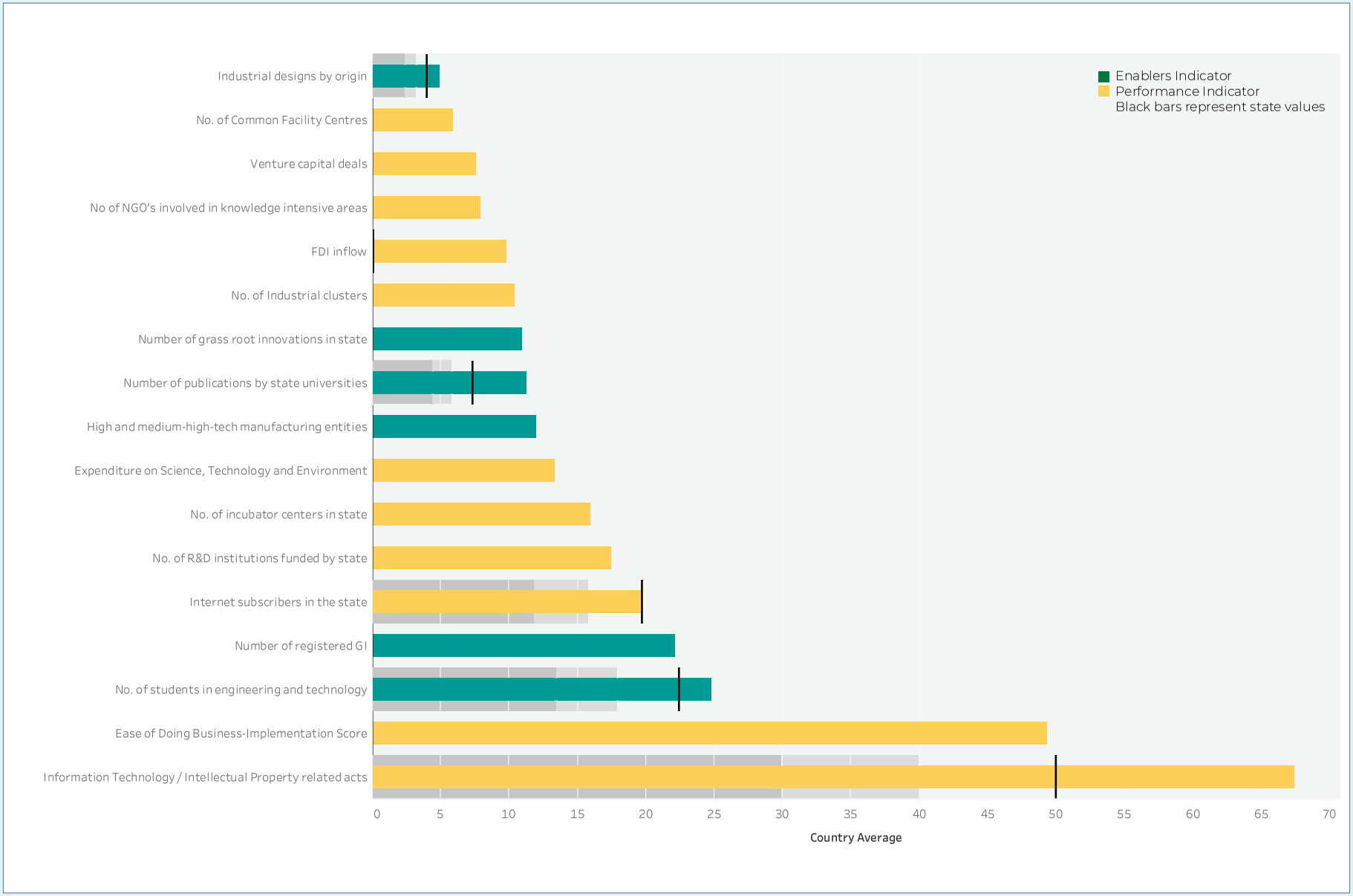
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
Venture capital deals
No of NGO's involved in knowledge intensive areas
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Expenditure on Science, Technology and Environment
No. of incubator centers in state
No. of R&D institutions funded by state
Internet subscribers in the state
Number of registered GI
No. of students in engineering and technology
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
Enablers Indicator
Performance Indicator
Black bars represent state values
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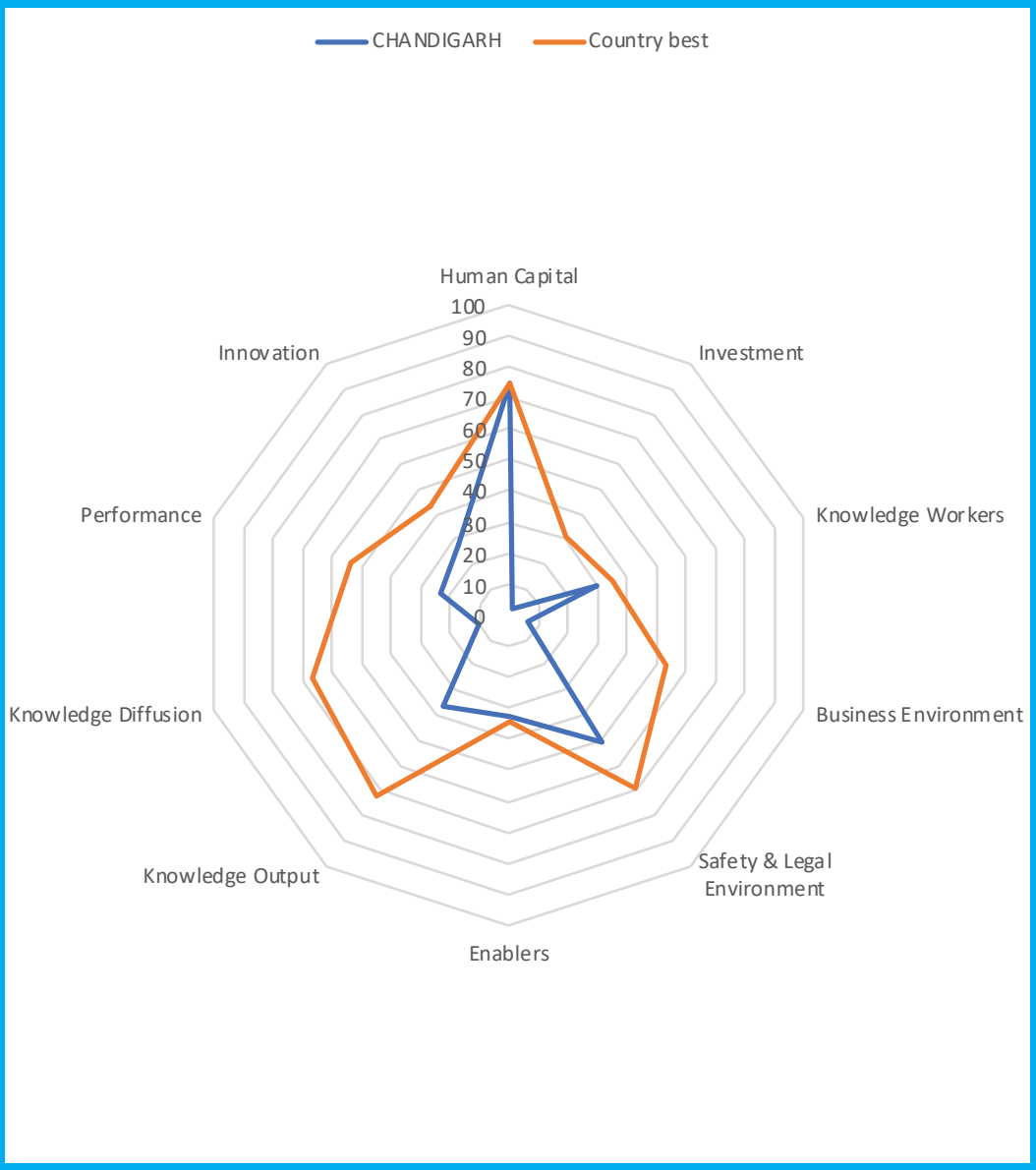
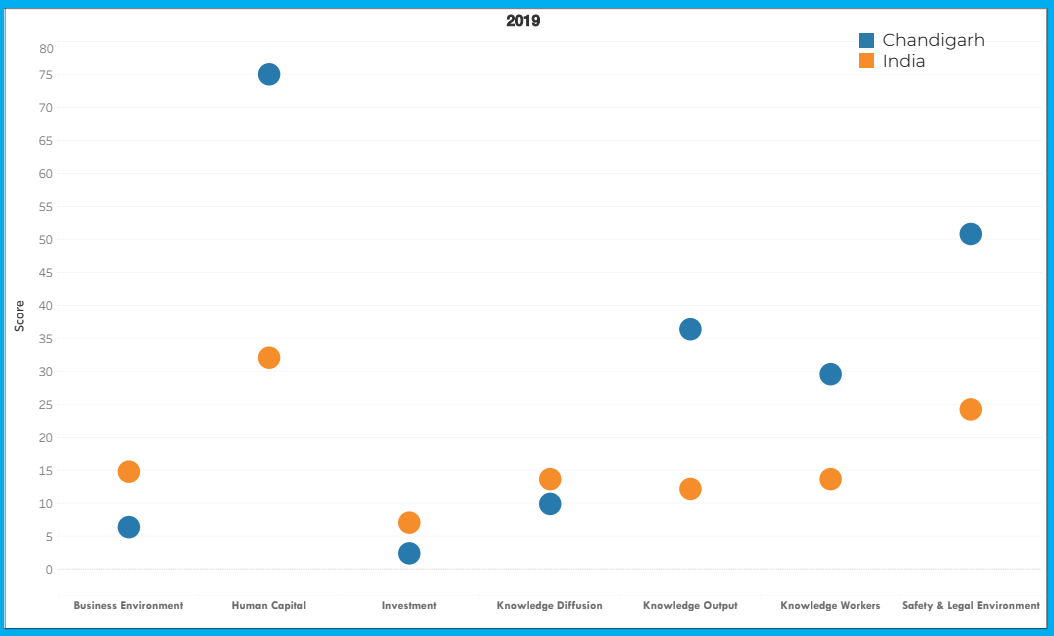
Country Average

Rank: 2 | **Efficiency Ratio:** 0.71 | **Category:** UT / City States / Small States

Distance to Frontier



Comparative Analysis



DADRA & NAGAR HAVELI

Rank: 7
Efficiency Ratio: 0.9
Category: UT / City States / Small States

Scorecard

DADRA & NAGAR HAVELI

India Innovation Index 2019

Innovation 11.74

Enablers 12.37

Human Capital 19.19

Enrolment in Ph.D	0
Higher education institutions with NAAC grade A and above	0
Number of students in engineering and technology	8.39
Percentage colleges connected through NMEICT	31.25
Percentage of schools with ICT labs	23.04
Pupil teacher ratio-higher education	66

Investment 1.90

Expenditure on Science, Technology & Environment	0
FDI inflow	0
State govt. expenditure on higher & technical education	7.91
Venture capital deals	0

Safety & Legal Environment 20.72

Information Technology/Intellectual Property Acts	80.77
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	17.59

Knowledge Workers 13.41

Knowledge-intensive employment	8.15
Number of NGO's involved in knowledge intensive areas	0
Number of R&D institutions funded by state	0
Private R&D units in state	51.18

Business Environment 6.63

Ease of Doing Business-Implementation Score	1.51
Internet subscribers in the state	19.76
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	15.16

Performance 11.11

Knowledge Output 11.49

Industrial designs by origin	23.59
Number of grass root innovations in state	0
Number of publications by state universities	0
Number of startups in the state	19.6
Patents filed from state	13.63
Trademark application filed	5.96

Knowledge Diffusion 10.73

High and medium-high-tech manufacturing entities	100
ICT exports	0
Number of citations	0
Number of registered GI	0

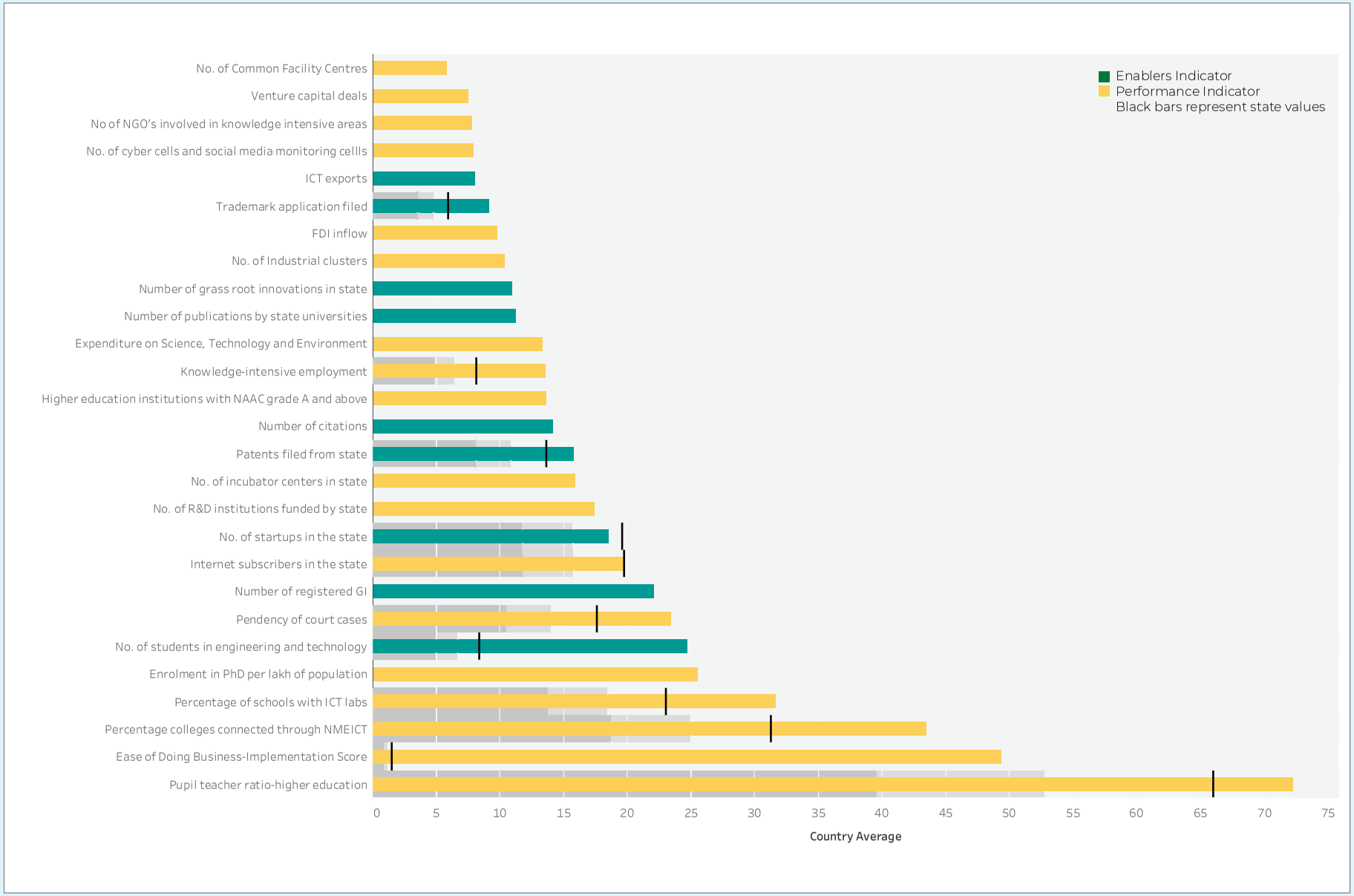
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


No. of Common Facility Centres
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
Expenditure on Science, Technology and Environment
Knowledge-intensive employment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Pupil teacher ratio-higher education
Enablers Indicator
Performance Indicator
Black bars represent state values
0
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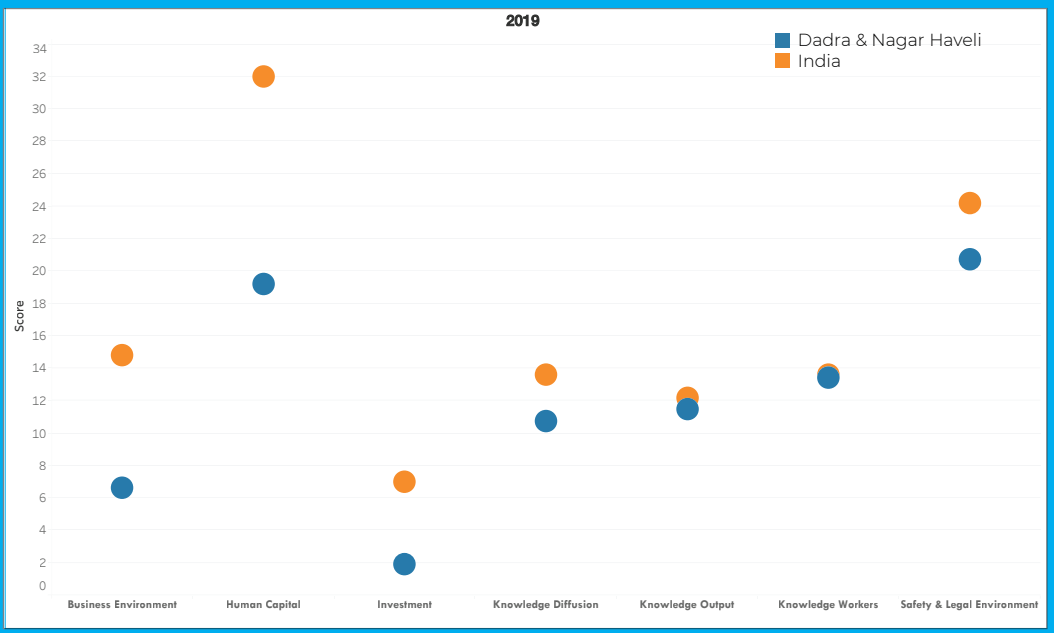
70
75
Country Average

Rank: 7 | **Efficiency Ratio:** 0.9 | **Category:** UT / City States / Small States

Distance to Frontier

Comparative Analysis



DAMAN & DIU

Rank: 6
Efficiency Ratio: 0.92
Category: UT / City States / Small States

Scorecard

DAMAN & DIU

India Innovation Index 2019

Innovation 12.1

Enablers 12.63

Human Capital 23.28

Enrolment in Ph.D	0
Higher education institutions with NAAC grade A and above	0
Number of students in engineering and technology	13.91
Percentage colleges connected through NMEICT	31.25
Percentage of schools with ICT labs	19.31
Pupil teacher ratio-higher education	94

Investment 0.11

Expenditure on Science, Technology & Environment	0
FDI inflow	0
State govt. expenditure on higher & technical education	0.44
Venture capital deals	0

Safety & Legal Environment 23.6

Information Technology/Intellectual Property Acts	65.38
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	31.57

Knowledge Workers 9.95

Knowledge-intensive employment	15.21
Number of NGO's involved in knowledge intensive areas	6.05
Number of R&D institutions funded by state	0
Private R&D units in state	18.08

Business Environment 6.23

Ease of Doing Business-Implementation Score	14.5
Internet subscribers in the state	19.76
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	5.56

Performance 11.56

Knowledge Output 17.06

Industrial designs by origin	100
Number of grass root innovations in state	0
Number of publications by state universities	0
Number of startups in the state	0
Patents filed from state	0
Trademark application filed	16.83

Knowledge Diffusion 6.06

High and medium-high-tech manufacturing entities	56.52
ICT exports	0
Number of citations	0
Number of registered GI	0

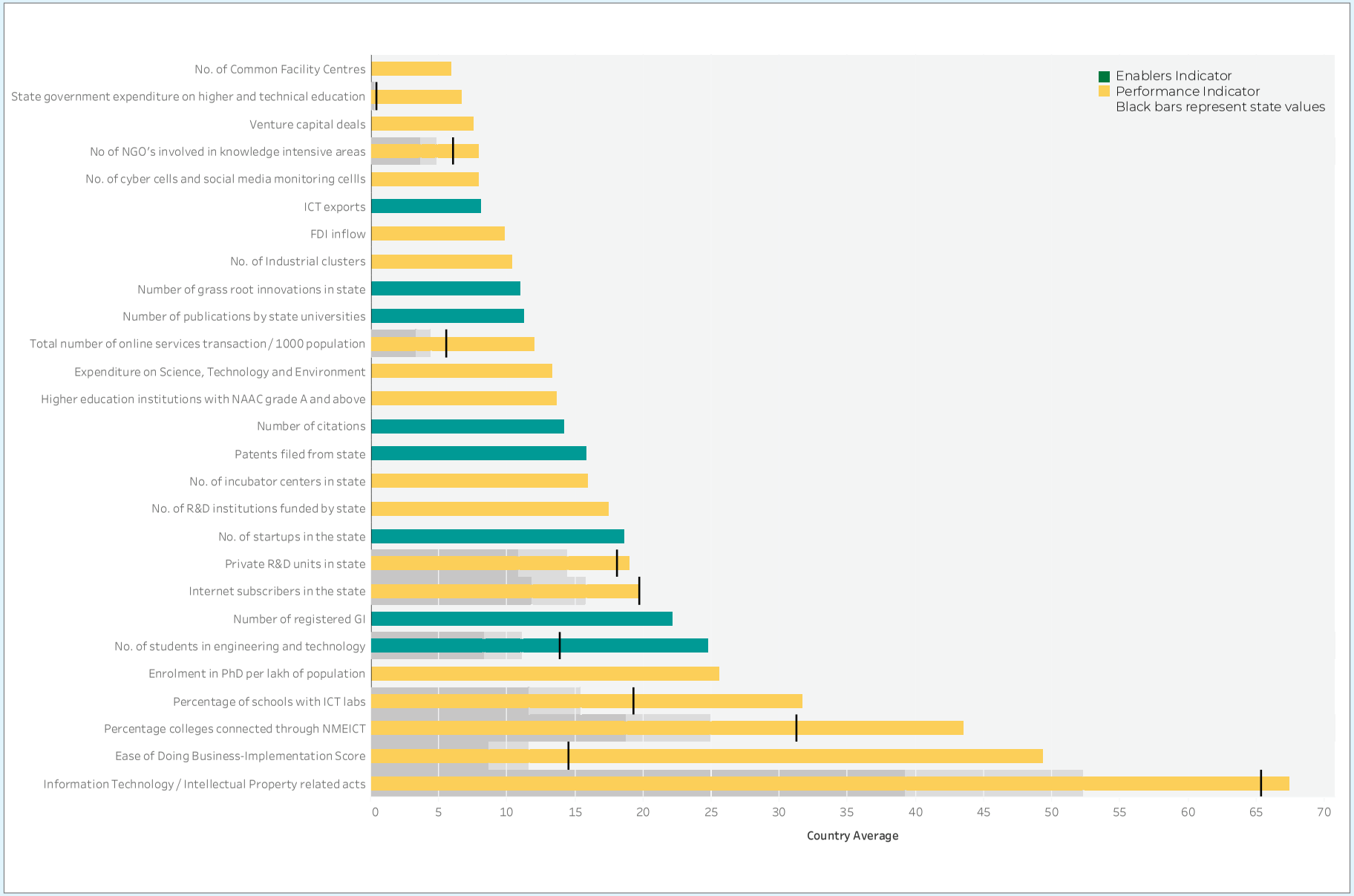
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
Enablers Indicator
Performance Indicator
Black bars represent state values
0
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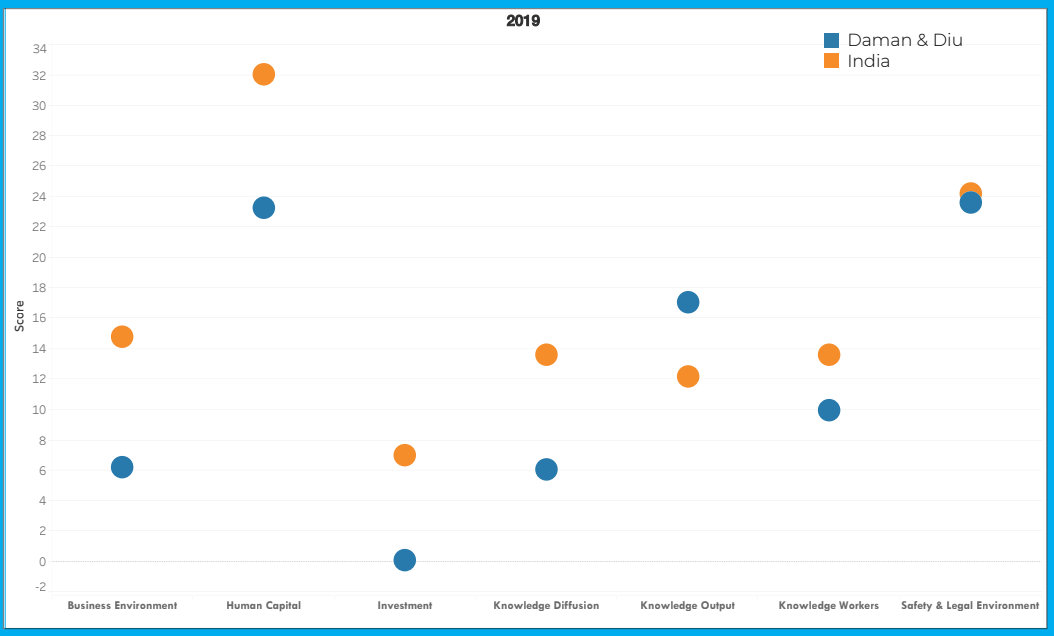
70
Country Average

Rank: 6 | **Efficiency Ratio:** 0.92 | **Category:** UT / City States / Small States

Distance to Frontier

Comparative Analysis



LAKSHADWEEP

Rank: 8
Efficiency Ratio: 0
Category: UT / City States / Small States

Scorecard

LAKSHADWEEP

India Innovation Index 2019

Innovation 8.35

Enablers 16.67

Human Capital 25.48

Enrolment in PhD per lakh of population	0
Higher education institutions with NAAC grade A and above (% of total)	0
No. of students in engineering and technology (at UG, PG & Diploma level)	0
Percentage colleges connected through NMEICT	0
Percentage of schools with ICT labs	100
Pupil teacher ratio-higher education	98

Investment 24.03

Expenditure on Science, Technology & Environment	0
FDI inflow	0
State govt. expenditure on higher & technical education	100
Venture capital deals	0

Safety & Legal Environment 17.06

Information Technology/Intellectual Property Acts	0
No. of cyber cells and social media monitoring cellls	0
Pendency of court cases	-11...

Knowledge Workers 0

Knowledge-intensive employment	0
No of NGO's involved in knowledge intensive areas	0
No. of R&D institutions funded by state	0
Private R&D units in state	0

Business Environment 16.75

Ease of Doing Business-Implementation Score	0
Internet subscribers in the state	19.76
No. of Common Facility Centres	0
No. of incubator centers in state	0
No. of Industrial clusters	0
Total number of online services transaction / 1000 population	100

Performance 0.04

Knowledge Output 0.08

Industrial designs by origin	0
No. of startups in the state	0
Number of grass root innovations in state	0
Number of publications by state universities	0
Patents filed from state	0
Trademark application filed	0.3

Knowledge Diffusion 0

High and medium-high-tech manufacturing entities	0
ICT exports	0
Number of citations	0
Number of registered GI	0

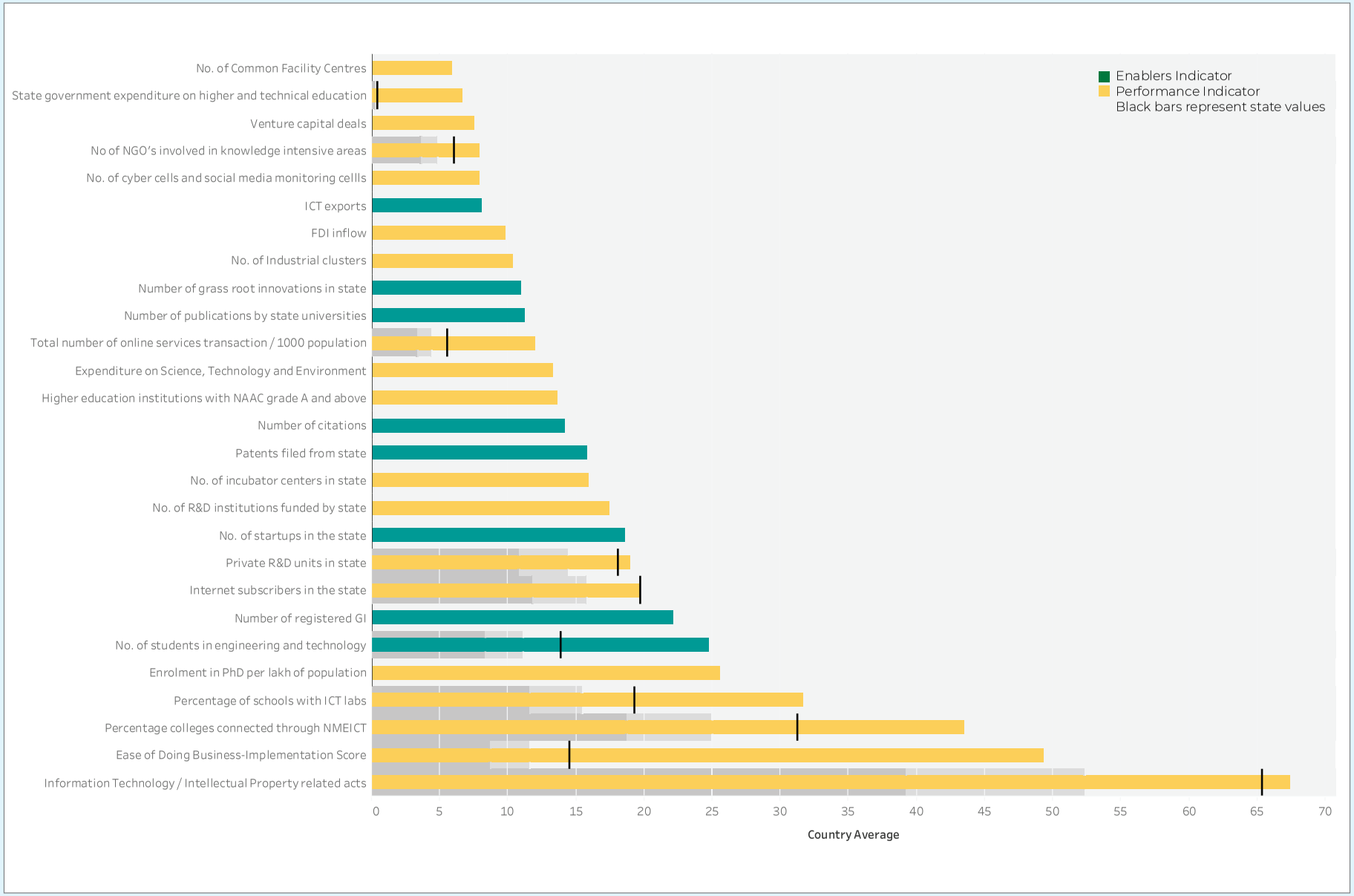
All the values represent scores on a scale of 0-100

Overperforming
Performing within expected range
Underperforming

Strength and Weakness is relative to 10 states with similar GDP

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
FDI inflow
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Higher education institutions with NAAC grade A and above
Number of citations
Patents filed from state
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Private R&D units in state
Internet subscribers in the state
Number of registered GI
No. of students in engineering and technology
Enrolment in PhD per lakh of population
Percentage of schools with ICT labs
Percentage colleges connected through NMEICT
Ease of Doing Business-Implementation Score
Information Technology / Intellectual Property related acts
Enablers Indicator
Performance Indicator
Black bars represent state values
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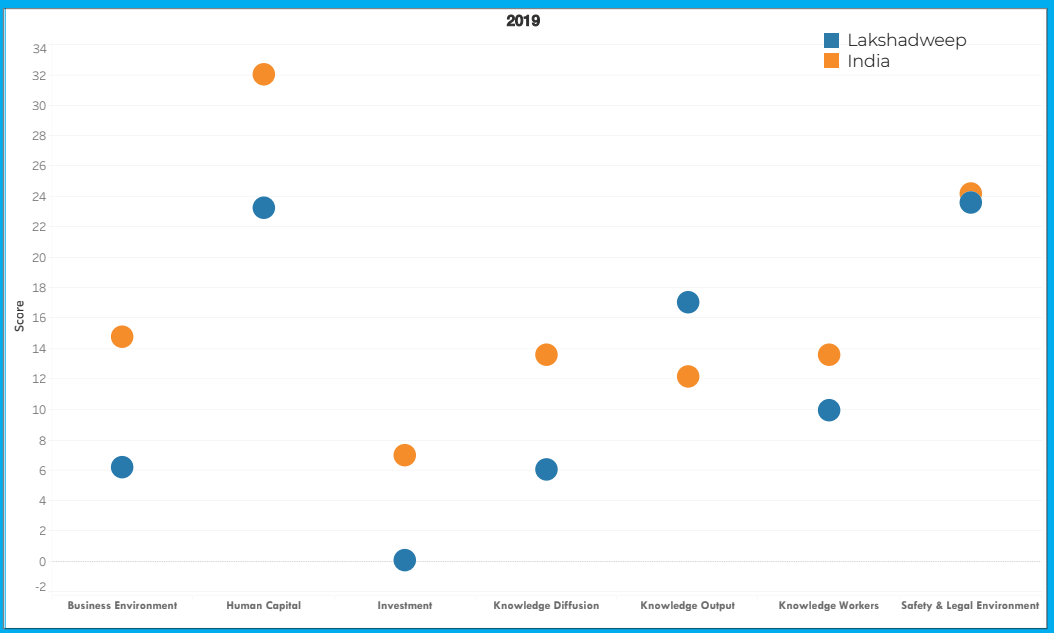
70
Country Average

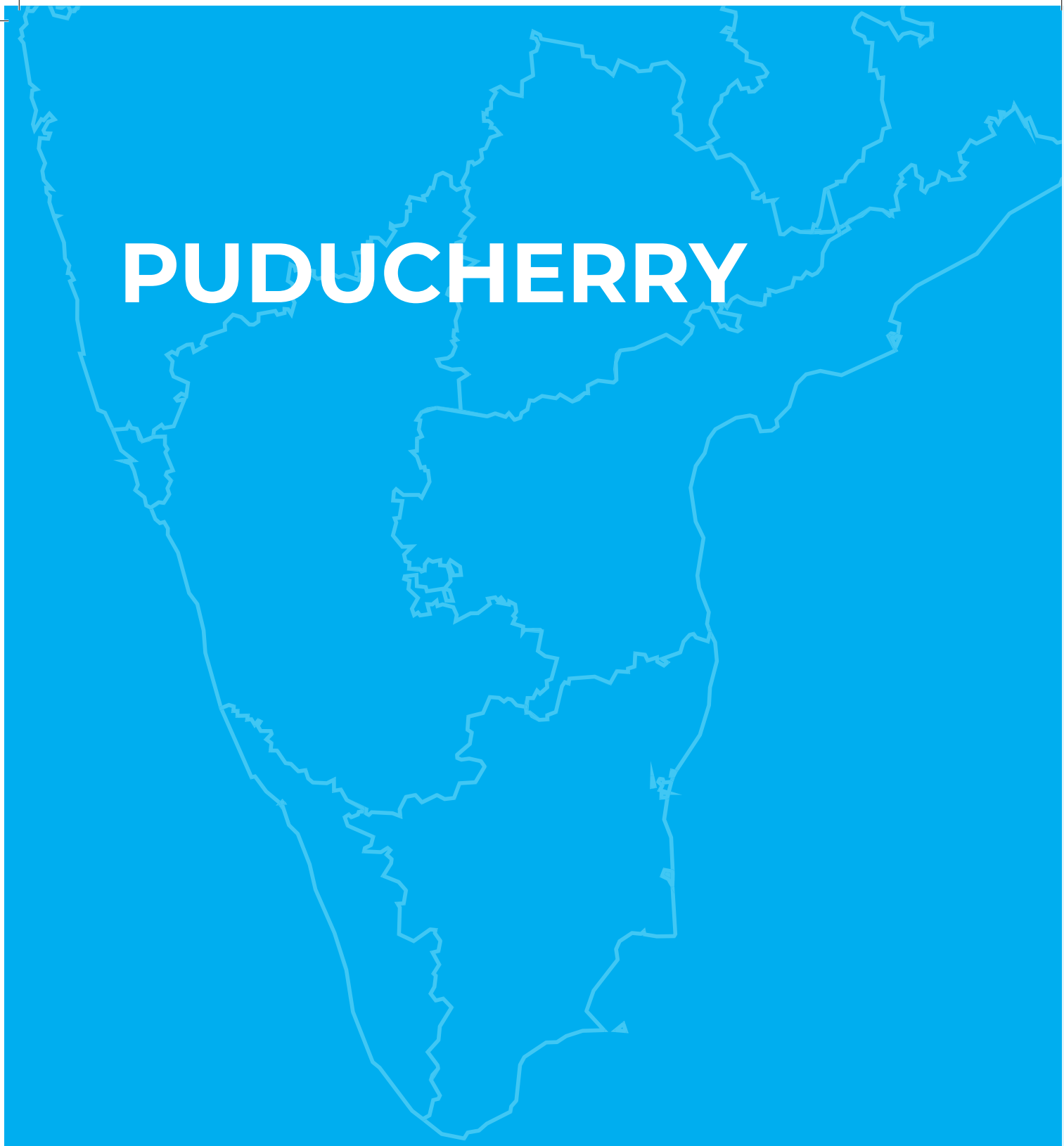
Rank: 8 | **Efficiency Ratio:** 0 | **Category:** UT / City States / Small States

Distance to Frontier

Comparative Analysis



PUDUCHERRY



Rank: 4
Efficiency Ratio: 0.4
Category: UT / City States / Small States

Scorecard

PUDUCHERRY

India Innovation Index 2019

Innovation 13.94

Enablers 19.9

Human Capital 56.32

Enrolment in Ph.D	73.97
Higher education institutions with NAAC grade A and above	18.94
Number of students in engineering and technology	100
Percentage colleges connected through NMEICT	65.79
Percentage of schools with ICT labs	23.04
Pupil teacher ratio-higher education	100

Investment 4.28

Expenditure on Science, Technology & Environment	8.76
FDI inflow	18.78
State govt. expenditure on higher & technical education	0.8
Venture capital deals	0

Safety & Legal Environment 15.09

Information Technology/Intellectual Property Acts	88.46
Number of cyber cells and social media monitoring cells	0
Pendency of court cases	0

Knowledge Workers 18.28

Knowledge-intensive employment	16.85
Number of NGO's involved in knowledge intensive areas	4.72
Number of R&D institutions funded by state	0
Private R&D units in state	56.38

Business Environment 5.54

Ease of Doing Business-Implementation Score	1.21
Internet subscribers in the state	19.76
Number of Common Facility Centers	0
Number of incubator centers in state	0
Number of Industrial clusters	0
Total number of online services transaction	6.27

Performance 7.97

Knowledge Output 10.21

Industrial designs by origin	0.48
Number of grass root innovations in state	0
Number of publications by state universities	4.04
Number of startups in the state	5.95
Patents filed from state	33.79
Trademark application filed	7.37

Knowledge Diffusion 5.73

High and medium-high-tech manufacturing entities	7.8
ICT exports	6.85
Number of citations	4.29
Number of registered GI	5.13

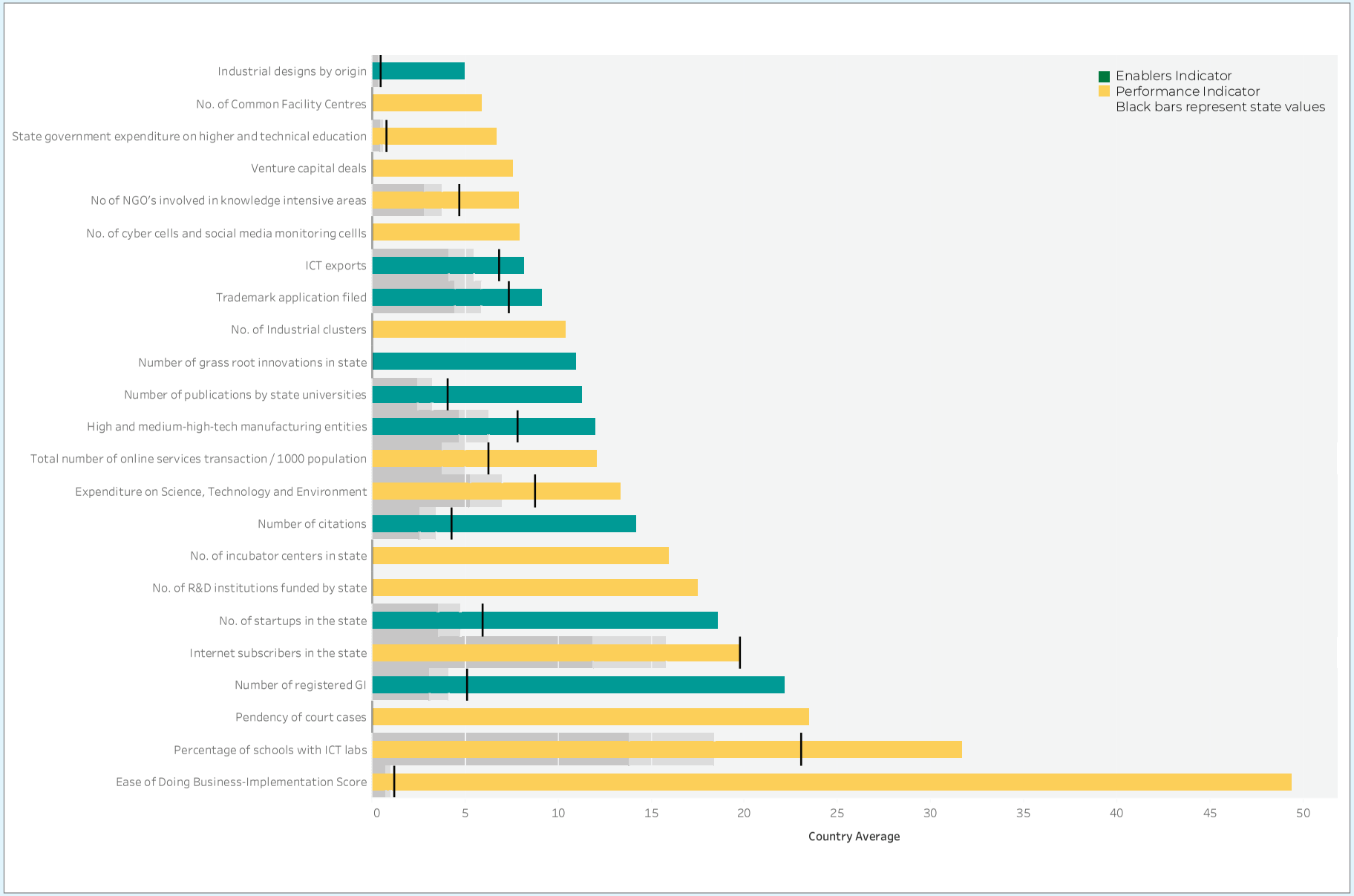
All the values represent scores on a scale of 0-100

Strength and Weakness is relative to 10 states with similar GDP

Overperforming
Performing within expected range
Underperforming

How to read the scorecard: All the values are scores on a scale of 0-100. So, higher score represents better performance. For instance, a score of 97 on pupil teacher ratio will depict high score of the indicator.

Focus Areas


Industrial designs by origin
No. of Common Facility Centres
State government expenditure on higher and technical education
Venture capital deals
No of NGO's involved in knowledge intensive areas
No. of cyber cells and social media monitoring cellls
ICT exports
Trademark application filed
No. of Industrial clusters
Number of grass root innovations in state
Number of publications by state universities
High and medium-high-tech manufacturing entities
Total number of online services transaction / 1000 population
Expenditure on Science, Technology and Environment
Number of citations
No. of incubator centers in state
No. of R&D institutions funded by state
No. of startups in the state
Internet subscribers in the state
Number of registered GI
Pendency of court cases
Percentage of schools with ICT labs
Ease of Doing Business-Implementation Score
Enablers Indicator
Performance Indicator
Black bars represent state values
0
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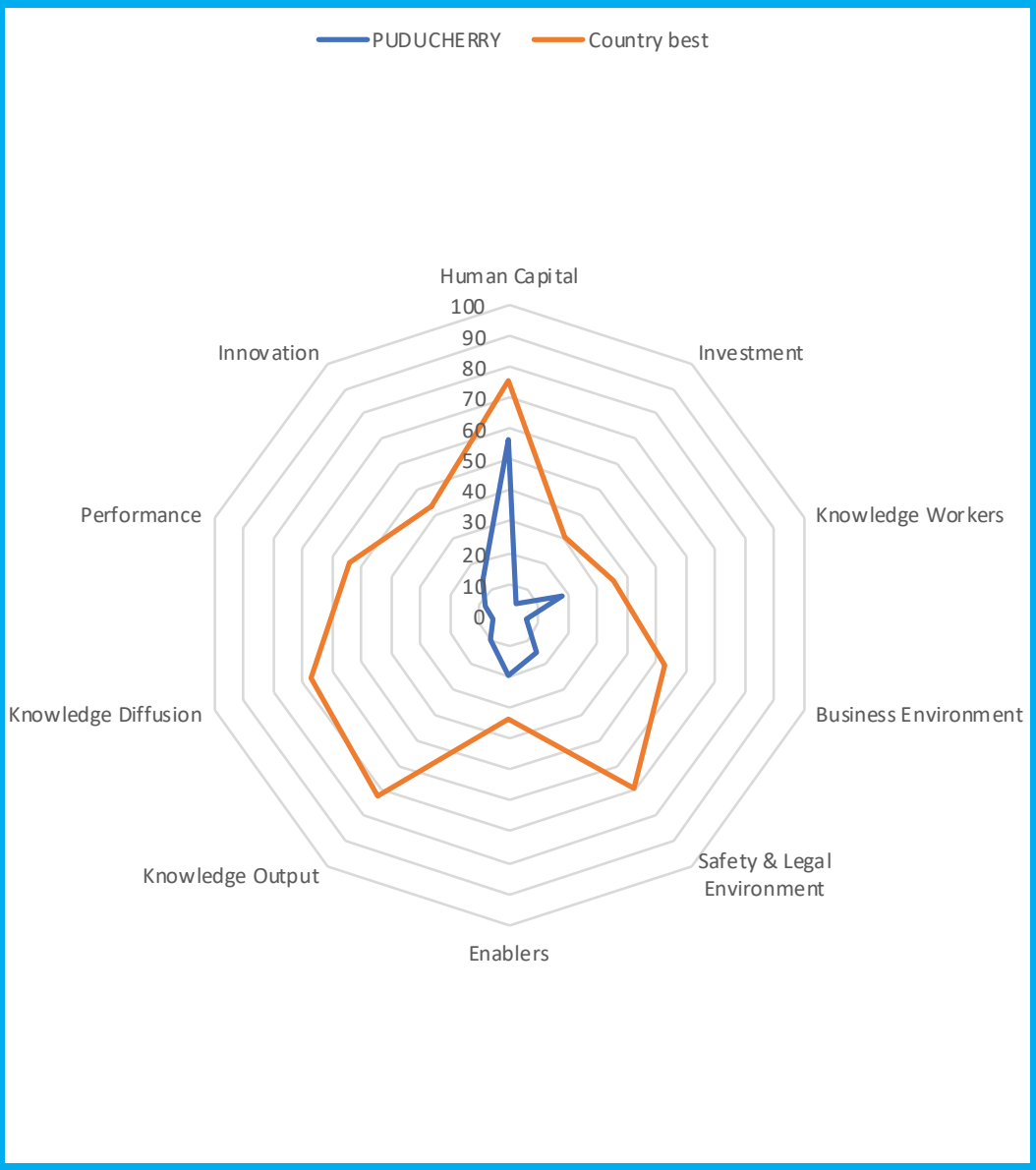
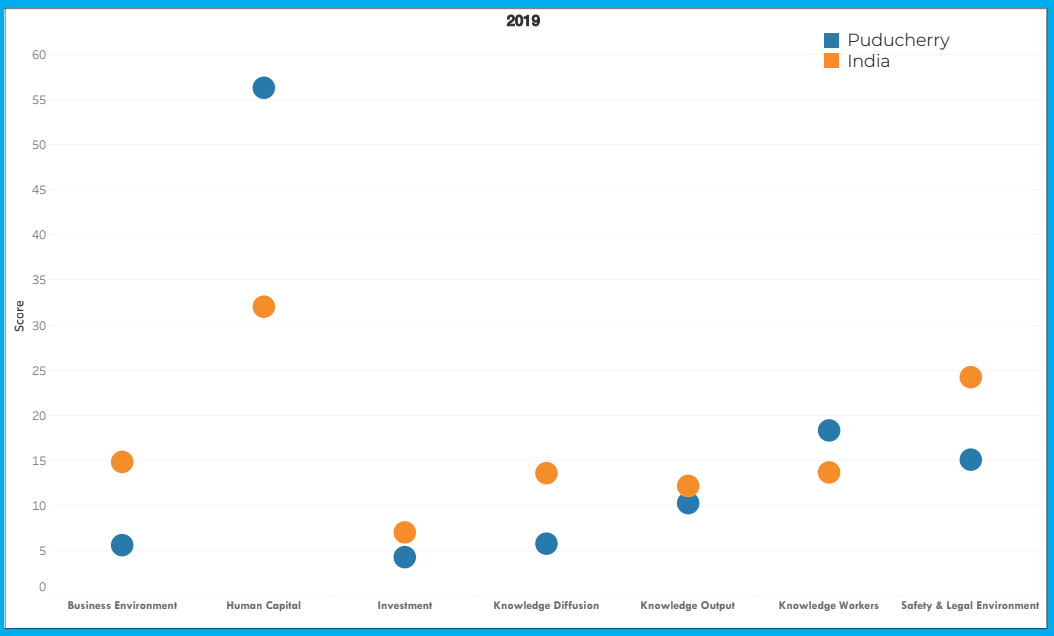
50
Country Average

Rank: 4 | **Efficiency Ratio:** 0.4 | **Category:** UT / City States / Small States

Distance to Frontier



Comparative Analysis



EFFICIENCY OF INNOVATION

10

The index scores of the India Innovation Index were obtained by taking out the average of the dimensions - enablers and performance. However, another method of calculating performance of states on innovation could be to test the efficiency of states on converting the enablers into performance. That would show how efficient the states are in using the available resources to obtain innovative outcomes.

Figure 10.1 maps the efficiency of the states with respect to their innovation scores. Efficiency here is calculated by dividing performance scores with enabler scores. The state of Uttar Pradesh leads the efficiency charts followed by Karnataka and Tamil Nadu. Delhi, which scores the highest on innovation is only the fourth-most efficient.

It must be noted that states that score an efficiency of less than 1 are the ones which have not been able to achieve even a one-to-one conversion of their enabling factors into performance. The figure shows that apart from seven states, all of them display low levels of innovation efficiency. The average efficiency ratio of the country is recorded at 0.68.

Another method of looking at efficiency of innovation can be seen in Figure 10.2. The figure shows the efficiency performance of the state with respect to the country average. Enabler scores for states are plotted against performance scores. The states are also colour graded based on their income per capita. It can be seen that the richest states have been the ones that have been able to provide the best enabling conditions for innovation.

The first quadrant shows the states which provide higher enabling factors for innovation than the national average and have also been able to achieve higher performance than the national average. The second quadrant, which has only three states - Uttar Pradesh, West Bengal and Telangana, are the ones that have not been able to provide strong enabling conditions but have been performing higher than the national average. The third quadrant is the one where states perform poorly on both enablers and performers. The final quadrant carries the states which have strong enabling factors but have not been able to convert it into performance. The latter group of states are the cause for most concern.

The Innovation Efficiency Ratio should not be considered in isolation. Higher efficiency ratio also arises in cases with low enabler scores as is the case with Uttar Pradesh and West Bengal. As a result, the ratio must be analyzed jointly with Innovation, Enablers, and Performance scores of the India Innovation Index, and with the development stages of the economies in mind. Although, Uttar Pradesh tops the efficiency ranking, its performance across the input pillars is weak.

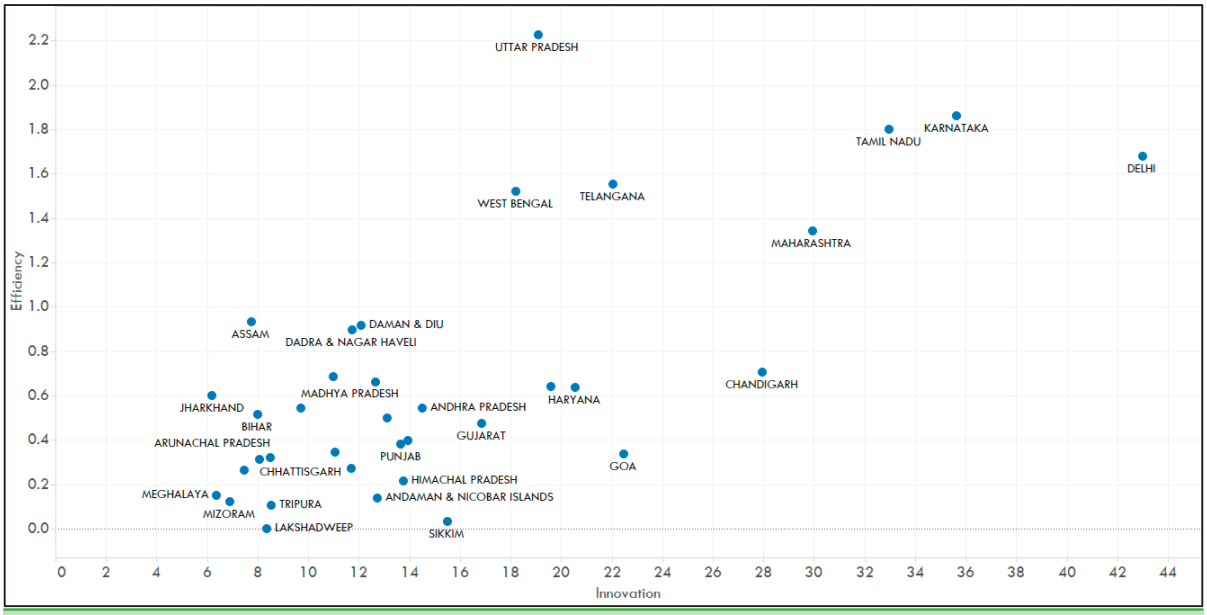


Figure 10.1: Efficiency in Innovation of Indian States

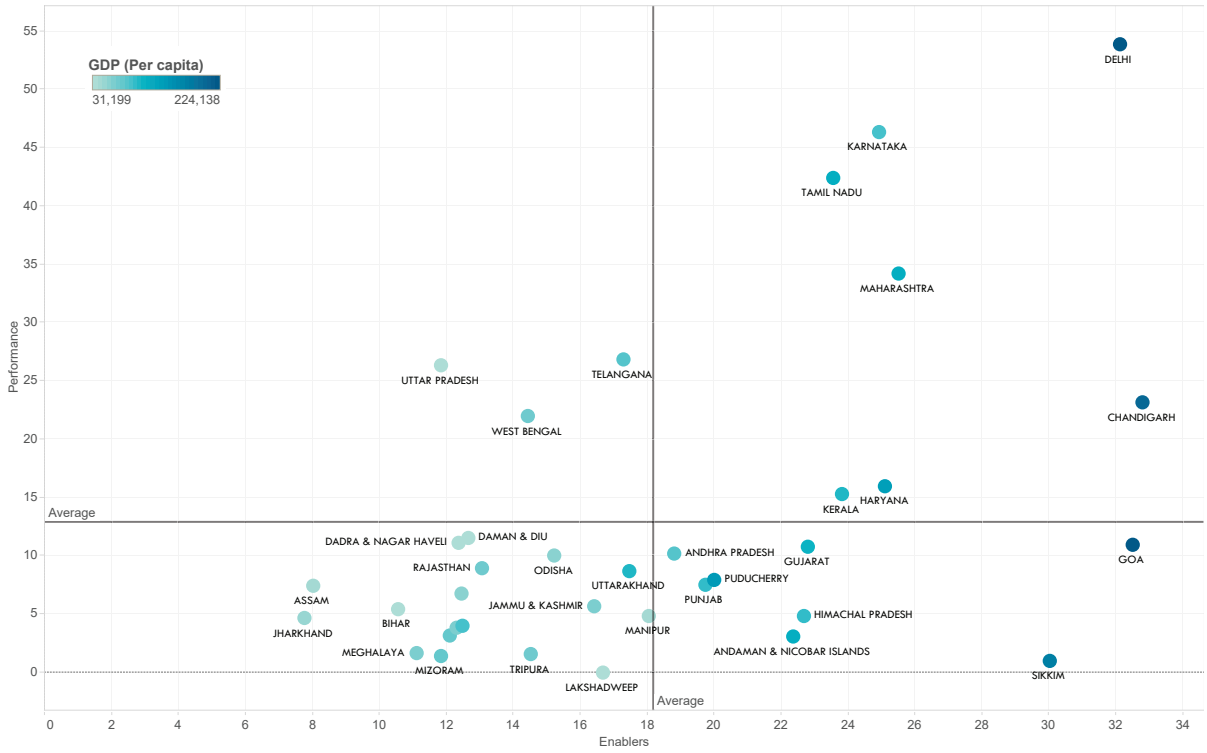


Figure 10.2: Efficiency in Innovation of Indian States Compared with National Average

The state is ranked 15th out of the 17 major states, scoring below average on all the five input pillars. With such feeble and fragile conditions, its top rank on efficiency and its fifth position on the performance dimension are praiseworthy indeed.

A final look into efficiency can be dividing the states into their innovation quartiles; that is, dividing the states into four groups based on their innovation scores. Such an approach helps in comparing states among their innovation peers. This is illustrated in Figure 10.3 below where states are divided into four tiers with Tier 1 consisting the most innovative states.

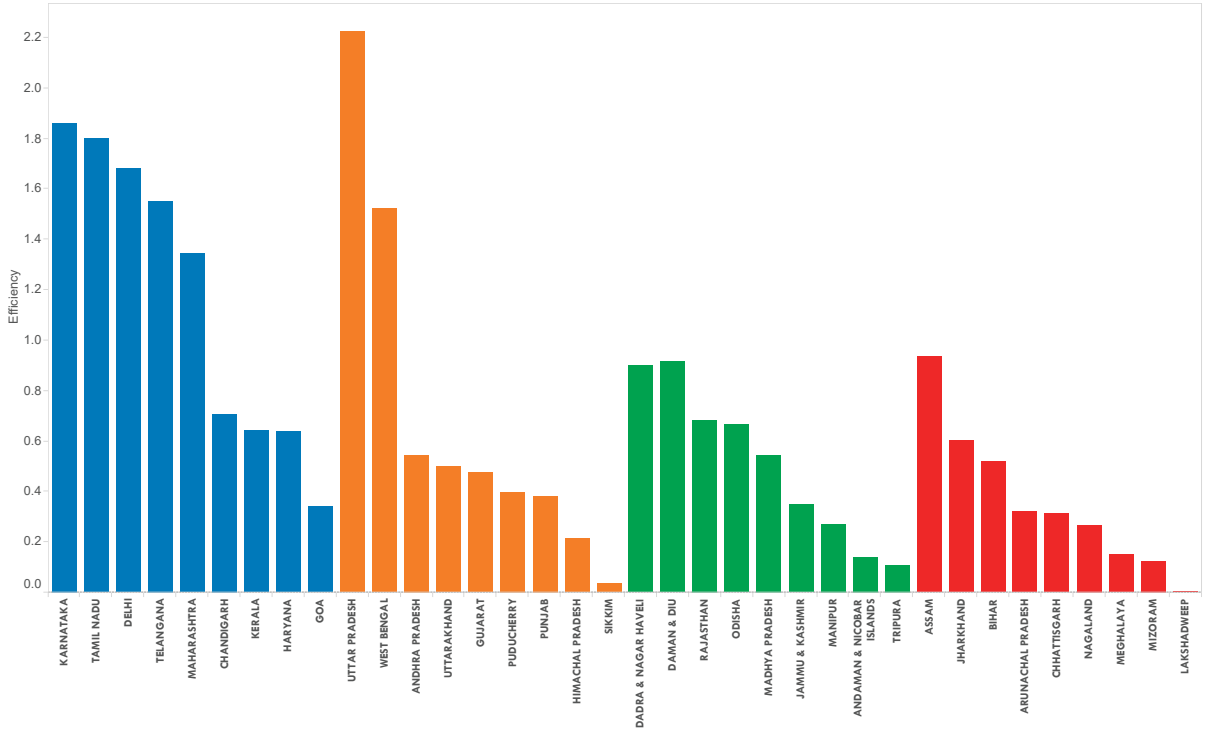


Figure 10.3: Efficiency in Innovation of Indian States Based on Innovation Tiers

The figure shows that there is a general downward trend in efficiency as innovative capacities reduce; that is the most innovative states are also the ones that are highly efficient in converting their enabling factors into performance on an average. There are surely some exceptions to the trend. Uttar Pradesh is one of them. But these exceptions also point to the fact that these states can perform much better on innovation if they work on providing better enabling conditions as they are highly efficient in doing so. What they need is a little more push.

Major states	Innovation Efficiency Ratio	Efficiency Ratio Rank	Enablers Rank	Performance Rank	III Rank
UTTAR PRADESH	2.22	1	15	5	7
KARNATAKA	1.86	2	3	1	1
TAMIL NADU	1.80	3	5	2	2
TELANGANA	1.55	4	9	4	4
WEST BENGAL	1.52	5	11	6	8
MAHARASHTRA	1.33	6	1	3	3
RAJASTHAN	0.68	7	12	12	13
ODISHA	0.66	8	10	11	12
KERALA	0.64	9	4	8	6
HARYANA	0.64	10	2	7	5
JHARKHAND	0.60	11	17	16	17
ANDHRA PRADESH	0.54	12	8	10	10
MADHYA PRADESH	0.54	13	13	14	14
BIHAR	0.52	14	16	15	16
GUJARAT	0.47	15	6	9	9
PUNJAB	0.38	16	7	13	11
CHHATTISGARH	0.31	17	14	17	15
NE & Hill states					
ASSAM	0.94	1	11	2	8
UTTARAKHAND	0.50	2	4	1	3
JAMMU & KASHMIR	0.35	3	5	3	5
ARUNACHAL PRADESH	0.31	4	7	6	7
NAGALAND	0.27	5	9	7	9
MANIPUR	0.26	6	3	4	4
HIMACHAL PRADESH	0.21	7	2	5	2
MEGHALAYA	0.15	8	10	8	11
MIZORAM	0.12	9	8	10	10
TRIPURA	0.10	10	6	9	6
SIKKIM	0.03	11	1	11	1
UT / City States / Small States					
DELHI	1.68	1	3	1	1
DAMAN & DIU	0.92	2	7	3	6
DADRA & NAGAR HAVELI	0.90	3	8	4	7
CHANDIGARH	0.71	4	2	2	2
PUDUCHERRY	0.40	5	5	6	4
GOA	0.32	6	1	5	3
ANDAMAN & NICOBAR ISLANDS	0.14	7	4	7	5
LAKSHADWEEP	0.00	8	6	8	8

Table 10.1: Performance of States based on Efficiency

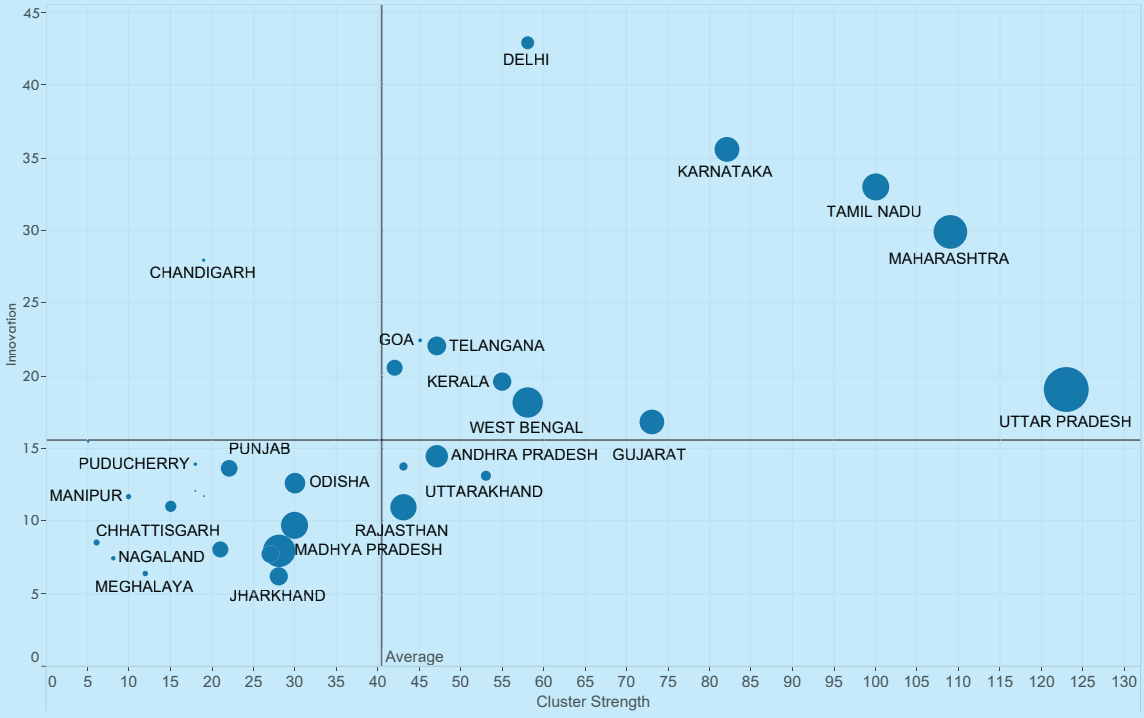
CLUSTERS & INNOVATION

There is a lot of evidence to suggest that clusters provide an environment conducive to innovation and knowledge creation. This trend is also observed in India. Regions that have a strong cluster portfolio also perform better on innovation. This is shown in the figure below. The figure shows the relationship between innovation and cluster strength. Cluster strength is a measure of the presence and growth of clusters in a region. The indicator for cluster strength is taken from the report "Clusters: The Drivers of Competitiveness", which was compiled by the Institute for Competitiveness, India for EAC-PM.

It is backed by the theory that the presence of firms in clusters offers them advantages in perceiving new technological, operating, or delivery possibilities. As compared to an isolated firm, firms in the cluster have better access to insights into new technology, component and machinery availability, service and marketing concepts. Firms within the clusters can source new machinery and components more rapidly. Mostly, clusters also include upstream manufacturers and suppliers, so they can also be closely involved in the innovation process, making it easy. The new specialized staff that is required for the new approaches can often be recruited locally, and complementarities involved in innovation are more easily achieved.

In short, clusters contribute to innovation in the following ways:

- by providing easier and faster access to new processes needed for innovation
- by proceeding faster with innovations due to the proximity of potential suppliers
- by making the services of specialized professionals easily available
- by identifying new technological, operating and delivery opportunities
- by direct observation of other firms



LEARNINGS AND RECOMMENDATIONS

11

The India Innovation Index helps in identifying and prioritizing issues by measuring both a state's absolute performance as well as its performance relative to states at a similar level of income. These absolute and relative results enable states to not only assess their own areas of strengths and weaknesses, but also to identify other states that may serve as role models.

The main learnings from the index are:

At any tier of innovation, states can learn from their peers and improve their innovative capacity, as the performance of states is not necessarily similar on all facets of innovation.

The India Innovation Index is calculated in a way that not only provides us with overall scores but also helps identify priority areas for regions by providing scores for every dimension and pillar. The scores reveal that there is immense scope of improvement for all the states as performance is not similar on all aspects of innovation. Some of the states may serve as role models for other states in certain aspects of innovation but on others they may need to learn from other states.

1. The top-ranking states Delhi, Karnataka, Tamil Nadu and Maharashtra show that attaining high levels of overall innovation is possible but achieving comparable levels of performance is not within reach for all states. Figure 12.1 puts this in perspective. The scores of the top four states are within comparable range on innovation but vary significantly across the seven components. Delhi outperforms the other three states on five components, while Karnataka sets an example by providing better diffusion of knowledge.
2. This holds true not only for best performers but also for low performing states. Andhra Pradesh provides a perfect example. The state overperforms, relative to its peers, on almost all aspects of enablers. This is reflective of the fact that the state has necessary infrastructure in place for innovation. But it under performs on almost all aspects of performance. It is unable to transform its inputs into outputs.

State and country specific issues

The components can be classified in two broad categories – state-specific issues and country-specific issues. There are certain components on which all the states demonstrate low performance, which are grouped under country-specific issues, as the center as well as state governments have to work out a plan of action for improving performance. On the other hand, there are certain components on which variation is registered across states, which are grouped under state-specific issues, as only the relevant state governments have to chalk out a plan of action to drive improvements.

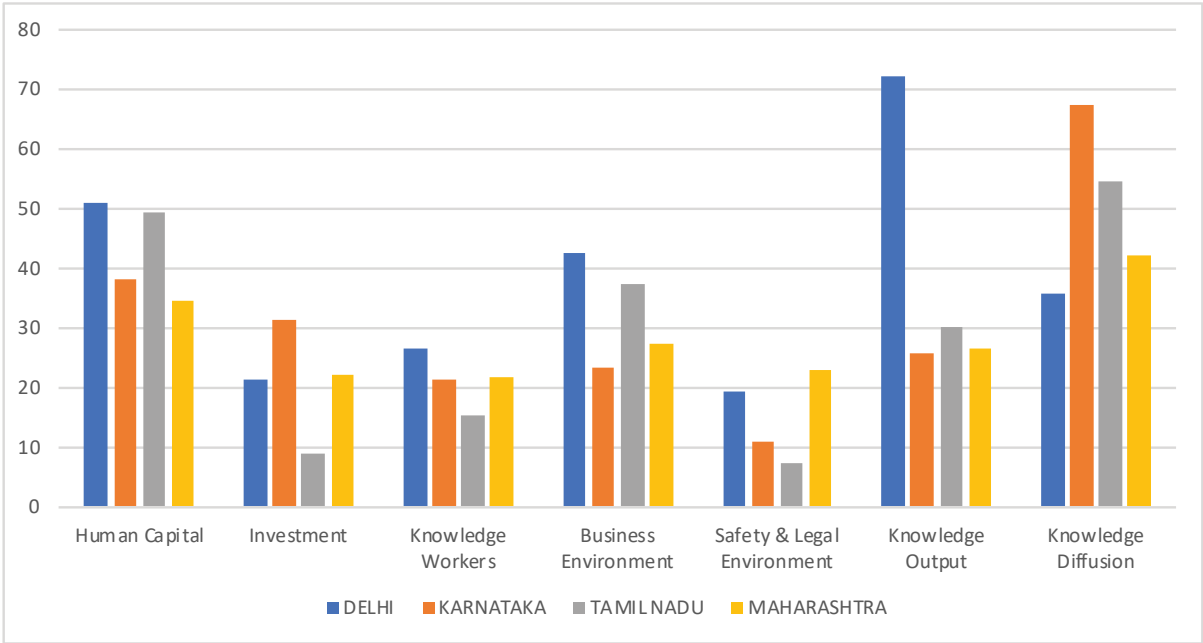


Figure 11.1: Comparing Country Leaders

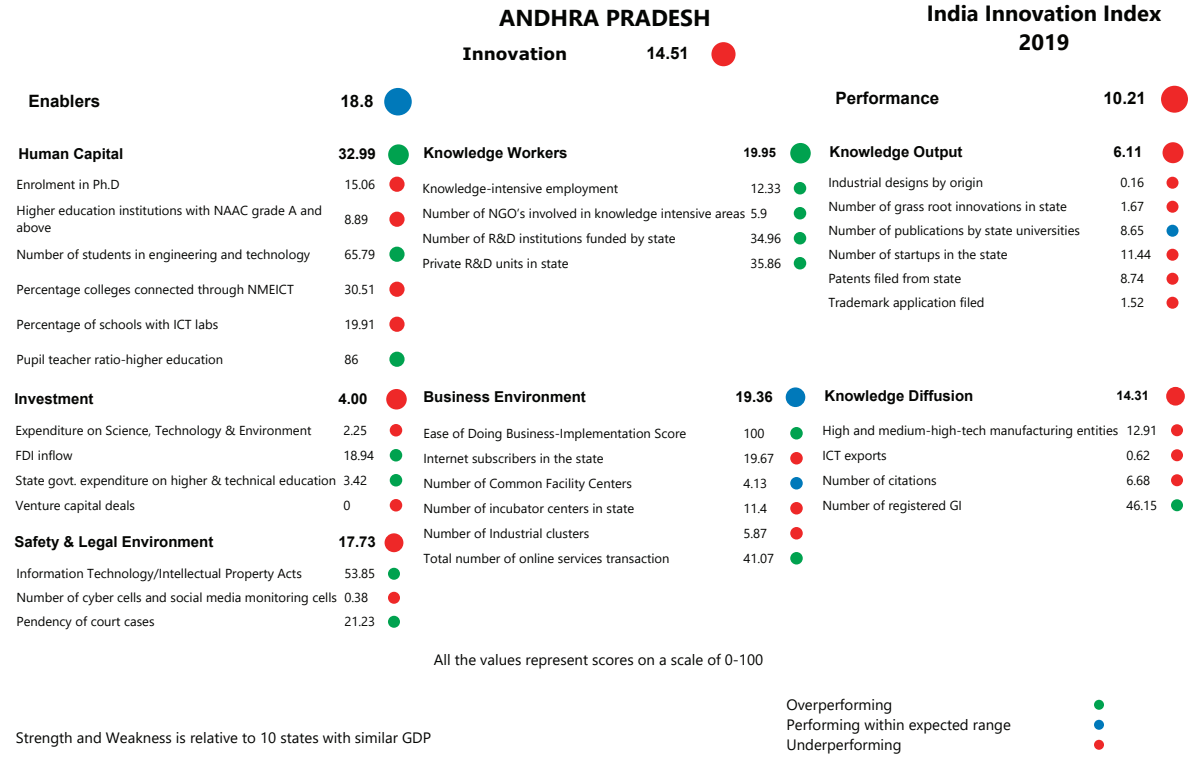


Figure 11.2: Scorecard of Andhra Pradesh

At the National Level

Despite all the challenges the national system of innovation has performed well in India. A few steps that can be taken to improve it further include:

- It is important for the country to improve the quality of the human resources in order to take advantage of the workforce. This can be done by:
  - Providing a platform to industry and academia to come together to design syllabus curriculums together to enhance the employability of students.
  - Focusing on the quality of education imparted by the professors. This will not only improve the quality of human capital but also give professors time to focus on research.
  - Encouraging universities to create Research Assistant positions to boost research at the postgraduate level in India.
  - Allowing taking of sabbaticals to run start-ups, academia to conduct research etc.
- A collaborative platform, having all stakeholders on board - innovators, researchers and investors from the industry, should be developed. This will help strengthen industry academia linkages and will ease the process of technology transfer by providing a platform for innovators to showcase their inventions. This is important because many times, universities work on the same issue without interacting with one other, which fails to create crucial synergy effects. Further, there are many research ideas that academicians work on that are not commercially viable, because of which the industry shows no interest in investing. Therefore, authorities can play an important role in channelising knowledge creation and dissemination in the right direction.
- All the universities should work towards creating an IP policy. They can study the IP policies for best practices.

At the State Level

- States should identify the clusters present and then strengthen the linkages between them to make them more innovative.
- States should focus more on kick starting an ecosystem of research and development.
- States should encourage cross sharing of ideas for scale at both the national and international level.

INNOVATION FOR PROSPERITY

It is a no-brainer to say that innovation is one of the most crucial elements in a nation's arsenal to develop a competitive edge. With the world innovating at breakneck speed, and transitioning to a knowledge-based economy, India cannot afford to remain on the side lines. A roundtable on "Innovation for Prosperity" was organised by NITI Aayog and Institute for Competitiveness on December 4, 2018, keeping in mind the urgency of the situation.

The roundtable brought together the academia and the industry to discuss India's innovation ecosystem and its IP regime, and debated the most suitable pathways for improving the country's innovative capacity. It also reviewed how innovation differed across regions, with the help of a state-level innovation index. The ultimate objective was to draw up an action plan for NITI Aayog to improve India's innovation capacity.

The esteemed group of panelists stressed upon the need to achieve double-digit growth because the country will continue to add young people till 2042. Further, they also highlighted the challenges faced by the Indian education system and the IP environment; both of which are critical for innovation.

Quality of Human Capital

A key focus of the discussion was the quality of the higher education institutes and their impact on human capital.

The panelists highlighted two main challenges faced by the education system. First, the education system is not industry oriented and hence produces students with low employability, forcing industries to undertake months of intensive training to improve the productivity levels of these students. Secondly, the focus of the Indian education system is on quantity—the numbers of hours taught—rather than on the quality of education imparted. What we need is research led teaching to be adopted by educational institutions.

Recommendations:

1. Industry and academia will need to come together to design syllabus and curricula to enhance the employability of our students.
2. Universities should focus on the quality of education imparted by the professors. This will not only improve the quality of human capital but also provide the professors time to focus on research.

Innovative Capacity, Economic Development and Regional Competitiveness

The panelists also agreed that the country's competitiveness and prosperity will grow manifold if its institutions can be turned into global innovation hubs. This can be achieved by involving institutions involved in the process of learning in contributing to the development and diffusion of knowledge.

Recommendations:

- A regional analysis that will highlight the strengths and weaknesses of the Indian states and the way they can climb the innovation ladder should be conducted.

Industry-Academia Linkages:

- The panelists argued that universities across the world are seen as innovation hubs where experts from different fields exchange ideas on developing new technologies, processes and systems that have a huge demand from the industry. The presence of such diversified products help a nation gain the competitive edge.
- Universities play a dual role: knowledge creation and knowledge transfer. For both these roles to play out properly, it is important that there exist strong industry-academia linkages. However, universities mostly work on research projects without collaborat- ing with the industry due to IP issues, which results in research that is not commercially viable.

Recommendations:

1. A collaborative platform consisting of all stakeholders of innovations will not only strengthen the industry-academia linkage, but also ease the process of technology transfer by providing a platform for innovators to showcase their inventions.
2. The government should push all universities to create an IP policy. They can also help these universities by creating a model policy framework that can be adopted by other universities.

India's IP Regime

The panelists also discussed two legal aspects of India's IP policy that have been at the centre of debates between policymakers and the industry. The first is Section 3(d) of the Patents (Amendment) Act, 2005, which has higher standards of patentability for incremental innovation than in other parts of the world. It was discussed if it discourages incremental innovation. The second is compulsory licensing. It allows the Controller to suspend patent privileges of innovator companies when the best interests of the citizens are at stake.

Another point of discussion was on patent pricing, on which the participants agreed that the drug pricing should be done in a manner that encourages the innovator while ensuring that the customer is not overcharged.

Recommendations:

1. The Government and Industry should discuss on section 3(d) of the Patents (Amendment) Act, 2005 to ensure that there is a balance between incentivising the industry and providing affordable access.
2. The government should discuss with the industry, the provisions concerning the use of compulsory licensing, under India's patent law, to ensure transparency and predictability.

Regulatory Framework

Participants from both academia and industry agreed that the Indian regulatory framework is highly unpredictable, which creates hurdles for the industry and makes it difficult for them to work. Therefore, in order to make India an attractive destination for global players, the government should relook at the regulatory challenges.

Recommendations:

1. The government should reduce the regulatory bottle- necks by creating a predictable environment.
2. Frequent changes in policies need to be avoided and industry should be given enough time to make the necessary adjustments.

12 | THE WAY FORWARD

The examination of regional innovation can never be exhaustive enough. Any framework or model representing innovation capabilities remains, at best, a simplified representation of reality. The essence of this extends beyond any single metric. The India Innovation Index (III) framework attempts to identify the innovation ecosystem of the country and the challenges it faces through a baseline model. The overall ranking is a summary measure of the ability of Indian states and union territories to participate in and benefit from the repository of knowledge and science and technology.

The Index will serve as an actionable tool for policymakers to identify the challenges that need to be addressed to improve the innovation ecosystem at the regional and national level. It further enables a state to learn from the policy and performance of other states with similar profiles and to identify best practices. Such learnings will instill a spirit of cooperative and competitive federalism among states.

The process of creation of the Index, involved consulting states on the overall framework as well as the indicators included. Incorporating the feedback from states strengthened the Index. Going forward, drawing from the learnings of the first edition, future editions will be further strengthened. The following are some of the improvements that can be made in successive editions:

- **Data Mechanism Development:** One significant challenge that was realised while developing the framework was the lack of availability of reliable data on several other metrices that would have further strengthened the index. The current index is based on government data from centralised sources. There is a requirement for a centralised platform for dynamic data collection, management, and dissemination, to enable data-driven governance. It is important to assess all government and non-government entities that generate and store data, to fully understand the scope of available data. This requires a robust data governance mechanism along with the supporting institutional structures.
- **Identifying innovation metrics:** The development of robust data mechanisms and inter-departmental data alliance would also enable better identification of relevant metrics for measuring innovation. Improved data availability and quality will make the Index more robust. For example, gross expenditure in research & development (GERD) by the private sector and more grassroot level indicators are important but have not been included in the Index, and it is important to capture these nuances as well, especially to understand innovation in the Indian context.

There are a few things that states can do at their end going forward. The Prime Minister's vision 2022 of 'A New Inclusive India' can be realised only if actions at the national level are complemented by policies and initiatives at the state level. An innovation policy just at the national level is not enough, and each state needs to formulate its own policy, which caters to its unique needs and resources. The India Innovation Index can help states identify specific policy areas that allow them to leverage their strengths and convert their enablers into performance.

APPENDIX

Appendix A: Indicator definitions and sources

Dimension	Indicator name	Definition	Source
Enablers			
Human Capital	Percentage of schools with ICT labs	Percentage of schools with Information & Communication Technology Labs	U-DISE – Unified- District Information System for Education
	Number of students in engineering and technology	Intake in Engineering and Technology at UG, PG and Diploma level (per lakh of population between 18-23 years)	AICTE - All India Council for Technical Education
	Enrolment in Ph.D.	Enrolment in Ph.D. in the state (per lakh of population)	AISHE-All India Survey of Higher Education
	Higher education institutions with NAAC grade A and above	Number of higher education institutions with NAAC grade A and above (% of total institutions graded by NAAC in the state)	NAAC-National Assessment and Accreditation Council
	Pupil-Teacher Ratio- Higher Education	Pupil-Teacher Ratio (PTR): Average number of pupils (students) per teacher at regular university level	AISHE-All India Survey of Higher Education
	Percentage of colleges connected through NMEICT	Number of colleges connected through ICT (National Mission in Education through ICT) (% of total colleges)	AISHE-All India Survey of Higher Education
Investment	Venture capital deals	Venture capital investment: Number of deals (per crore of GSDP)	DIPP- Department of Industrial Policy and Promotion
	State government expenditure on higher and technical education	State government expenditure on higher and technical education (per lakh of population) (Capital Expenditure)	MHRD- Analysis of Budgeted Expenditure on Education
	Expenditure on Science, Technology and Environment	Expenditure on Science, Technology and Environment by state government (Revenue Expenditure)	RBI- State Finances- A Study of State Budgets
	FDI inflows	Foreign Direct Investment (FDI), (% of GSDP)	RBI- Reserve Bank of India
Knowledge Workers	Private R&D units in state	Number of private R&D units in the state (per lakh of population)	DST- Department of Science & Technology
	Knowledge-intensive employment	Employment in Knowledge intensive services (employment in aerospace vehicles and defence, biopharmaceutical, medical devices, information technology and analytical instruments, video production and distribution and production technology & heavy machinery) (% of total employment)	ASI- Annual Survey of Industries)
	Number of NGOs involved in knowledge intensive areas	Number of NGOs involved in knowledge intensive areas (per lakh of population) (following sectors-biotechnology, information and communication technology, new & renewable energy, Science & technology, scientific and industrial research, urban development and poverty alleviation and water resources.)	NGO-Darpan
	Number of R & D Institutions funded by States/UTs	Number of R&D Institutions funded by the state (per lakh of population)	DST- Department of Science & Technology

Business Environment	Total number of online services transactions	Total amount of online services transactions (per thousand population) e-TAAL serves as a platform for providing integrated, real-time aggregated view of e-Transaction statistics for major e-Governance programmes which are Govt-to-Citizen (G2C), Govt-to-Business (G2B) and Business-to-Citizen (B2C) in nature.	e-TAAL- Electronic Transaction Aggregation & Analysis Layer
	Ease of Doing Business – Implementation Percentage	Ease of Doing Business Score- Implementation percentage	DIPP- Department of Industrial Policy and Promotion
	Number of incubator centres in state	Number of Incubator centres in the state (per crore of GSDP)	DIPP- Start-up India
	Number of industrial clusters	Number of MSME (Micro Small and Medium Enterprises) clusters (per lakh of MSME units)	MSME- Ministry of Micro, Small and Medium Enterprises
	Number of Common Facility Centres	Number of MSME Common Facility Centres in the state (per lakh of Micro, Small and Medium Enterprises- MSME)	MSME- Ministry of Micro, Small and Medium Enterprises
	Internet subscribers in the state	Number of internet subscribers per 100 population	TRAI- Telecom Regulatory Authority India
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	Information Technology / Intellectual Property related Acts (Rate of offences) (Total Cases reported under IT and IP/Total Population) x 10000 i.e., Incidence of crimes relating to IT & IP per one lakh of population	NCRB- National Crime Records Bureau
	Number of cyber cells and social media monitoring cells	Number of cyber cells and social media monitoring cells (per lakh of population)	BPRD- Bureau of Police Research & Development
	Pendency of court cases	Percentage of court cases pending (between 2 to 5 years)	NJDG- National Judiciary Data Grid
Performance			
Knowledge Output	Number of grass root innovations in state	Number of grass root innovations in the state (per lakh of population)	NIF- National Innovation Foundation
	Patents filed from state	Number of patent applications filed in the state (per lakh of population)	DIPP- Department of Industrial Policy and Promotion
	Industrial designs by origin	Number of Industrial design applications filed in the state (per lakh of population)	DIPP- Department of Industrial Policy and Promotion
	Trademark application filed	Number of trademarks applications filed in the state (per lakh of population)	DIPP- Department of Industrial Policy and Promotion
	Number of publications	Number of publications by state institutes (among top 100 of NIRF ranking)	NIRF- National Institute Ranking Framework
	Number of start-ups in the state	Number of start-ups in the state (per crore of GSDP)	DIPP- Start-up India
Knowledge Diffusion	ICT exports	Telecommunications, computers and information services export (% of GSDP)	STPI- Software Technology Parks of India
	High and medium-high-tech manufacturing entities	Number of high tech and medium high-tech manufacturing entities (per crore of GSDP)- companies with investment in plant and machinery above ten crore rupees- in the state	DIPP- Department of Industrial Policy and Promotion
	Number of registered GI	Number of registered Geographical Indications in a state	DIPP- Department of Industrial Policy and Promotion
	Number of citations	Number of citations (citations of academic publications by institutes among top 100 of NIRF ranking)	NIRF- National Institute Ranking Framework

Appendix B: Data Availability

Indicator name/ III Year	
Percentage of schools with ICT labs	2017
Number of students in engineering and technology	2017-18
Enrolment in Ph.D.	2017-18
Higher education institutions with NAAC grade A and above	2016 (prior 1st July)
Pupil-Teacher Ratio- Higher Education	2017-18
Percentage of colleges connected through NMEICT	2016-17
Venture capital deals	2018
State government expenditure on higher and technical education	2015
Expenditure on Science, Technology and Environment	2018-19
FDI inflows	2017
Private R&D units in state	2018
Knowledge-intensive employment	2015-16
Number of NGOs involved in knowledge intensive areas	2018
Number of R&D Institutions funded by States/UTs	2018
Total number of online services transaction	2017-18
Ease of Doing Business – Implementation Percentage	2017
Number of incubator centres in state	2018
Number of industrial clusters	2018
Number of Common Facility Centres	2018
Internet subscribers in the state	2017
Information Technology / Intellectual Property related Acts (Rate of offences)	2016
Number of cyber cells and social media monitoring cells	2017
Pendency of court cases	2018
Number of grass root innovations in state	2018
Patents filed from state	2016-17
Industrial designs by origin	2016-17
Trademark application filed	2016-17
Number of publications	2018
Number of start-ups in the state	2018
ICT exports	2017
High and medium-high-tech manufacturing entities	2018
Number of registered GI	2018
Number of citations	2018

Appendix C: Inverted Indicators

Inverted Indicators
Pupil-Teacher Ratio- Higher Education
Information Technology / Intellectual Property related Acts (Rate of offences)
Pendency of court cases

Appendix D: Weights

Indicator Name	Weight
Human Capital	
Percentage of schools with ICT labs	0.18087
Number of students in engineering and technology	0.22679
Enrolment in Ph.D.	0.27881
Higher education institutions with NAAC grade A and above	0.29228
Pupil Teacher Ratio- Higher Education	0.22287
Percentage of colleges connected through NMEICT	0.25489
Investment	
Venture capital deals	0.41124
State government expenditure on higher and technical education	0.34678
Expenditure on Science, Technology and Environment	0.24385
FDI inflows	0.45495
Knowledge Workers	
Private R&D units in state	0.37206
Knowledge-intensive employment	0.46710
Number of NGOs involved in knowledge intensive areas	0.28169
Number of R & D Institutions funded by States/UTs	0.38284
Business Environment	
Total number of online services transaction	0.17700
Ease of Doing Business – Implementation Percentage	0.14192
Number of incubator centres in state	0.32340
Number of industrial clusters	0.23244
Number of Common Facility Centres	0.30265
Internet subscribers in the state	0.27345
Safety & Legal Environment	
Information Technology / Intellectual Property related Acts (Rate of offences)	0.58363
Number of cyber cells and social media monitoring cells	0.29015
Pendency of court cases	0.54964
Knowledge Output	
Number of grass root innovations in state	0.06389
Patents filed from state	0.27942
Industrial designs by origin	0.15166
Trademark application filed	0.27785
Number of publications	0.20099
Number of start-ups in the state	0.27342
Knowledge Diffusion	
ICT exports	0.35129
High and medium-high-tech manufacturing entities	0.20233
Number of registered GI	0.35222
Number of citations	0.36499

Appendix E: Best and Worst-Case Scenarios

Indicator Name	Best case	Worst case
Human Capital		
Percentage of schools with ICT labs	86	4.72
Number of students in engineering and technology	7827.56	0
Enrolment in Ph.D.	118.82	0
Higher education institutions with NAAC grade A and above	24	0
Pupil Teacher Ratio- Higher Education	10	65
Percentage of colleges connected through NMEICT	44	0
Investment		
Venture capital deals	3.44193	0
State government expenditure on higher and technical education	186124	0
Expenditure on Science, Technology and Environment	29629.16	0
FDI inflows	19.41	0
Knowledge Workers		
Private R&D units in state	2.27391	0
Knowledge-intensive employment	75.8462	0
Number of NGOs involved in knowledge intensive areas	6.79320	0
Number of R&D Institutions funded by States/UTs	0.62640	0
Business Environment		
Total number of online services transaction	29976.3	315.7
Ease of Doing Business – Implementation Percentage	98.7	0
Number of incubator centres in state	0.000067	0
Number of industrial clusters	1.4285	0
Number of Common Facility Centres	0	23.7
Internet subscribers in the state	125.8	16.41
Safety & Legal Environment		
Information Technology / Intellectual Property related Acts (Rate of offences)	0	0.525512
Number of cyber cells and social media monitoring cells	2.6	0
Pendency of court cases	3.8	37
Knowledge Output		
Number of grass root innovations in state	0.722685	0
Patents filed from state	6.87398	0
Industrial designs by origin	33.2994	0
Trademark application filed	324.137	0.36456
Number of publications	8616	0
Number of start-ups in the state	0.01175	0
Knowledge Diffusion		
ICT exports	17.43659	0
High and medium-high-tech manufacturing entities	2.22779	0
Number of registered GI	39	0
Number of citations	294723	0

Appendix F: Dimension and Pillar Scores 2019

	Dimension	Pillar					Dimension	Pillar	
States/Year	Enablers	Human Capital	Investment	Knowledge Workers	Business Environment	Safety & Legal Environment	Performance	Knowledge Output	Knowledge Diffusion
ANDHRA PRADESH	18.80	32.99	4.00	19.95	19.36	17.73	10.21	6.11	14.31
ARUNACHAL PRADESH	13.00	24.86	11.38	4.64	4.36	19.76	4.00	7.39	0.61
ASSAM	7.99	19.91	0.80	4.74	4.81	9.70	7.48	5.90	9.07
BIHAR	10.54	8.98	0.06	3.04	11.09	29.54	5.44	3.62	7.26
CHHATTISGARH	12.30	25.50	1.12	3.81	11.88	19.20	3.82	3.86	3.78
DELHI	32.13	50.96	21.35	26.32	42.57	19.44	53.84	72.20	35.48
GOA	34.01	43.79	15.82	32.79	52.81	24.85	10.98	18.04	3.92
GUJARAT	22.90	36.99	7.54	21.39	18.05	30.52	10.83	11.01	10.65
HARYANA	25.10	35.39	12.81	15.40	21.94	39.96	16.01	15.95	16.07
HIMACHAL PRADESH	22.68	33.18	1.67	35.24	21.44	21.88	4.84	5.72	3.97
JAMMU & KASHMIR	16.45	25.89	2.20	15.48	11.01	27.68	5.68	5.80	5.56
JHARKHAND	7.75	11.24	0.51	2.73	7.60	16.69	4.65	6.25	3.06
KARNATAKA	24.96	38.00	31.31	21.17	23.30	10.99	46.35	25.63	67.06
KERALA	23.88	46.17	9.10	14.45	27.45	22.21	15.29	9.83	20.75
MADHYA PRADESH	12.61	23.24	3.07	7.77	13.19	15.78	6.79	6.43	7.15
MAHARASHTRA	25.64	34.45	22.00	21.60	27.20	22.97	34.22	26.26	42.17
MANIPUR	18.50	24.36	14.54	24.82	4.38	24.42	4.87	7.33	2.42
MEGHALAYA	11.09	27.79	0.21	9.76	5.23	12.46	1.66	1.73	1.60
MIZORAM	12.31	33.36	5.25	1.11	4.80	17.01	1.46	2.31	0.61
NAGALAND	11.76	24.20	3.63	5.81	4.55	20.59	3.21	4.61	1.82
ODISHA	15.25	28.42	1.69	5.14	12.63	28.36	10.08	4.99	15.16
PUNJAB	19.80	40.88	0.91	8.81	14.50	33.87	7.55	9.19	5.91
RAJASTHAN	13.06	25.90	5.12	7.23	12.83	14.24	8.93	6.26	11.59
SIKKIM	29.98	39.34	4.79	33.62	3.41	68.74	1.01	0.94	1.07
TAMIL NADU	23.56	49.20	9.03	15.42	37.07	7.08	42.40	30.22	54.59
TELANGANA	17.29	31.04	6.55	15.82	23.43	9.63	26.82	18.76	34.89
TRIPURA	15.51	30.02	7.90	5.14	5.42	29.05	1.56	3.13	0.00
UTTARAKHAND	17.51	28.37	2.40	21.77	7.55	27.47	8.73	10.44	7.01
UTTAR PRADESH	11.85	14.97	4.15	5.83	13.83	20.47	26.32	15.44	37.20
WEST BENGAL	14.45	23.91	1.15	7.19	16.87	23.14	21.97	11.52	32.43
ANDAMAN & NICOBAR ISLANDS	22.35	39.89	6.86	0.80	5.94	58.26	3.14	6.28	0.00
CHANDIGARH	32.79	74.96	2.40	29.56	6.31	50.74	23.14	36.42	9.87
DADRA & NAGAR HAVELI	12.37	19.19	1.90	13.41	6.63	20.72	11.11	11.49	10.73
DAMAN & DIU	12.63	23.28	0.11	9.95	6.23	23.60	11.56	17.06	6.06
LAKSHADWEEP	16.67	25.48	24.03	0.00	16.75	17.06	0.04	0.08	0.00
PUDUCHERRY	19.90	56.32	4.28	18.28	5.54	15.09	7.97	10.21	5.73

Appendix G: Peer Groups

ANDHRA PRADESH	DELHI,TELANGANA,KERALA,RAJASTHAN,MADHYA PRADESH,HARYANA,PUNJAB,BIHAR,ODISHA,CHHATTISGARH
ARUNACHAL PRADESH	MANIPUR,NAGALAND,SIKKIM,PUDUCHERRY,MIZORAM,MEGHALAYA,CHANDIGARH,TRIPURA,ANDAMAN & NICOBAR ISLANDS,DADRA & NAGAR HAVELI
ASSAM	JHARKHAND,UTTARAKHAND,CHHATTISGARH,JAMMU & KASHMIR,HIMACHAL PRADESH,ODISHA,BIHAR,GOA,TRIPURA,PUNJAB
BIHAR	ODISHA,PUNJAB,CHHATTISGARH,HARYANA,JHARKHAND,MADHYA PRADESH,ASSAM,KERALA,UTTARAKHAND,TELANGANA
CHHATTISGARH	JHARKHAND,ASSAM,UTTARAKHAND,ODISHA,BIHAR,JAMMU & KASHMIR,HIMACHAL PRADESH,PUNJAB,GOA,TRIPURA
DELHI	ANDHRA PRADESH,TELANGANA,KERALA,MADHYA PRADESH,HARYANA,RAJASTHAN,PUNJAB,BIHAR,ODISHA,CHHATTISGARH
GOA	TRIPURA,CHANDIGARH,MEGHALAYA,PUDUCHERRY,ARUNACHAL PRADESH,MANIPUR,NAGALAND,SIKKIM,MIZORAM,ANDAMAN & NICOBAR ISLANDS
GUJARAT	UTTAR PRADESH,TAMIL NADU,KARNATAKA,WEST BENGAL,RAJASTHAN,ANDHRA PRADESH,DELHI,TELANGANA,KERALA,MADHYA PRADESH
HARYANA	MADHYA PRADESH,KERALA,TELANGANA,PUNJAB,DELHI,ANDHRA PRADESH,BIHAR,ODISHA,RAJASTHAN,CHHATTISGARH
HIMACHAL PRADESH	JAMMU & KASHMIR,GOA,UTTARAKHAND,TRIPURA,CHANDIGARH,MEGHALAYA,PUDUCHERRY,ARUNACHAL PRADESH,MANIPUR,ASSAM
JAMMU & KASHMIR	HIMACHAL PRADESH,GOA,UTTARAKHAND,TRIPURA,CHANDIGARH,MEGHALAYA,PUDUCHERRY,ARUNACHAL PRADESH,MANIPUR,ASSAM
JHARKHAND	CHHATTISGARH,ASSAM,UTTARAKHAND,ODISHA,JAMMU & KASHMIR,HIMACHAL PRADESH,BIHAR,PUNJAB,GOA,TRIPURA
KARNATAKA	GUJARAT,UTTAR PRADESH,TAMIL NADU,WEST BENGAL,RAJASTHAN,ANDHRA PRADESH,DELHI,TELANGANA,KERALA,MADHYA PRADESH
KERALA	TELANGANA,DELHI,MADHYA PRADESH,ANDHRA PRADESH,HARYANA,RAJASTHAN,PUNJAB,BIHAR,ODISHA,CHHATTISGARH
MADHYA PRADESH	HARYANA,KERALA,TELANGANA,DELHI,PUNJAB,ANDHRA PRADESH,BIHAR,ODISHA,RAJASTHAN,CHHATTISGARH
MAHARASHTRA	WEST BENGAL,TAMIL NADU,UTTAR PRADESH,GUJARAT,KARNATAKA,RAJASTHAN,ANDHRA PRADESH,DELHI,TELANGANA,KERALA
MANIPUR	ARUNACHAL PRADESH,NAGALAND,SIKKIM,MIZORAM,PUDUCHERRY,MEGHALAYA,CHANDIGARH,ANDAMAN & NICOBAR ISLANDS,DADRA & NAGAR HAVELI,TRIPURA
MEGHALAYA	PUDUCHERRY,CHANDIGARH,ARUNACHAL PRADESH,MANIPUR,TRIPURA,NAGALAND,SIKKIM,MIZORAM,ANDAMAN & NICOBAR ISLANDS,DADRA & NAGAR HAVELI
MIZORAM	SIKKIM,NAGALAND,MANIPUR,ARUNACHAL PRADESH,ANDAMAN & NICOBAR ISLANDS,PUDUCHERRY,DADRA & NAGAR HAVELI,MEGHALAYA,DAMAN & DIU,LAKSHADWEEP
NAGALAND	SIKKIM,MANIPUR,ARUNACHAL PRADESH,MIZORAM,PUDUCHERRY,MEGHALAYA,CHANDIGARH,ANDAMAN & NICOBAR ISLANDS,DADRA & NAGAR HAVELI,DAMAN & DIU
ODISHA	BIHAR,PUNJAB,CHHATTISGARH,JHARKHAND,HARYANA,ASSAM,MADHYA PRADESH,UTTARAKHAND,KERALA,TELANGANA
PUNJAB	BIHAR,ODISHA,HARYANA,MADHYA PRADESH,KERALA,CHHATTISGARH,TELANGANA,JHARKHAND,DELHI,ASSAM
RAJASTHAN	ANDHRA PRADESH,DELHI,TELANGANA,KERALA,MADHYA PRADESH,HARYANA,PUNJAB,KARNATAKA,BIHAR,ODISHA

SIKKIM	NAGALAND,MIZORAM,MANIPUR,ARUNACHAL PRADESH,PUDUCHERRY,MEGHALAYA,ANDAMAN & NICOBAR ISLANDS,DADRA & NAGAR HAVELI,CHANDIGARH,DAMAN & DIU
TAMIL NADU	UTTAR PRADESH,GUJARAT,WEST BENGAL,KARNATAKA,RAJASTHAN,ANDHRA PRADESH,DELHI,TELANGANA,KERALA,MADHYA PRADESH
TELANGANA	KERALA,DELHI,ANDHRA PRADESH,MADHYA PRADESH,HARYANA,RAJASTHAN,PUNJAB,BIHAR,ODISHA,CHHATTISGARH
TRIPURA	CHANDIGARH,MEGHALAYA,PUDUCHERRY,ARUNACHAL PRADESH,MANIPUR,NAGALAND,SIKKIM,MIZORAM,GOA,ANDAMAN & NICOBAR ISLANDS
UTTARAKHAND	ASSAM,JHARKHAND,JAMMU & KASHMIR,HIMACHAL PRADESH,CHHATTISGARH,-GOA,TRIPURA,CHANDIGARH,MEGHALAYA,PUDUCHERRY
UTTAR PRADESH	GUJARAT,TAMIL NADU,KARNATAKA,WEST BENGAL,RAJASTHAN,ANDHRA PRADESH,DELHI,TELANGANA,KERALA,MADHYA PRADESH
WEST BENGAL	TAMIL NADU,UTTAR PRADESH,GUJARAT,KARNATAKA,RAJASTHAN,ANDHRA PRADESH,DELHI,TELANGANA,KERALA,MAHARASHTRA
ANDAMAN & NICOBAR ISLANDS	DADRA & NAGAR HAVELI,DAMAN & DIU,LAKSHADWEEP,MIZORAM,SIKKIM,NAGALAND,MANIPUR,ARUNACHAL PRADESH,PUDUCHERRY,MEGHALAYA
CHANDIGARH	MEGHALAYA,TRIPURA,PUDUCHERRY,ARUNACHAL PRADESH,MANIPUR,NAGALAND,SIKKIM,MIZORAM,ANDAMAN & NICOBAR ISLANDS,GOA
DADRA & NAGAR HAVELI	DAMAN & DIU,ANDAMAN & NICOBAR ISLANDS,LAKSHADWEEP,MIZORAM,SIKKIM,NAGALAND,MANIPUR,ARUNACHAL PRADESH,PUDUCHERRY,MEGHALAYA
DAMAN & DIU	DADRA & NAGAR HAVELI,LAKSHADWEEP,ANDAMAN & NICOBAR ISLANDS,MIZORAM,SIKKIM,NAGALAND,MANIPUR,ARUNACHAL PRADESH,PUDUCHERRY,MEGHALAYA
LAKSHADWEEP	DAMAN & DIU,DADRA & NAGAR HAVELI,ANDAMAN & NICOBAR ISLANDS,MIZORAM,SIKKIM,NAGALAND,MANIPUR,ARUNACHAL PRADESH,PUDUCHERRY,MEGHALAYA
PUDUCHERRY	MEGHALAYA,ARUNACHAL PRADESH,MANIPUR,CHANDIGARH,NAGALAND,SIKKIM,MIZORAM,TRIPURA,ANDAMAN & NICOBAR ISLANDS,DADRA & NAGAR HAVELI

Appendix H: Raw Data Tables

ANDHRA PRADESH		
Pillars	**Indicators**	
Human Capital	Percentage of schools with ICT labs	21.48
	Number of students in engineering and technology (at UG, PG & Diploma level)	5008.30
	Enrolment in Ph.D.	12.66
	Higher education institutions with NAAC grade A and above	3.91
	Pupil Teacher Ratio- Higher Education	18
	Percentage of colleges connected through NMEICT	12.20
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.64
	Expenditure on Science, Technology and Environment	665.94
	FDI inflows	1.58
Knowledge Workers	Private R&D units in state	0.82
	Knowledge-intensive employment	9.35
	Number of NGOs involved in knowledge intensive areas	0.40
	Number of R&D Institutions funded by States/UTs	0.17
Business Environment	Total number of online services transaction	12691.90
	Ease of Doing Business - Implementation Percentage	98.78
	Number of incubator centers in state	1E-05
	Number of industrial clusters	0.00403
	Internet subscribers in the state	38.28
	Number of Common Facility Centres	0.06
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.20
	Number of cyber cells and social media monitoring cellls	0.002
	Pendency of court cases	29.95
Knowledge Output	Number of grass root innovations in state	0.012
	Patents filed from state	0.56
	Industrial designs by origin	0.05
	Trademark application filed	5.29
	Number of publications by state universities	7457
	Number of startups in the state	0.00134
Knowledge Diffusion	ICT exports	0.107
	High and medium-high-tech manufacturing entities	0.0002
	Number of registered GI	18
	Number of citations	19688

*For detailed definition of the indicators, refer to Appendix A.

ARUNACHAL PRADESH		
Pillars	**Indicators**	
Human Capital	Percentage of schools with ICT labs	20.81
	Number of students in engineering and technology (at UG, PG & Diploma level)	823.66
	Enrolment in Ph.D.	46.54
	Higher education institutions with NAAC grade A and above	7.14
	Pupil Teacher Ratio- Higher Education	29
	Percentage of colleges connected through NMEICT	0
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.25
	Expenditure on Science, Technology and Environment	22830.39
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0
	Knowledge-intensive employment	NA
	Number of NGOs involved in knowledge intensive areas	1.52
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	725.70
	Ease of Doing Business - Implementation Percentage	0.30
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	36.51
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.5
	Number of cyber cells and social media monitoring cells	0.07
	Pendency of court cases	NA
Knowledge Output	Number of grass root innovations in state	0.72
	Patents filed from state	0.43
	Industrial designs by origin	0
	Trademark application filed	0.94
	Number of publications by state universities	0
	Number of startups in the state	0.00066
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	1
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

ASSAM		
Pillars	**Indicators**	
Human Capital	Percentage of schools with ICT labs	9.81
	Number of students in engineering and technology (at UG, PG & Diploma level)	269.63
	Enrolment in Ph.D.	13.26
	Higher education institutions with NAAC grade A and above	2.78
	Pupil Teacher Ratio- Higher Education	29
	Percentage of colleges connected through NMEICT	12.20
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0
	Expenditure on Science, Technology and Environment	1636.39
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0.04
	Knowledge-intensive employment	1.09
	Number of NGOs involved in knowledge intensive areas	0.36
	Number of R&D Institutions funded by States/UTs	0.07
Business Environment	Total number of online services transaction	907
	Ease of Doing Business - Implementation Percentage	14.29
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0.003
	Internet subscribers in the state	25.58
	Number of Common Facility Centres	0.08
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	2.30
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	30.49
Knowledge Output	Number of grass root innovations in state	0.01
	Patents filed from state	0.22
	Industrial designs by origin	0.01
	Trademark application filed	3.21
	Number of publications by state universities	10639
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.01
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	6
	Number of citations	53151

*For detailed definition of the indicators, refer to Appendix A.

BIHAR		
Pillars	**Indicators**	
Human Capital	Percentage of schools with ICT labs	14.32
	Number of students in engineering and technology (at UG, PG & Diploma level)	252.85
	Enrolment in Ph.D.	2.74
	Higher education institutions with NAAC grade A and above	1.48
	Pupil Teacher Ratio- Higher Education	61
	Percentage of colleges connected through NMEICT	11.24
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.02
	Expenditure on Science, Technology and Environment	0
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0.004
	Knowledge-intensive employment	1.73
	Number of NGOs involved in knowledge intensive areas	0.25
	Number of R&D Institutions funded by States/UTs	0.04
Business Environment	Total number of online services transaction	684
	Ease of Doing Business - Implementation Percentage	75.82
	Number of incubator centres in state	2E-05
	Number of industrial clusters	0.001
	Internet subscribers in the state	16.83
	Number of Common Facility Centres	0.03
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.30
	Number of cyber cells and social media monitoring cells	0.002
	Pendency of court cases	24.97
Knowledge Output	Number of grass root innovations in state	0.01
	Patents filed from state	0.03
	Industrial designs by origin	0.01
	Trademark application filed	2.53
	Number of publications by state universities	1080
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.002
	High and medium-high-tech manufacturing entities	0.000003
	Number of registered GI	11
	Number of citations	5667

*For detailed definition of the indicators, refer to Appendix A.

CHHATTISGARH		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	27.98
	Number of students in engineering and technology (at UG, PG & Diploma level)	1184.42
	Enrolment in Ph.D.	4.56
	Higher education institutions with NAAC grade A and above	1.13
	Pupil Teacher Ratio- Higher Education	23
	Percentage of colleges connected through NMEICT	17.38
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.45
	Expenditure on Science, Technology and Environment	813.83
	FDI inflows	0.08
Knowledge Workers	Private R&D units in state	0.04
	Knowledge-intensive employment	3.17
	Number of NGOs involved in knowledge intensive areas	0.21
	Number of R&D Institutions funded by States/UTs	0.04
Business Environment	Total number of online services transaction	5093
	Ease of Doing Business - Implementation Percentage	97.32
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0
	Internet subscribers in the state	21.80
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.30
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	33.54
Knowledge Output	Number of grass root innovations in state	0.02
	Patents filed from state	0.09
	Industrial designs by origin	0.03
	Trademark application filed	5.28
	Number of publications by state universities	0
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.018
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	5
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

DELHI		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	33.82
	Number of students in engineering and technology (at UG, PG & Diploma level)	679.81
	Enrolment in Ph.D.	84.06
	Higher education institutions with NAAC grade A and above	24.61
	Pupil Teacher Ratio- Higher Education	24
	Percentage of colleges connected through NMEICT	17.42
Investment	Venture capital deals	0.63
	State government expenditure on higher and technical education	0.91
	Expenditure on Science, Technology and Environment	442.35
	FDI inflows	8.33
Knowledge Workers	Private R&D units in state	1.98
	Knowledge-intensive employment	9.56
	Number of NGOs involved in knowledge intensive areas	1.27
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	3917
	Ease of Doing Business - Implementation Percentage	47.62
	Number of incubator centres in state	6E-05
	Number of industrial clusters	0
	Internet subscribers in the state	125.86
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.30
	Number of cyber cells and social media monitoring cells	0.02
	Pendency of court cases	29.06
Knowledge Output	Number of grass root innovations in state	0.07
	Patents filed from state	6.40
	Industrial designs by origin	5.87
	Trademark application filed	307.15
	Number of publications by state universities	34640
	Number of startups in the state	0.01
Knowledge Diffusion	ICT exports	0.313
	High and medium-high-tech manufacturing entities	0.001
	Number of registered GI	1
	Number of citations	175472

*For detailed definition of the indicators, refer to Appendix A.

GOA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	66.87
	Number of students in engineering and technology (at UG, PG & Diploma level)	2440.07
	Enrolment in Ph.D.	7.68
	Higher education institutions with NAAC grade A and above	20.00
	Pupil Teacher Ratio- Higher Education	15
	Percentage of colleges connected through NMEICT	12.73
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	3.02
	Expenditure on Science, Technology and Environment	19983.45
	FDI inflows	1.24
Knowledge Workers	Private R&D units in state	1.58
	Knowledge-intensive employment	34.69
	Number of NGOs involved in knowledge intensive areas	0.21
	Number of R&D Institutions funded by States/UTs	0.07
Business Environment	Total number of online services transaction	2644
	Ease of Doing Business - Implementation Percentage	18.15
	Number of incubator centres in state	9E-05
	Number of industrial clusters	0.07
	Internet subscribers in the state	46.77
	Number of Common Facility Centres	1.43
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.40
	Number of cyber cells and social media monitoring cells	0.07
	Pendency of court cases	27.49
Knowledge Output	Number of grass root innovations in state	NA
	Patents filed from state	1.99
	Industrial designs by origin	0.82
	Trademark application filed	58.76
	Number of publications by state universities	754
	Number of startups in the state	0.004
Knowledge Diffusion	ICT exports	0.19
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	1
	Number of citations	4488
NA- Data not available		

*For detailed definition of the indicators, refer to Appendix A.

GUJARAT		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	55.73
	Number of students in engineering and technology (at UG, PG & Diploma level)	1994.50
	Enrolment in Ph.D.	8.69
	Higher education institutions with NAAC grade A and above	2.03
	Pupil Teacher Ratio- Higher Education	26
	Percentage of colleges connected through NMEICT	31.05
Investment	Venture capital deals	0.11
	State government expenditure on higher and technical education	0.47
	Expenditure on Science, Technology and Environment	3091.88
	FDI inflows	2.53
Knowledge Workers	Private R&D units in state	0.59
	Knowledge-intensive employment	17.24
	Number of NGOs involved in knowledge intensive areas	0.23
	Number of R&D Institutions funded by States/UTs	0.19
Business Environment	Total number of online services transaction	8882
	Ease of Doing Business - Implementation Percentage	98.21
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0.003
	Internet subscribers in the state	44.36
	Number of Common Facility Centres	0.03
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.60
	Number of cyber cells and social media monitoring cells	0.003
	Pendency of court cases	22.58
Knowledge Output	Number of grass root innovations in state	0.07
	Patents filed from state	1.05
	Industrial designs by origin	1.48
	Trademark application filed	40.04
	Number of publications by state universities	1204
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.26
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	13
	Number of citations	11685

*For detailed definition of the indicators, refer to Appendix A.

HARYANA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	48.32
	Number of students in engineering and technology (at UG, PG & Diploma level)	3542.43
	Enrolment in Ph.D.	12.34
	Higher education institutions with NAAC grade A and above	3.14
	Pupil Teacher Ratio- Higher Education	25
	Percentage of colleges connected through NMEICT	20.35
Investment	Venture capital deals	1.50
	State government expenditure on higher and technical education	0.68
	Expenditure on Science, Technology and Environment	810.72
	FDI inflows	0.005
Knowledge Workers	Private R&D units in state	0.86
	Knowledge-intensive employment	9.17
	Number of NGOs involved in knowledge intensive areas	0.18
	Number of R&D Institutions funded by States/UTs	0.07
Business Environment	Total number of online services transaction	3634
	Ease of Doing Business - Implementation Percentage	96.95
	Number of incubator centres in state	2E-05
	Number of industrial clusters	0.02
	Internet subscribers in the state	37.77
	Number of Common Facility Centres	0.10
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.70
	Number of cyber cells and social media monitoring cells	0.19
	Pendency of court cases	21.8
Knowledge Output	Number of grass root innovations in state	0.06
	Patents filed from state	1.75
	Industrial designs by origin	0.85
	Trademark application filed	45.84
	Number of publications by state universities	805
	Number of startups in the state	0.003
Knowledge Diffusion	ICT exports	5.22
	High and medium-high-tech manufacturing entities	0.0006
	Number of registered GI	1
	Number of citations	905
NA- Data not available		

*For detailed definition of the indicators, refer to Appendix A.

HIMACHAL PRADESH		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	51.30
	Number of students in engineering and technology (at UG, PG & Diploma level)	1936.06
	Enrolment in Ph.D.	24.76
	Higher education institutions with NAAC grade A and above	1.15
	Pupil Teacher Ratio- Higher Education	23
	Percentage of colleges connected through NMEICT	17.11
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.84
	Expenditure on Science, Technology and Environment	1184.07
	FDI inflows	0.005
Knowledge Workers	Private R&D units in state	0.12
	Knowledge-intensive employment	30.14
	Number of NGOs involved in knowledge intensive areas	0.26
	Number of R&D Institutions funded by States/UTs	0.50
Business Environment	Total number of online services transaction	7792.30
	Ease of Doing Business - Implementation Percentage	65.48
	Number of incubator centres in state	2E-05
	Number of industrial clusters	0
	Internet subscribers in the state	54.12
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.80
	Number of cyber cells and social media monitoring cells	0.01
	Pendency of court cases	29.54
Knowledge Output	Number of grass root innovations in state	0.13
	Patents filed from state	0.58
	Industrial designs by origin	0.26
	Trademark application filed	12.40
	Number of publications by state universities	0
	Number of startups in the state	0.001
Knowledge Diffusion	ICT exports	0.01
	High and medium-high-tech manufacturing entities	0.00003
	Number of registered GI	6
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

JAMMU & KASHMIR		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	16.56
	Number of students in engineering and technology (at UG, PG & Diploma level)	675.52
	Enrolment in Ph.D.	19.90
	Higher education institutions with NAAC grade A and above	3.65
	Pupil Teacher Ratio- Higher Education	26
	Percentage of colleges connected through NMEICT	16.77
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.08
	Expenditure on Science, Technology and Environment	4331.42
	FDI inflows	0.002
Knowledge Workers	Private R&D units in state	0.01
	Knowledge-intensive employment	9.46
	Number of NGOs involved in knowledge intensive areas	0.69
	Number of R&D Institutions funded by States/UTs	0.22
Business Environment	Total number of online services transaction	874.70
	Ease of Doing Business - Implementation Percentage	0.30
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0.01
	Internet subscribers in the state	39.70
	Number of Common Facility Centres	0.14
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.20
	Number of cyber cells and social media monitoring cells	0.03
	Pendency of court cases	29.18
Knowledge Output	Number of grass root innovations in state	0.07
	Patents filed from state	0.39
	Industrial designs by origin	0.03
	Trademark application filed	5.07
	Number of publications by state universities	1843
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.003
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	8
	Number of citations	6922

*For detailed definition of the indicators, refer to Appendix A.

JHARKHAND		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	14.06
	Number of students in engineering and technology (at UG, PG & Diploma level)	506.51
	Enrolment in Ph.D.	5.45
	Higher education institutions with NAAC grade A and above	1.22
	Pupil Teacher Ratio- Higher Education	56
	Percentage of colleges connected through NMEICT	11.73
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.37
	Expenditure on Science, Technology and Environment	0
	FDI inflows	0.014
Knowledge Workers	Private R&D units in state	0.02
	Knowledge-intensive employment	3.31
	Number of NGOs involved in knowledge intensive areas	0.20
	Number of R&D Institutions funded by States/UTs	0.01
Business Environment	Total number of online services transaction	758.20
	Ease of Doing Business - Implementation Percentage	96.57
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0
	Internet subscribers in the state	16.83
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.90
	Number of cyber cells and social media monitoring cells	0.003
	Pendency of court cases	32.55
Knowledge Output	Number of grass root innovations in state	0.02
	Patents filed from state	0.44
	Industrial designs by origin	0.01
	Trademark application filed	2.72
	Number of publications by state universities	7849
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.001
	High and medium-high-tech manufacturing entities	0.00003
	Number of registered GI	0
	Number of citations	28832

*For detailed definition of the indicators, refer to Appendix A.

KARNATAKA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	29.82
	Number of students in engineering and technology (at UG, PG & Diploma level)	2999.40
	Enrolment in Ph.D.	23.23
	Higher education institutions with NAAC grade A and above	4.44
	Pupil Teacher Ratio- Higher Education	16
	Percentage of colleges connected through NMEICT	22.94
Investment	Venture capital deals	3.44
	State government expenditure on higher and technical education	0.85
	Expenditure on Science, Technology and Environment	1217.21
	FDI inflows	1.76
Knowledge Workers	Private R&D units in state	0.70
	Knowledge-intensive employment	11.40
	Number of NGOs involved in knowledge intensive areas	0.25
	Number of R&D Institutions funded by States/UTs	0.22
Business Environment	Total number of online services transaction	1793.20
	Ease of Doing Business - Implementation Percentage	88.23
	Number of incubator centres in state	4E-05
	Number of industrial clusters	0.02
	Internet subscribers in the state	40.55
	Number of Common Facility Centres	0.10
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	2.10
	Number of cyber cells and social media monitoring cells	0.01
	Pendency of court cases	31.19
Knowledge Output	Number of grass root innovations in state	0.04
	Patents filed from state	2.97
	Industrial designs by origin	0.42
	Trademark application filed	24.10
	Number of publications by state universities	27910
	Number of startups in the state	0.005
Knowledge Diffusion	ICT exports	17.44
	High and medium-high-tech manufacturing entities	0.0002
	Number of registered GI	39
	Number of citations	113790

*For detailed definition of the indicators, refer to Appendix A.

KERALA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	67.21
	Number of students in engineering and technology (at UG, PG & Diploma level)	3058.71
	Enrolment in Ph.D.	17.69
	Higher education institutions with NAAC grade A and above	8.60
	Pupil Teacher Ratio- Higher Education	15
	Percentage of colleges connected through NMEICT	26.01
Investment	Venture capital deals	0.67
	State government expenditure on higher and technical education	0.34
	Expenditure on Science, Technology and Environment	4714.40
	FDI inflows	0.68
Knowledge Workers	Private R&D units in state	0.22
	Knowledge-intensive employment	6.71
	Number of NGOs involved in knowledge intensive areas	0.12
	Number of R&D Institutions funded by States/UTs	0.22
Business Environment	Total number of online services transaction	7433.80
	Ease of Doing Business - Implementation Percentage	26.97
	Number of incubator centres in state	3E-05
	Number of industrial clusters	0.04
	Internet subscribers in the state	52.42
	Number of Common Facility Centres	0.38
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.10
	Number of cyber cells and social media monitoring cells	0.06
	Pendency of court cases	30.76
Knowledge Output	Number of grass root innovations in state	0.13
	Patents filed from state	0.83
	Industrial designs by origin	0.26
	Trademark application filed	23.14
	Number of publications by state universities	5271
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.79
	High and medium-high-tech manufacturing entities	0.000002
	Number of registered GI	27
	Number of citations	29525

*For detailed definition of the indicators, refer to Appendix A.

MADHYA PRADESH		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	18.83
	Number of students in engineering and technology (at UG, PG & Diploma level)	1547.37
	Enrolment in Ph.D.	5.49
	Higher education institutions with NAAC grade A and above	2.04
	Pupil Teacher Ratio- Higher Education	31
	Percentage of colleges connected through NMEICT	17.17
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.09
	Expenditure on Science, Technology and Environment	5778.61
	FDI inflows	0.09
Knowledge Workers	Private R&D units in state	0.07
	Knowledge-intensive employment	9.07
	Number of NGOs involved in knowledge intensive areas	0.30
	Number of R&D Institutions funded by States/UTs	0.06
Business Environment	Total number of online services transaction	2916.50
	Ease of Doing Business - Implementation Percentage	97.01
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0.001
	Internet subscribers in the state	21.80
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.30
	Number of cyber cells and social media monitoring cells	0.01
	Pendency of court cases	37
Knowledge Output	Number of grass root innovations in state	0.02
	Patents filed from state	0.19
	Industrial designs by origin	0.11
	Trademark application filed	8.87
	Number of publications by state universities	1137
	Number of startups in the state	0.003
Knowledge Diffusion	ICT exports	0.13
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	9
	Number of citations	10305

*For detailed definition of the indicators, refer to Appendix A.

MAHARASHTRA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	44.03
	Number of students in engineering and technology (at UG, PG & Diploma level)	2424.09
	Enrolment in Ph.D.	8.19
	Higher education institutions with NAAC grade A and above	7.64
	Pupil Teacher Ratio- Higher Education	22
	Percentage of colleges connected through NMEICT	18.01
Investment	Venture capital deals	0.84
	State government expenditure on higher and technical education	0.11
	Expenditure on Science, Technology and Environment	1995.69
	FDI inflows	7.95
Knowledge Workers	Private R&D units in state	1.04
	Knowledge-intensive employment	16.30
	Number of NGOs involved in knowledge intensive areas	0.39
	Number of R&D Institutions funded by States/UTs	0.09
Business Environment	Total number of online services transaction	1216.60
	Ease of Doing Business - Implementation Percentage	92.86
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0.02
	Internet subscribers in the state	46.77
	Number of Common Facility Centres	0.21
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.60
	Number of cyber cells and social media monitoring cells	0.04
	Pendency of court cases	31.38
Knowledge Output	Number of grass root innovations in state	0.02
	Patents filed from state	3.20
	Industrial designs by origin	1.46
	Trademark application filed	56.12
	Number of publications by state universities	28397
	Number of startups in the state	0.003
Knowledge Diffusion	ICT exports	4.16
	High and medium-high-tech manufacturing entities	0.0002
	Number of registered GI	30
	Number of citations	139742

*For detailed definition of the indicators, refer to Appendix A.

MANIPUR		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	26.06
	Number of students in engineering and technology (at UG, PG & Diploma level)	193.87
	Enrolment in Ph.D.	22.62
	Higher education institutions with NAAC grade A and above	1.15
	Pupil Teacher Ratio- Higher Education	29
	Percentage of colleges connected through NMEICT	16.09
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.15
	Expenditure on Science, Technology and Environment	29629.16
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0.11
	Knowledge-intensive employment	0.42
	Number of NGOs involved in knowledge intensive areas	6.79
	Number of R&D Institutions funded by States/UTs	0.07
Business Environment	Total number of online services transaction	647.60
	Ease of Doing Business - Implementation Percentage	1.19
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	36.51
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.20
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	29.7
Knowledge Output	Number of grass root innovations in state	0.46
	Patents filed from state	0.07
	Industrial designs by origin	0
	Trademark application filed	0.91
	Number of publications by state universities	0
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	4
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

MEGHALAYA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	7.46
	Number of students in engineering and technology (at UG, PG & Diploma level)	286.47
	Enrolment in Ph.D.	33.00
	Higher education institutions with NAAC grade A and above	7.94
	Pupil Teacher Ratio- Higher Education	27
	Percentage of colleges connected through NMEICT	15.87
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.02
	Expenditure on Science, Technology and Environment	358.52
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0.07
	Knowledge-intensive employment	0
	Number of NGOs involved in knowledge intensive areas	0.24
	Number of R&D Institutions funded by States/UTs	0.20
Business Environment	Total number of online services transaction	2844.20
	Ease of Doing Business - Implementation Percentage	0.30
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	36.51
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.40
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	33.14
Knowledge Output	Number of grass root innovations in state	0.10
	Patents filed from state	0
	Industrial designs by origin	0
	Trademark application filed	1.08
	Number of publications by state universities	1200
	Number of startups in the state	0.0004
Knowledge Diffusion	ICT exports	0.04
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	2
	Number of citations	3160

*For detailed definition of the indicators, refer to Appendix A.

MIZORAM		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	5.44
	Number of students in engineering and technology (at UG, PG & Diploma level)	154.20
	Enrolment in Ph.D.	58.60
	Higher education institutions with NAAC grade A and above	6.90
	Pupil Teacher Ratio- Higher Education	14
	Percentage of colleges connected through NMEICT	13.33
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.82
	Expenditure on Science, Technology and Environment	8648.30
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0
	Knowledge-intensive employment	NA
	Number of NGOs involved in knowledge intensive areas	0.36
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	1706.20
	Ease of Doing Business - Implementation Percentage	0.89
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	36.51
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.40
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	34.83
Knowledge Output	Number of grass root innovations in state	0
	Patents filed from state	0.27
	Industrial designs by origin	1.73
	Trademark application filed	0.64
	Number of publications by state universities	0
	Number of startups in the state	0.0004
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	1
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

NAGALAND		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	17.66
	Number of students in engineering and technology (at UG, PG & Diploma level)	274.44
	Enrolment in Ph.D.	21.38
	Higher education institutions with NAAC grade A and above	4.62
	Pupil Teacher Ratio- Higher Education	16
	Percentage of colleges connected through NMEICT	6.15
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.27
	Expenditure on Science, Technology and Environment	6753.75
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0.05
	Knowledge-intensive employment	0
	Number of NGOs involved in knowledge intensive areas	1.06
	Number of R&D Institutions funded by States/UTs	0.05
Business Environment	Total number of online services transaction	1023.30
	Ease of Doing Business - Implementation Percentage	1.49
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	36.51
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.10
	Number of cyber cells and social media monitoring cells	0.05
	Pendency of court cases	NA
Knowledge Output	Number of grass root innovations in state	0.35
	Patents filed from state	0.05
	Industrial designs by origin	NA
	Trademark application filed	1.47
	Number of publications by state universities	0
	Number of startups in the state	0.001
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	3
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

ODISHA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	39.69
	Number of students in engineering and technology (at UG, PG & Diploma level)	2046.17
	Enrolment in Ph.D.	7.10
	Higher education institutions with NAAC grade A and above	1.86
	Pupil Teacher Ratio- Higher Education	26
	Percentage of colleges connected through NMEICT	17.06
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.35
	Expenditure on Science, Technology and Environment	2466.26
	FDI inflows	0.03
Knowledge Workers	Private R&D units in state	0.07
	Knowledge-intensive employment	1.13
	Number of NGOs involved in knowledge intensive areas	0.39
	Number of R&D Institutions funded by States/UTs	0.07
Business Environment	Total number of online services transaction	1596.00
	Ease of Doing Business - Implementation Percentage	92.73
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0.01
	Internet subscribers in the state	24.23
	Number of Common Facility Centres	0.05
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.10
	Number of cyber cells and social media monitoring cells	0.005
	Pendency of court cases	27.27
Knowledge Output	Number of grass root innovations in state	0.04
	Patents filed from state	0.25
	Industrial designs by origin	0.08
	Trademark application filed	2.97
	Number of publications by state universities	11404
	Number of startups in the state	0.001
Knowledge Diffusion	ICT exports	0.85
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	15
	Number of citations	42466

*For detailed definition of the indicators, refer to Appendix A.

PUNJAB		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	52.96
	Number of students in engineering and technology (at UG, PG & Diploma level)	3333.17
	Enrolment in Ph.D.	24.79
	Higher education institutions with NAAC grade A and above	6.67
	Pupil Teacher Ratio- Higher Education	20
	Percentage of colleges connected through NMEICT	20.13
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.30
	Expenditure on Science, Technology and Environment	1077.71
	FDI inflows	0.005
Knowledge Workers	Private R&D units in state	0.24
	Knowledge-intensive employment	6.37
	Number of NGOs involved in knowledge intensive areas	0.09
	Number of R&D Institutions funded by States/UTs	0.09
Business Environment	Total number of online services transaction	1854.70
	Ease of Doing Business - Implementation Percentage	91.07
	Number of incubator centres in state	9E-06
	Number of industrial clusters	0.004
	Internet subscribers in the state	54.84
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.70
	Number of cyber cells and social media monitoring cells	0.01
	Pendency of court cases	19.48
Knowledge Output	Number of grass root innovations in state	0.05
	Patents filed from state	0.75
	Industrial designs by origin	0.97
	Trademark application filed	38.86
	Number of publications by state universities	9613
	Number of startups in the state	0.001
Knowledge Diffusion	ICT exports	0.11
	High and medium-high-tech manufacturing entities	0.00005
	Number of registered GI	2
	Number of citations	40285

*For detailed definition of the indicators, refer to Appendix A.

RAJASTHAN		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	37.97
	Number of students in engineering and technology (at UG, PG & Diploma level)	1215.34
	Enrolment in Ph.D.	11.64
	Higher education institutions with NAAC grade A and above	0.59
	Pupil Teacher Ratio- Higher Education	30
	Percentage of colleges connected through NMEICT	17.39
Investment	Venture capital deals	0.54
	State government expenditure on higher and technical education	0.05
	Expenditure on Science, Technology and Environment	1166.72
	FDI inflows	0.199
Knowledge Workers	Private R&D units in state	0.11
	Knowledge-intensive employment	6.10
	Number of NGOs involved in knowledge intensive areas	0.20
	Number of R&D Institutions funded by States/UTs	0.07
Business Environment	Total number of online services transaction	3270.50
	Ease of Doing Business - Implementation Percentage	96.43
	Number of incubator centres in state	7E-06
	Number of industrial clusters	0.001
	Internet subscribers in the state	31.44
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.20
	Number of cyber cells and social media monitoring cells	0.001
	Pendency of court cases	32.85
Knowledge Output	Number of grass root innovations in state	0.04
	Patents filed from state	0.26
	Industrial designs by origin	0.11
	Trademark application filed	14.26
	Number of publications by state universities	5936
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.18
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	14
	Number of citations	22825

*For detailed definition of the indicators, refer to Appendix A.

SIKKIM		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	25.99
	Number of students in engineering and technology (at UG, PG & Diploma level)	1720.01
	Enrolment in Ph.D.	21.29
	Higher education institutions with NAAC grade A and above	6.25
	Pupil Teacher Ratio- Higher Education	14
	Percentage of colleges connected through NMEICT	29.41
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	2.33
	Expenditure on Science, Technology and Environment	3414.50
	FDI inflows	0.074
Knowledge Workers	Private R&D units in state	0.16
	Knowledge-intensive employment	75.85
	Number of NGOs involved in knowledge intensive areas	0
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	1290.50
	Ease of Doing Business - Implementation Percentage	0.60
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	30.76
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.20
	Number of cyber cells and social media monitoring cells	0.16
	Pendency of court cases	3.8
Knowledge Output	Number of grass root innovations in state	0
	Patents filed from state	0
	Industrial designs by origin	NA
	Trademark application filed	4.26
	Number of publications by state universities	0
	Number of startups in the state	0.0004
Knowledge Diffusion	ICT exports	0.27
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	1
	Number of citations	0
NA- Data not available		

*For detailed definition of the indicators, refer to Appendix A.

TAMIL NADU		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	21.46
	Number of students in engineering and technology (at UG, PG & Diploma level)	7096.34
	Enrolment in Ph.D.	41.27
	Higher education institutions with NAAC grade A and above	8.99
	Pupil Teacher Ratio- Higher Education	15
	Percentage of colleges connected through NMEICT	22.34
Investment	Venture capital deals	0.74
	State government expenditure on higher and technical education	0.40
	Expenditure on Science, Technology and Environment	136.19
	FDI inflows	1.53
Knowledge Workers	Private R&D units in state	0.65
	Knowledge-intensive employment	7.47
	Number of NGOs involved in knowledge intensive areas	0.26
	Number of R&D Institutions funded by States/UTs	0.13
Business Environment	Total number of online services transaction	5009.80
	Ease of Doing Business - Implementation Percentage	62.80
	Number of incubator centres in state	4E-05
	Number of industrial clusters	0.04
	Internet subscribers in the state	47.99
	Number of Common Facility Centres	0.34
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	2.60
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	31.04
Knowledge Output	Number of grass root innovations in state	0.05
	Patents filed from state	2.80
	Industrial designs by origin	0.71
	Trademark application filed	21.04
	Number of publications by state universities	86163
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	3.64
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	28
	Number of citations	294723

*For detailed definition of the indicators, refer to Appendix A.

TELANGANA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	16.32
	Number of students in engineering and technology (at UG, PG & Diploma level)	5223.99
	Enrolment in Ph.D.	13.88
	Higher education institutions with NAAC grade A and above	2.20
	Pupil Teacher Ratio- Higher Education	18
	Percentage of colleges connected through NMEICT	10.17
Investment	Venture capital deals	0.44
	State government expenditure on higher and technical education	0.10
	Expenditure on Science, Technology and Environment	425.16
	FDI inflows	1.56
Knowledge Workers	Private R&D units in state	0.31
	Knowledge-intensive employment	16.68
	Number of NGOs involved in knowledge intensive areas	0.23
	Number of R&D Institutions funded by States/UTs	0.13
Business Environment	Total number of online services transaction	13528.70
	Ease of Doing Business - Implementation Percentage	98.78
	Number of incubator centres in state	4E-05
	Number of industrial clusters	0
	Internet subscribers in the state	38.28
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.90
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	32.76
Knowledge Output	Number of grass root innovations in state	0.04
	Patents filed from state	2.29
	Industrial designs by origin	0.23
	Trademark application filed	22.65
	Number of publications by state universities	12368
	Number of startups in the state	0.004
Knowledge Diffusion	ICT exports	10.27
	High and medium-high-tech manufacturing entities	0.0004
	Number of registered GI	14
	Number of citations	48411

*For detailed definition of the indicators, refer to Appendix A.

TRIPURA		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	35.90
	Number of students in engineering and technology (at UG, PG & Diploma level)	420.48
	Enrolment in Ph.D.	3.24
	Higher education institutions with NAAC grade A and above	1.96
	Pupil Teacher Ratio- Higher Education	28
	Percentage of colleges connected through NMEICT	30.77
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	1.42
	Expenditure on Science, Technology and Environment	12512.58
	FDI inflows	0.01
Knowledge Workers	Private R&D units in state	0
	Knowledge-intensive employment	0
	Number of NGOs involved in knowledge intensive areas	0.57
	Number of R&D Institutions funded by States/UTs	0.08
Business Environment	Total number of online services transaction	943.90
	Ease of Doing Business - Implementation Percentage	16.67
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	36.51
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.10
	Number of cyber cells and social media monitoring cells	0.03
	Pendency of court cases	28.25
Knowledge Output	Number of grass root innovations in state	0.11
	Patents filed from state	0.19
	Industrial designs by origin	NA
	Trademark application filed	1.20
	Number of publications by state universities	0
	Number of startups in the state	0.001
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	0
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

UTTAR PRADESH		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	30.71
	Number of students in engineering and technology (at UG, PG & Diploma level)	1106.19
	Enrolment in Ph.D.	7.71
	Higher education institutions with NAAC grade A and above	0.69
	Pupil Teacher Ratio- Higher Education	58
	Percentage of colleges connected through NMEICT	13.76
Investment	Venture capital deals	0.44
	State government expenditure on higher and technical education	0.28
	Expenditure on Science, Technology and Environment	783.12
	FDI inflows	0.001
Knowledge Workers	Private R&D units in state	0.09
	Knowledge-intensive employment	7.05
	Number of NGOs involved in knowledge intensive areas	0.36
	Number of R&D Institutions funded by States/UTs	0.02
Business Environment	Total number of online services transaction	1630.70
	Ease of Doing Business - Implementation Percentage	84.52
	Number of incubator centres in state	2E-05
	Number of industrial clusters	0.004
	Internet subscribers in the state	22.17
	Number of Common Facility Centres	0.02
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.30
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	26.95
Knowledge Output	Number of grass root innovations in state	0.01
	Patents filed from state	0.32
	Industrial designs by origin	0.14
	Trademark application filed	8.47
	Number of publications by state universities	36169
	Number of startups in the state	0.004
Knowledge Diffusion	ICT exports	1.91
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	27
	Number of citations	169136

*For detailed definition of the indicators, refer to Appendix A.

UTTARAKHAND		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	14.27
	Number of students in engineering and technology (at UG, PG & Diploma level)	2588.11
	Enrolment in Ph.D.	38.75
	Higher education institutions with NAAC grade A and above	0.68
	Pupil Teacher Ratio- Higher Education	24
	Percentage of colleges connected through NMEICT	11.11
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	1.13
	Expenditure on Science, Technology and Environment	1830.14
	FDI inflows	0.03
Knowledge Workers	Private R&D units in state	0.24
	Knowledge-intensive employment	20.41
	Number of NGOs involved in knowledge intensive areas	0.60
	Number of R&D Institutions funded by States/UTs	0.22
Business Environment	Total number of online services transaction	1957.90
	Ease of Doing Business - Implementation Percentage	96.13
	Number of incubator centres in state	1E-05
	Number of industrial clusters	0
	Internet subscribers in the state	22.17
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.60
	Number of cyber cells and social media monitoring cellls	0
	Pendency of court cases	24.92
Knowledge Output	Number of grass root innovations in state	0.19
	Patents filed from state	0.63
	Industrial designs by origin	0.22
	Trademark application filed	23.93
	Number of publications by state universities	10643
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0.06
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	1
	Number of citations	52453

*For detailed definition of the indicators, refer to Appendix A.

WEST BENGAL		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	21.89
	Number of students in engineering and technology (at UG, PG & Diploma level)	725.17
	Enrolment in Ph.D.	7.61
	Higher education institutions with NAAC grade A and above	4.44
	Pupil Teacher Ratio- Higher Education	33
	Percentage of colleges connected through NMEICT	18.38
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.46
	Expenditure on Science, Technology and Environment	1023.12
	FDI inflows	0.031
Knowledge Workers	Private R&D units in state	0.24
	Knowledge-intensive employment	6.98
	Number of NGOs involved in knowledge intensive areas	0.28
	Number of R&D Institutions funded by States/UTs	0.03
Business Environment	Total number of online services transaction	3135.10
	Ease of Doing Business - Implementation Percentage	84.23
	Number of incubator centres in state	6E-06
	Number of industrial clusters	0.013
	Internet subscribers in the state	30.76
	Number of Common Facility Centres	0.05
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.70
	Number of cyber cells and social media monitoring cells	0.001
	Pendency of court cases	28.09
Knowledge Output	Number of grass root innovations in state	0.02
	Patents filed from state	0.53
	Industrial designs by origin	0.67
	Trademark application filed	10.65
	Number of publications by state universities	36589
	Number of startups in the state	0.001
Knowledge Diffusion	ICT exports	0.69
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	21
	Number of citations	175342

*For detailed definition of the indicators, refer to Appendix A.

ANDAMAN & NICOBAR ISLANDS		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	21.00
	Number of students in engineering and technology (at UG, PG & Diploma level)	1071.36
	Enrolment in Ph.D.	17.87
	Higher education institutions with NAAC grade A and above	14.29
	Pupil Teacher Ratio- Higher Education	18
	Percentage of colleges connected through NMEICT	28.57
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	5.22
	Expenditure on Science, Technology and Environment	NA
	FDI inflows	0.069
Knowledge Workers	Private R&D units in state	0
	Knowledge-intensive employment	0
	Number of NGOs involved in knowledge intensive areas	0.26
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	3629.00
	Ease of Doing Business - Implementation Percentage	0.30
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	NA
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.40
	Number of cyber cells and social media monitoring cells	0.53
	Pendency of court cases	36.73
Knowledge Output	Number of grass root innovations in state	NA
	Patents filed from state	0.53
	Industrial designs by origin	NA
	Trademark application filed	3.94
	Number of publications by state universities	0
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	0
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

CHANDIGARH		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	44.00
	Number of students in engineering and technology (at UG, PG & Diploma level)	1709.66
	Enrolment in Ph.D.	84.04
	Higher education institutions with NAAC grade A and above	44.00
	Pupil Teacher Ratio- Higher Education	22
	Percentage of colleges connected through NMEICT	40.00
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	1.86
	Expenditure on Science, Technology and Environment	NA
	FDI inflows	0.005
Knowledge Workers	Private R&D units in state	2.27
	Knowledge-intensive employment	19.99
	Number of NGOs involved in knowledge intensive areas	0
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	4542.40
	Ease of Doing Business - Implementation Percentage	0.30
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	NA
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	1.30
	Number of cyber cells and social media monitoring cells	0.19
	Pendency of court cases	14.67
Knowledge Output	Number of grass root innovations in state	NA
	Patents filed from state	3.32
	Industrial designs by origin	1.33
	Trademark application filed	175.56
	Number of publications by state universities	6297
	Number of startups in the state	0.007
Knowledge Diffusion	ICT exports	3.09
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	0
	Number of citations	44826

*For detailed definition of the indicators, refer to Appendix A.

DADRA & NAGAR HAVELI		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	24
	Number of students in engineering and technology (at UG, PG & Diploma level)	638.40
	Enrolment in Ph.D.	NA
	Higher education institutions with NAAC grade A and above	0
	Pupil Teacher Ratio- Higher Education	28
	Percentage of colleges connected through NMEICT	12.50
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	1.47
	Expenditure on Science, Technology and Environment	NA
	FDI inflows	0
Knowledge Workers	Private R&D units in state	1.16
	Knowledge-intensive employment	6.18
	Number of NGOs involved in knowledge intensive areas	0
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	5093.40
	Ease of Doing Business - Implementation Percentage	1.79
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	NA
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.50
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	31.16
Knowledge Output	Number of grass root innovations in state	NA
	Patents filed from state	0.87
	Industrial designs by origin	7.86
	Trademark application filed	18.91
	Number of publications by state universities	0
	Number of startups in the state	0.002
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0.001
	Number of registered GI	0
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

DAMAN & DIU		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	21
	Number of students in engineering and technology (at UG, PG & Diploma level)	1058.52
	Enrolment in Ph.D.	NA
	Higher education institutions with NAAC grade A and above	0
	Pupil Teacher Ratio- Higher Education	14
	Percentage of colleges connected through NMEICT	12.50
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.08
	Expenditure on Science, Technology and Environment	NA
	FDI inflows	0
Knowledge Workers	Private R&D units in state	0.41
	Knowledge-intensive employment	11.54
	Number of NGOs involved in knowledge intensive areas	0.41
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	2277.30
	Ease of Doing Business - Implementation Percentage	14.58
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	NA
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.90
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	26.52
Knowledge Output	Number of grass root innovations in state	NA
	Patents filed from state	0
	Industrial designs by origin	33.30
	Trademark application filed	52.21
	Number of publications by state universities	0
	Number of startups in the state	0
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0.001
	Number of registered GI	0
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

LAKSHADWEEP		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	86
	Number of students in engineering and technology (at UG, PG & Diploma level)	NA
	Enrolment in Ph.D.	NA
	Higher education institutions with NAAC grade A and above	0
	Pupil Teacher Ratio- Higher Education	12
	Percentage of colleges connected through NMEICT	0
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	18.61
	Expenditure on Science, Technology and Environment	NA
	FDI inflows	NA
Knowledge Workers	Private R&D units in state	0
	Knowledge-intensive employment	NA
	Number of NGOs involved in knowledge intensive areas	0
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	29976.30
	Ease of Doing Business - Implementation Percentage	0.30
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	NA
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	NA
Knowledge Output	Number of grass root innovations in state	NA
	Patents filed from state	NA
	Industrial designs by origin	NA
	Trademark application filed	1.55
	Number of publications by state universities	0
	Number of startups in the state	0
Knowledge Diffusion	ICT exports	0
	High and medium-high-tech manufacturing entities	0
	Number of registered GI	0
	Number of citations	0

*For detailed definition of the indicators, refer to Appendix A.

PUDUCHERRY		
Pillars	Indicators	
Human Capital	Percentage of schools with ICT labs	24
	Number of students in engineering and technology (at UG, PG & Diploma level)	7612.44
	Enrolment in Ph.D.	62.18
	Higher education institutions with NAAC grade A and above	8.33
	Pupil Teacher Ratio- Higher Education	11
	Percentage of colleges connected through NMEICT	26.32
Investment	Venture capital deals	0
	State government expenditure on higher and technical education	0.15
	Expenditure on Science, Technology and Environment	2595.85
	FDI inflows	1.56
Knowledge Workers	Private R&D units in state	1.28
	Knowledge-intensive employment	12.78
	Number of NGOs involved in knowledge intensive areas	0.32
	Number of R&D Institutions funded by States/UTs	0
Business Environment	Total number of online services transaction	2487.70
	Ease of Doing Business - Implementation Percentage	1.49
	Number of incubator centres in state	0
	Number of industrial clusters	0
	Internet subscribers in the state	NA
	Number of Common Facility Centres	0
Safety & Legal Environment	Information Technology / Intellectual Property related Acts (Rate of offences)	0.30
	Number of cyber cells and social media monitoring cells	0
	Pendency of court cases	NA
Knowledge Output	Number of grass root innovations in state	NA
	Patents filed from state	2.16
	Industrial designs by origin	0.16
	Trademark application filed	23.24
	Number of publications by state universities	3484
	Number of startups in the state	0.001
Knowledge Diffusion	ICT exports	1.19
	High and medium-high-tech manufacturing entities	0.0001
	Number of registered GI	2
	Number of citations	12645

*For detailed definition of the indicators, refer to Appendix A.

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