सत्यमेव जयते

NITI Aayog

INDIA INNOVATION INDEX

2020

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NITI Aayog

INDIA INNOVATION INDEX

2020

डॉ. राजीव कुमार
उपाध्यक्ष
DR. RAJIV KUMAR
VICE-CHAIRMAN

Phones : 23096677, 23096688
Fax : 23096699
E-mail : vch-niti@gov.in

सत्यमेव जयते

भारत सरकार
नीति आयोग, संसद मार्ग
नई दिल्ली-110001

Government of India
NATIONAL INSTITUTION FOR TRANSFORMING INDIA
NITI Aayog, Parliament Street
New Delhi-110 001

MESSAGE

As the world grapples with the COVID-19 pandemic this year, the significance of innovation is even more greatly felt. While innovation has always been pivotal for higher productivity and economic growth, it is also crucial for bolstering a post-crisis economy. In this light, the foresight of the central government in fostering a culture of innovation through initiatives like the Atal Innovation Mission, Startup India, etc. is laudable.

To instil a culture of innovation amongst the states, NITI Aayog had introduced the first-ever *India Innovation Index* in 2019. A year later, it is safe to say that we are on the right path toward transforming India into an innovation-driven economy. The index has not only served as a useful tool for governments to assess the innovation landscape in their states, but has also helped strengthen competitive federalism and create synergies between different stakeholders in the innovation ecosystem.

The second edition of the index will allow states to continue to evaluate their innovation environment and assess their progress. The division of innovation into two dimensions, namely innovation capabilities (Enablers) and innovation outcomes (Performance) will give the states a better perspective for identifying the critical focus areas. To facilitate policymaking, the index also highlights the challenges present in the way of improving innovation in the country and creates a distinction between issues that can be tackled at the national and state levels.

I hope the second edition of the index continues to foster a competitive spirit among the states, and enables them to learn from their peers.

I congratulate the Science and Technology Vertical of NITI Aayog for its effort in bringing out the index. My compliments to the Central Ministries/Departments, the states' Nodal Officers, the Confederation of Indian Industry, and our knowledge partner, Institute for Competitiveness, for their contribution in developing the India Innovation Index 2020.

(Dr. Rajiv Kumar)

स्वच्छ भारत
एक कदम स्वच्छता की ओर

डॉ. वी. के. सारस्वत
DR. V.K. SARASWAT
सदस्य
Member

Tele : 23096566, 23096567
Fax : 23096603
E-mail : vk.saraswat@gov.in

सत्यमेव जयते

भारत सरकार
नीति आयोग, संसद मार्ग
नई दिल्ली-110001

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MESSAGE

The rich cultural history of the Indian Subcontinent is dotted with illustrative instances of a dynamic past in the fields of mathematics, science, arts, architecture, and metallurgy, to name a few. Much of this glorious past is accredited to the ideas that were developed in the very heart of this soil, which were new at the time, but led India to prosperity. A millennium hence, India continues ahead with the same determination to chalk out a new destiny in the manner it wants.

In the 21st century, technology and science have played an indisputable role in helping India address the challenges of droughts, poverty and hunger, among others. Innovation has been instrumental in ushering in the **Green, White, and Blue revolutions,** and bringing millions out of poverty, generating livelihood opportunities, and paving the way for a young and self-reliant nation.

The pandemic has confronted us with unprecedented challenges. We must use science and technology to address these grave issues. But first, we must create a conducive culture, and reorient our education system to encourage young minds to think out of the box. Policy interventions such as Atal Innovation Mission strives to create a platform that not only generates new ideas, but also helps in making them more accessible to help resolve societal challenges.

The India Innovation Index depicts the innovation landscape of the country at the sub-national level. It portrays the innovative capabilities of the States, highlighting their strengths, which can be replicated in others, and weaknesses, which can be rectified. It will also help states to assess their own capacities in identifying areas that have the potential to boost the development of innovation-led entrepreneurship and attract start-ups and hi-tech companies.

India's innovation journey has been strictly restricted to certain regions that have been privileged with economic growth and have a legacy of industrialization. This index, in the spirit of cooperative and competitive federalism, will allow the sharing of good practices between States/UTs, to widen and replicate the innovation landscape across the country, especially in the parts that have the potential to become hubs of innovation. But most importantly, this index will help other important stakeholders to assess these areas of the innovation landscape, and the value they holds for businesses so they can partake in this innovation journey.

(Dr. V.K. Saraswat)
Member, NITI Aayag

स्वच्छ भारत
एक कदम स्वच्छता की ओर

अमिताभ कांत

Amitabh Kant

मुख्य कार्यकारी अधिकारी

Chief Executive Officer

सत्यमेव जयते

भारत सरकार
नीति आयोग, संसद मार्ग
नई दिल्ली-110001

Government of India
NATIONAL INSTITUTION FOR TRANSFORMING INDIA
NITI Aayog, Parliament Street
New Delhi-110 001

Tel. : 23096576, 23096574 Fax : 23096575
E-mail : ceo-niti@gov.in, amitabh.kant@nic.in

MESSAGE

Innovation is at the forefront of India's "Make in India" and "Aatmanirbhar Bharat" initiatives. The aim is not only to make in India but also to innovate in India and transform the Indian economy. With the thrust from innovation, India can scale-up its manufacturing and develop its export competitiveness.

The ongoing pandemic has impacted nearly every aspect of life. It has, however, also created significant new growth opportunities. As countries and firms around the world reevaluate their manufacturing and trade strategies, India can serve as the economic engine of the world, considering the inherent competitive advantages that it possesses.

The Science, Technology and Innovation Policy (STIP) 2020, which will be announced soon, will reorient priorities, sectoral focus and strategies of science, technology and innovation efforts in the country. The focus is also to revisit and re-energize how research is conducted and technologies are developed/deployed, targeting socio-economic progress and welfare.

Another major step in this direction is the release of the second edition of the India Innovation Index. Building on the previous edition, which was released in 2019, the current index provides a comprehensive framework to examine the sub-national innovation ecosystem across India. The index's learning can be useful for formulating policies and devising strategies at both the state and the national levels. The index benchmarks the performance of the states and union territories against their peers, to better understand the reasons for differential performance and the areas of strengths and weaknesses.

I hope that the India Innovation Index 2020 can help the country in recognizing the key areas of developmental intervention, with innovation as the central driver for growth. NITI Aayog will continue to take such initiatives that play a significant role in promoting cooperative and competitive federalism.

I congratulate the entire Science and Technology team at NITI Aayog, and the various Central Ministries and Departments, for their efforts in bringing out this new index. I also compliment the knowledge partner, the Institute for Competitiveness, for its invaluable contribution to the study.

(Amitabh Kant)

नीरज सिन्हा
सलाहकार (वि. एवम् प्रौ.)
NEERAJ SINHA
ADVISER (S&T)

सत्यमेव जयते

भारत सरकार
नीति आयोग, नीति भवन
संसद मार्ग, नई दिल्ली-110001
NATIONAL INSTITUTION FOR TRANSFORMING INDIA
NITI Bhawan
Parliament Street, New Delhi-110 001
Telefax : 91-11-23096795
E-mail : npsa@nic.in
Website : http://www.niti.gov.in

MESSAGE

In 2019, NITI Aayog, in collaboration with the Institute for Competitiveness, had embarked upon a journey to develop a comprehensive tool for benchmarking the innovation ecosystem of the country. The release of the second edition of the India Innovation Index, in these trying times, is a testament to the Government of India's continued commitment toward transforming the country into an innovation-driven economy.

The index intends to create an environment where innovation factors are under constant re-evaluation. The framework is designed in a way to distinguish between the inputs and outputs of innovation. Five Enablers pillars capture the aspects of a conducive environment, while two Performance pillars demonstrate the innovation results. It is expected that, over the years, the index will evolve with the refinement of the indicators and improvement of the methodology.

The index aims to perform two objectives: first, to rank the states and the union territories based on their relative performance, and second, to empower them to improve their innovation policies by highlighting their strengths and weaknesses. The methodology of the ranking is designed in a way that the states can draw lessons from the national leaders in innovation. Hopefully, this will lead to a healthy competition amongst the states and the union territories, thereby catalysing development and fostering competitive federalism.

The India Innovation Index 2020 is a collaborative effort, and there are many who have made valuable contributions toward the success of this edition. The Science and Technology (S&T) Vertical of NITI Aayog thanks all the relevant Ministries and Departments, and the knowledge partner — the Institute for Competitiveness — for their support.

The S&T Vertical is indebted to the Vice-Chairman, Member (S&T) and Chief Executive Officer, NITI Aayog, for their constant guidance and encouragement, without which this edition would not have been possible.

It is hoped that the India Innovation Index 2020 will prove to be a potent tool for all the states and union territories in their collective journey to make India an innovation-driven economy.

(NEERAJ SINHA)

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Dr. Amit Kapoor |
Honorary Chairman

Over the last decade, India has laid a policy emphasis on innovation as a growth strategy. The fact that India has been instrumental in the development of the COVID-19 vaccine validates the success of this policy focus. As we enter a new decade and explore ways of recovering from the shock of a pandemic, it has become even more crucial to strengthen the economy's innovative capacity. The second edition of the India Innovation Index has been compiled keeping these new realities in mind.

The study's objective is to provide policymakers and other key stakeholders with a comprehensive assessment of the spatial dynamics of the innovation ecosystem of India. It offers insights into how Indian states can achieve the dual goals of economic and social development by focusing on the innovation landscape. The findings from the study can also be used to identify the challenges that persist across regional economies in maximizing their innovative capacities and provide solutions to address them. The focus on regional economies becomes pertinent when it comes to innovation since the level of development and industrial base vary significantly across Indian states.

The 2020 edition of the index builds upon its maiden edition with the addition of new indicators for a more robust assessment of the innovation ecosystem. The current set of indicators have evolved as a result of extensive deliberations on possible means to better capture the innovation landscape. For instance, R&D expenditure by the state governments has been added to better understand the regional disparities in investment toward innovation.

I am grateful to NITI Aayog, who gave the Institute for Competitiveness the opportunity to take this important body of work forward. I could never hope to name all those who have helped us, but I would like to highlight the following individuals for their contributions. I would like to thank Dr. Rajiv Kumar, Dr. VK Saraswat, Shri Amitabh Kant and Shri Neeraj Sinha for their guidance and feedback.

Finally, I would like to acknowledge the support of my team at the Institute for Competitiveness, including Harshula Sinha, Sreetama Basu, Jatin Nair, Aniruddh Duttaa, Adya Behera, Manisha Kapoor, and Chirag Yadav in preparing this report.

I am certain that the study will enable change in India's innovation landscape by helping the states in identifying areas of strengths and weaknesses.

(Amit Kapoor)

U 24 / 8, DLF Phase 3, Gurgaon _ 122 002, Haryana, India
www.competitiveness.in | amit.kapoor@competitiveness.in | +91 9810402639

PREFACE

India's vision of becoming a $5-trillion economy is intricately linked with an innovation-oriented approach to economic growth. In this present crisis-hit world, while most countries are looking inward, India should use this opportunity to build its innovative capabilities to meet future global demands by producing a range of novel products, services, and processes.

Historically, economic crises often tend to curb the innovative tendencies of a nation. For instance, post the Great Depression, the United States of America witnessed a fall in the number of both individual and firm-based patents, which took decades to recover.

However, in the present scenario, India could avoid such an outcome as the nation is fully prepared to usher in a new era of innovation and development. Driven by 'Aatmanirbhar Bharat' and 'Make in India' initiatives, there is a strong push to empower the local manufacturing sectors that would, in turn, contribute to the production of innovative products at economical rates. Along with improving the scale of production, India has also aimed at enhancing its research capacities by introducing the new Science, Technology, and Innovation Policy 2020. These measures will play a crucial role in enabling the innovative capacity of the country.

The India Innovation Index is a reliable benchmark that will highlight the impact of the above measures at a sub-national level. The first edition of the index has managed to guide and support policymakers in improving local innovation ecosystems. This drive to enhance the innovative tendencies has resulted in

India breaking into the top 50 nations of the Global Innovation Index 2020, with the World Intellectual Property Organization (WIPO) declaring India as one of the leading innovation achievers of 2019-20 in the central and southern Asian region.

It is expected that the second iteration of the index will help in providing detailed insights into and a vivid picture of the innovation ecosystem at both the national and sub-national levels. This would support in transforming India into an innovation-driven economy, thereby cementing its position as an emerging global leader.

EXECUTIVE SUMMARY

The last edition of the India Innovation Index, released in October 2019, was a first-of-its-kind metric for assessing the innovation capabilities of Indian states and union territories. Since then, India, and the world, have undergone a tectonic shift due to the COVID-19 pandemic. With the pandemic triggering an economic shutdown, the role of innovation to revitalize the economy, has never been more important.

The 2020 edition builds on the previous year's methodology by introducing more metrics to provide a more holistic outlook of the Indian economy. The framework is updated to include globally considered parameters for measuring innovation, such as the percentage of GDP spent on research and development, while keeping them specific to the Indian economy.

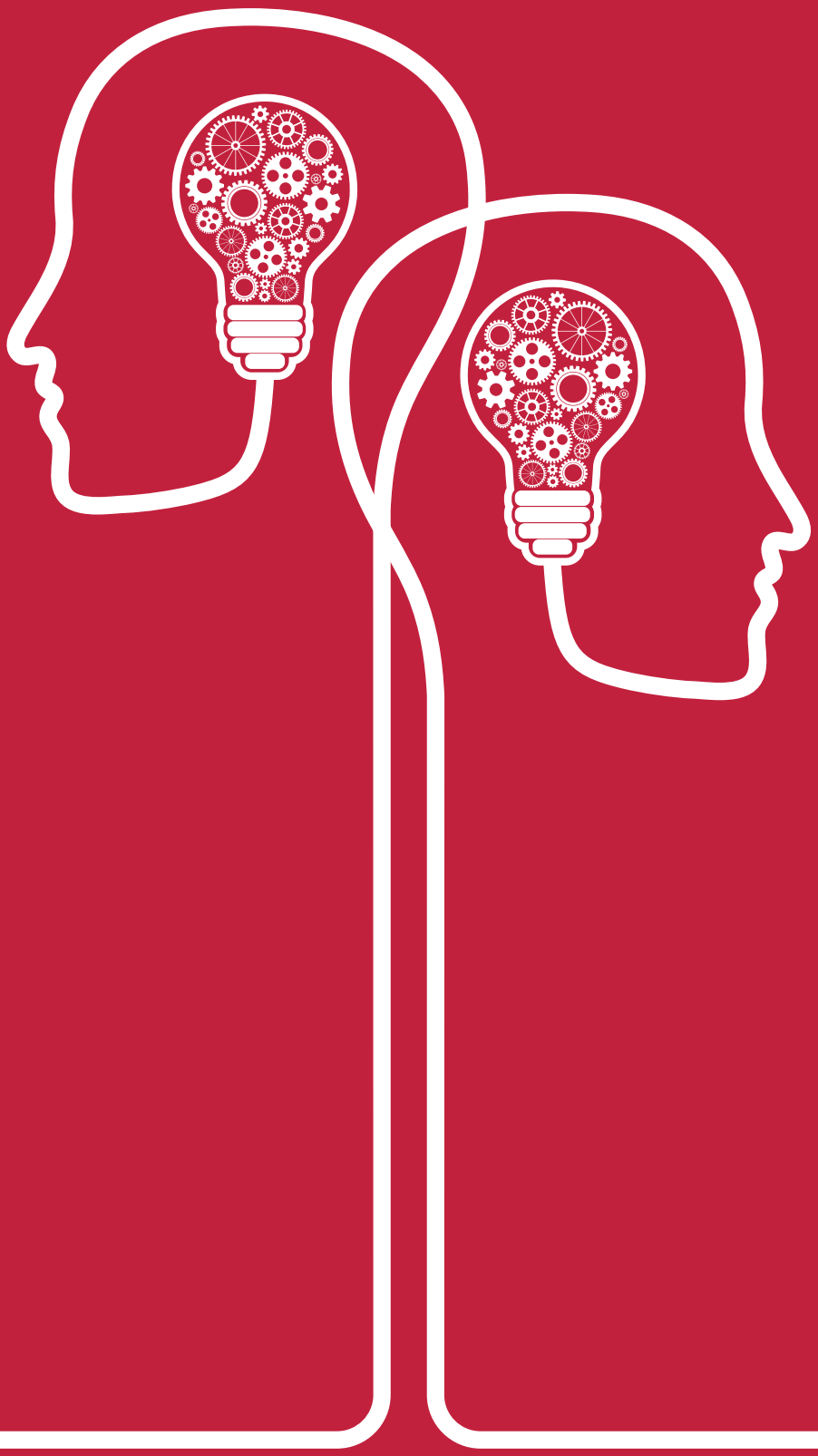
The India Innovation Index is the outcome of extensive research and analysis for evaluating India's innovation readiness at a sub-national level, highlighting the obstacles that deter governments, businesses, and individuals from fully capturing the benefits of innovation. The report broadly consists of four thematic sections—the first talks about innovation and its ability to drive economic growth; the crucial role it plays in not only facilitating the country's recovery but also sustaining competitiveness during these times. Apart from this, a comparison is drawn between India and select economies on various parameters to give an idea of how the country fares globally.

The next section lays out the unique framework of innovation and the methodology used to calculate the index, followed by key findings and rankings. Karnataka has maintained its top position among the Major States, while Maharashtra has leapfrogged Tamil Nadu to occupy the second place. Telangana, Kerala, Haryana, Andhra Pradesh, Gujarat, Uttar Pradesh and Punjab complete the top ten in that order. Among Union Territories and North-Eastern and Hill States, Delhi and Himachal

Pradesh occupy the top spots respectively. This section also captures trends and provides a detailed analysis of various factors that drive innovation at the country, state and pillar level. It is hoped that these analyses will help policymakers in identifying the catalysts and inhibitors of innovation at the national and sub-national levels.

The third section provides learnings and recommendations at the national and state level for policymakers to ponder on. Also included are profiles of all the states and union territories, providing a comprehensive snapshot of each region's current innovation landscape. Finally, the last section of the report consists of detailed data tables for all the framework indicators, along with sources and definitions.

The study aims to help relevant stakeholders track the regional progress on innovation ecosystems and inform policy choices that can address the identified gaps.



CONTENTS

Preface 14

Executive Summary 16

Introduction 21

What is Innovation? 25

The Need to Innovate 29

India vs the World 31

India Innovation Index 37

India Innovation Index: Key Findings 55

Profiles of States 87

Efficiency of Innovation 233

Evolution of States 237

Learnings and Recommendations 241

The Way Forward 245

Appendix 249

LIST OF TABLES

Table 1: India's performance on the Global Innovation Index	33
Table 2: Measures of India Innovation Index	40
Table 3: Index calculation steps	43
Table 4: India Innovation Index Framework	44
Table 5: Alpha Values	50
Table 6: KMO Values	51
Table 7: Ranking Comparison	239

LIST OF FIGURES

Figure 1: Research and Development Expenditure as percentage of GDP in 2018-19	33
Figure 2: National R&D Expenditure and its percentage share of GDP (estimated)	34
Figure 3: Researcher per million inhabitants, 2018-19	34
Figure 4: National Research and Development Expenditure, 2017-18	35
Figure 5: Sectoral distribution in R&D expenditure across countries in 2018-19	36
Figure 6: Country-level Analysis of India Innovation Index	56
Figure 7: Correlation between states' GDP and innovation scores	59
Figure 8: Regional mapping of Human Capital scores	66
Figure 9: Indicator scores under Human Capital	68
Figure 10: Regional mapping of Investment scores	69
Figure 11: Indicator scores under Investment	71
Figure 12: Regional mapping of Knowledge Workers scores	72
Figure 13: Indicator scores under Knowledge Workers	73
Figure 14: Regional mapping of Business Environment scores	75
Figure 15: Indicator scores under Business Environment	76
Figure 16: Regional mapping of Safety and Legal Environment scores	78
Figure 17: Indicator scores of Safety and Legal Environment Indicators	79
Figure 18: Regional mapping of Knowledge Output scores	81
Figure 19: Average scores of Knowledge Output Indicators	82
Figure 20: Regional mapping of Knowledge Diffusion scores	84
Figure 21: Average scores of Knowledge Diffusion Indicators	85
Figure 22: Efficiency in Innovation of Indian States	234
Figure 23: Efficiency in the innovation of Indian states compared with National Average	235
Figure 24: Efficiency in Innovation of Indian states based on innovation tiers	236
Figure 25: Comparing top-ranking states across pillars.	243
Figure 26: Comparing low-performing states across pillars.	243

Note: All images are for representation purpose only

01 Introduction

Throughout history, the need to innovate has been central to economic development for any nation. But with the COVID-19 pandemic, innovation has become even more pertinent for the world as a driver of growth.

Man is by nature a social animal. And yet, modern technology has been able to revolutionize human interactions significantly. This unprecedented surge in technological advancement is known as the fourth industrial revolution for its ability to make significant changes to economy and society within a short span of time. The depth of this revolution lies in its speedy permeation across different regions and income groups, due to the globally intertwined nature of nation-states. This global connectivity, spurring from the strongest wave of globalization in the 20th century, has paved the way not only for the free flow of capital and persons, but also for the exchange of ideas in a truly transnational sense. But with the aid of modern technology, this wave of globalization has helped materialize these ideas into products and utilities in real time, helping both businesses and society.

However, globalization has its own set of challenges. Not all sections of society have benefited from the promises of globalization and it has widened economic inequalities and social cleavages over time. This discontent has manifested in the form of restriction of cross-border flow of capital and labour, in order to protect the domestic from the social, economic, and cultural invasion of the global. But what happens when borders are actually shut, and there is a restricted flow of capital and labour? As COVID-19 spread across the world, nations sealed borders overnight and went into lockdown to combat the spread of the virus. While the pandemic has resulted in the loss of lives, it has not dampened the human spirit. The development of vaccines in a record 18-month period is a miraculous achievement, and a testimony to the global connectivity that has enabled the exchange of ideas, data and relevant information from across the world. The cooperative competition in the process of vaccine-development highlights the significant role played by institutions across states, markets and society in envisaging innovation in times of crisis. While affecting various sectors of the economy in negative ways, such crises often catalyse innovation and productivity. With conditions that are specifically unique to the crisis at hand, it encourages leaders and innovators to pave the way for such unique changes by creative problem-solving. The development of an indigenous supply-chain for manufacturing Personal Protective Equipment (PPE) kits in six weeks is an exemplification of this creative problem-solving, through innovation.

By improving our innovation landscape, we can not only employ and empower this labour force, but also embrace a gender-inclusive approach.

During the onset of COVID-19 in March 2020, India was faced with the tough challenge of keeping the pandemic under control. At the time, India heavily relied on importing healthcare equipment, testing kits, body overalls and masks from countries

such as China. With a growing number of cases, a demand estimate prepared by the Empowered Group headed by Dr. Vinod Kumar Paul (Member, NITI Aayog) calculated that more than 20 million PPE kits and 40 million N-95 masks would be needed by July 2020, translating to almost 20,000 PPE kits and 400,000 N-95/FFP-2 class masks per day. The Ministry of Textiles, under the "Vocal for Local" initiative of the Government of India, with support from the Ministry of Health and Family Welfare, was able to create an end-to-end indigenous supply chain set-up to manufacture PPE kits as per WHO standards in six weeks. The Indian PPE market, the second largest in the world now, is expected to reach beyond Rs 7.8 billion by the end of 2020, with a compounded annual growth rate of 19%. More importantly, this initiative has not only helped healthcare workers and COVID-19 patients but has also been a source of livelihood for low-income individuals, small-scale manufacturers, and textile companies (Kapoor and Goyal, 2020). The manufacturing of PPE kits during the COVID-19 pandemic is a testament to the fact that the innovative spirit can be furthered at every level of society, with the support of institutions across the state, market, and society.

India enjoys a crucial competitive advantage in the world, with its demographic dividend. Theoretically, this demographic dividend occurs when the proportion of the working population within the total population is high, which implies that more people have the potential to be productive and contribute to the economic growth of the country. As much as 70% of India's population is below 30 years of age, as compared to the older population of China, Japan and the US. According to Mukherjee, Bajaj and Gulati, 2019, utilizing this demographic dividend is however dependent on India addressing its declining labour force participation rate (LFPR). This essentially implies that while India has a potentially high working-age population, it is not necessarily contributing to the economy. In fact, India also

has one of the lowest female LFPRs in the world. The key to harnessing this competitive advantage lies in defining and expanding India's innovative capabilities, by improving its innovation landscape that can not only employ and empower this labour force but can also be gender-inclusive in its approach.

The India Innovation Index 2020 examines the existing innovation landscape in India. In a diverse country such as India, it must be understood that its innovative capabilities significantly vary across different states and union territories. Through this index, the goal is to identify the strengths and weaknesses of the Indian innovation landscape, that could provide an impetus to different stakeholders to encapsulate these insights into decision-making.

02

What is innovation?

Innovation is the creation, development and implementation of a new product, process or service, with the aim of improving efficiency, effectiveness or competitive advantage.

The term 'innovation' invokes a sense of originality, as it strives to improve the mundaneness of everyday life. Innovation essentially paves the way to creatively improve the standard of living and satisfy the needs of consumers.

The spirit of innovation by itself is not new, for the virtue of curiosity that has mothered the values of innovation is intrinsic to the spirit of humanity. The earliest literature on innovation can be traced back to Adam Smith's *An Inquiry into the Nature and Causes of the Wealth of Nations,* which explores the role played by innovators in leading technological improvements in factories and society. However, it was Joseph Schumpeter who accorded innovation the centrality in its role of pushing economic growth and industry transformation. Schumpeter conceptualized innovation as "the introduction of new or significantly improved products, processes, organization methods, and marketing methods in internal business practices or the marketplace." Under the *wave theory* proposed by him, Schumpeter highlighted the evolution of technologies in different phases of industrialization and business cycles.

But to limit innovation to merely its ability of industrial transformation posits a narrow understanding, for its essence lies in its basic value of generating, accepting, and implementing new ideas, processes, products, or services (Nair, Guldiken, Fainshmidt, and Pezeshkan, 2015). Innovation permeates into society and state, as both formal and informal institutions evolve with changes in societal interactions, culture, communication, and even education structures, especially in this digital era. But this relation is symbiotic, as changes in society, economy, and the polity also play a role in driving innovation.

Innovation is, thus, not only a process limited to particular firms or industry, but is rather a multisectoral process involving various actors, institutions and organizations from

Interestingly, the innovation ecosystem is run by two parallel economies, commercial and research. While fundamental research is the key driver of research economy, commercial economy is primarily driven by the marketplace.

the realm of the state, market and society. This large framework, dubbed as an "innovation ecosystem", works with the larger goal of driving and enabling an environment that is conducive for innovation and technological advancement. The innovation ecosystem runs on both material capital, such as funds, equipment, facilities, as well as human capital, which makes up the various institutional actors and entities participating in the ecosystem. Interestingly, the innovation ecosystem is run by two parallel economies, commercial economy and the research economy. While fundamental research is the key driver of research economy, commercial economy is primarily driven by the marketplace. This changes the manner in which innovation is understood, pursued and even incentivized by different actors in the innovation ecosystem. While a firm pursues innovation to expand its market presence, the state has to imbibe innovation with the larger goals of economic growth and development in mind, and invest accordingly.

According to Michael Porter, the world's foremost thinker on modern strategy, innovation is a key component in the characterization of development strategy. The first stage of this development strategy is factor-driven, wherein the competitive advantage is based exclusively on endowments of labour and natural resources. In the second stage, which is investment-driven, the efficiency of producing standard products and services becomes the dominant source of competitive advantage. The focus of investment-driven economies is on manufacturing and outsourced service exports. The wages in this stage are higher, but these economies are susceptible to external sector-specific demand shocks. The third stage, which is innovation-driven, can produce innovative products and services at the global technology frontier using the most advanced methods, which becomes the dominant source of competitive advantage. At this stage, the national business environment is characterized by the presence of deep clusters. Clusters become critical motors, not only in generating productivity but also in encouraging innovation at the global level. Institutions and incentives supporting innovation are also well developed, increasing the efficiency of cluster interaction. Companies compete with unique strategies that are often global in scope and invest strongly in advanced skills, the latest technology, and innovative capacity.

An economy that is steered by innovation across all sectors also requires a conducive innovation ecosystem, which is inclusive and sensitive to the aspirations and needs of the country. An innovation-driven economy can thus be India's key to cement its position as an emerging world leader.

03

The need to innovate

The need to innovate is intrinsic for a healthy economy to harbour the spirit of competition.

An attempt to understand the way different nation-states grow and prosper had led Adam Smith, the father of modern economics, to write his treatise *An Inquiry into the Nature and Causes of the Wealth of Nations*. This enabled a traditional understanding of generating wealth as output (O), a function of capital (K) and labour (L), which has dominated much of classical economics.

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

However, an increase in labour and capital could not entirely account for economic growth. As Robert Solow pointed out in 1957 it was the technological change that in fact enhanced the efficiency and productivity of factors of production such as labour and capital. Technological change, thus, became a crucial factor that was added to this explanation.

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

Solow's model on economic growth assumed perfect competition, constant returns to scale and complete absence of externalities, wherein technological change was taken to be exogenous. However, in 1986 Paul Romer challenged this assumption and argued that technology was a result of explicit efforts in research and development (R&D), and human capital (HC).

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

Thus, economic growth was no longer defined through merely labour and capital, but rather through aspects that directly influenced these factors of production such as research and development, and human capital. Both R&D and human capital thus sought investment that could further enhance a country's economic growth. Innovation thus became a part of this new recipe for the growth and prosperity of a nation.

The need to innovate is intrinsic for a robust economy in order to harbour the spirit of competition. Through the medium of competition, different firms can utilize resources such as land, labour and capital that has the power to create value through new products. The aspiration of innovation can thus drive firms to increase their productivity and efficiency, thereby achieving growth. And it is this ushering in of new ideas in material form that drives social and economic transformation.

04

India vs the World

The world economy has changed with the onset of the fourth industrial revolution.

The post-liberalization economy in India witnessed rapid growth, owing to the structural reforms initiated to attract foreign investment and encourage competition in India's buoyant domestic market. Spearheading this process was the National Science and Technology Entrepreneurship Development Board (NSTEDB), established in 1982, and the National Innovation Foundation (NIF) in 2000, both set up under the aegis of the Department of Science and Technology, Government of India. While NSTEDB was at the forefront of promoting science and technology parks and incubators through technology-based companies, NIF focused on strengthening the evolution, sustenance, and diffusion of grassroots innovation. The first annual innovation competition in 2000, organized by NIF, received more than 1600 entries, with the winning innovations including a bicycle made from bamboo and a water pulley that allowed women to rest while drawing water from a well (Nair, Guldiken, Fainshmidt, and Pezeshkan, 2015).

The innovation agenda has been furthered in recent times through Atal Innovation Mission, DST-NIDHI's PRAYAS (PRomoting and Accelerating Young and ASpiring technology entrepreneurs), Digital India, and Startup India. These initiatives have encouraged the entrepreneurial spirit while enabling access to the requisite resources to harness this youthful energy. The goal has been to make innovation a part of India's policy agenda, in order to develop and strengthen the existing innovation ecosystem that drives positive impact.

Standing at the 30-year mark of the economic reforms of 1991, this milestone urges one to question the way the spirit of innovation has been absorbed in the Indian economy. India has made tremendous strides in the research and technology space, but to ascertain how it performs at the global level is crucial to shape the future aspirations of this young nation.

While truly living up to the spirit of grassroots innovation, the world economy has changed with the onset of the fourth industrial revolution, decidedly changing the way firms function in the modern world.

The Global Innovation Index (GII) is a joint collaborative effort between the WIPO, Cornell University, and INSEAD that annually ranks the innovation performance of more than 130 economies. As of 2020, India's rank as the 48th innovative nation is a testament to the improvements made in its innovation ecosystem. Additionally, India ranks the highest amongst central and southern Asian countries and is a new entrant to the Top 3 innovation economies among the lower-middle-income group nations with Vietnam and Ukraine. The significance of this consistent progress is evident when compared to the 2015 rankings, wherein India occupied the 81st position.

Table 1:

India's performance on the Global Innovation Index

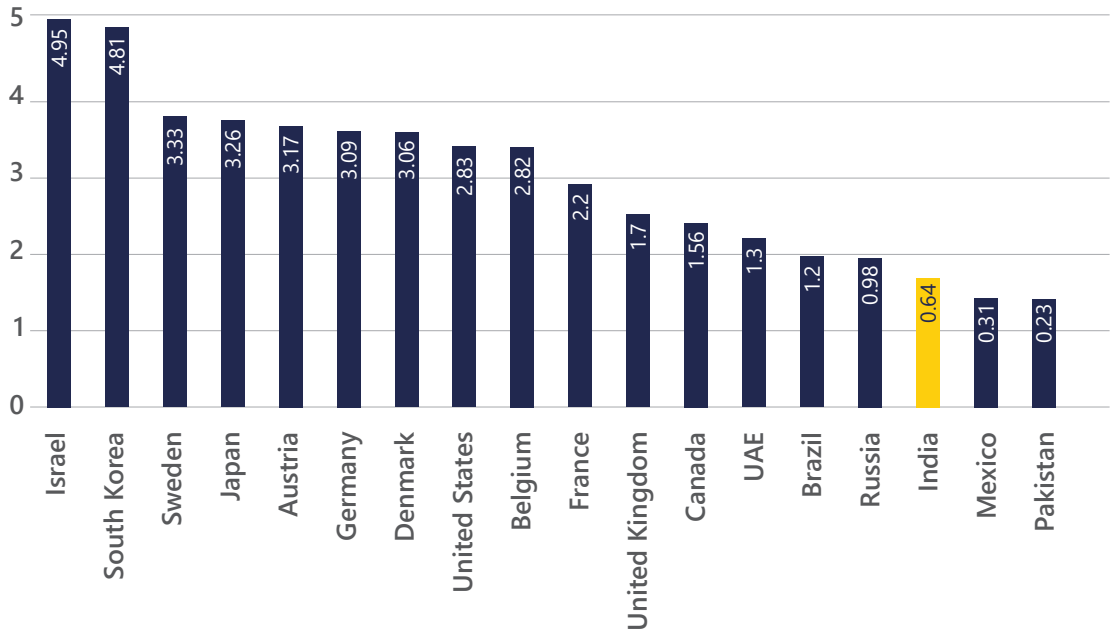
Year	GII Score	GII Rank	Total Countries
2015	31.7	81	141
2016	33.6	66	128
2017	35.5	60	127
2018	35.2	57	126
2019	**36.58**	**52**	**129**
2020	**35.6**	**48**	**131**

Research and Development

Figure 1 shows that India spends around 0.7% of its GDP on research and development, which is much lower than the top spenders, such as Israel (4.95%), South Korea, Sweden, and Japan. This relative ranking puts India at par with other developing countries, such as Mexico, and much ahead of countries in the South and West Asian region. However, India lies below other BRICS nations in terms of the percentage of GDP spent on R&D.

Figure 1:

R&D Expenditure as Percentage of GDP in 2018-19

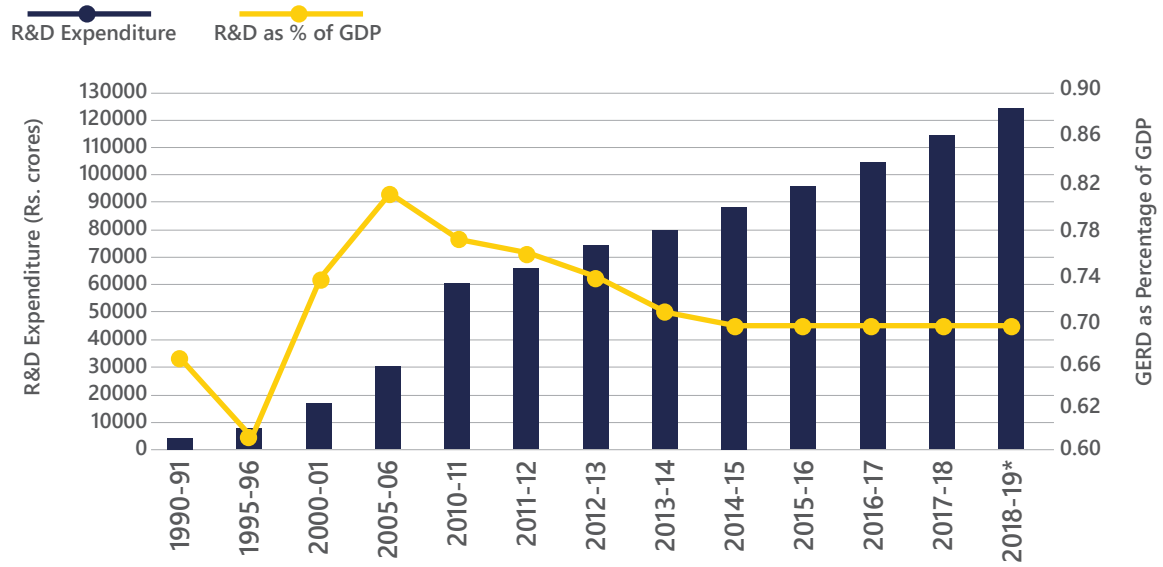


Source: UNESCO Institute of Statistics, June 2020

However, in absolute terms, the Gross Expenditure on R&D (GERD) has consistently risen over the years, tripling from Rs 39,437.77 crores in 2007-08 to Rs 1,13,825.03 crores in 2017-18, as shown in Figure 2. For the year 2018-19, GERD in India is estimated to be Rs. 1,23,847.70.

Figure 2:

National R&D Expenditure and its Percentage with GDP

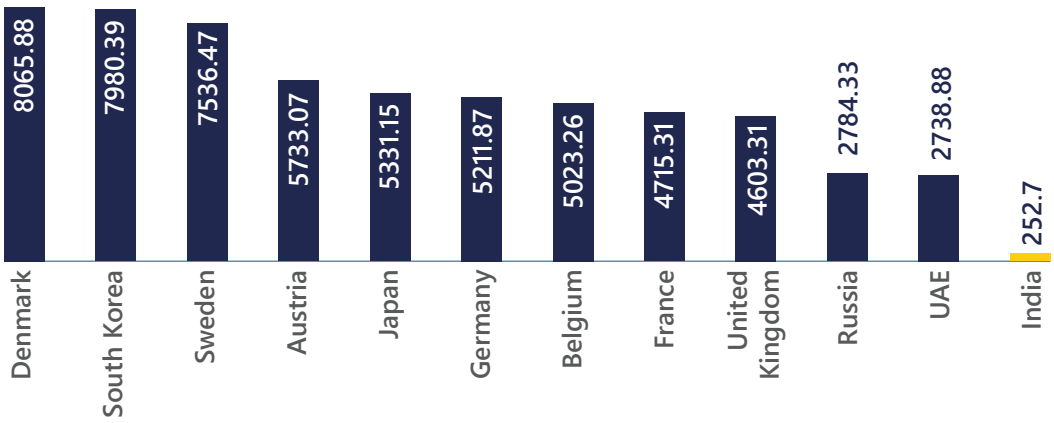


Source: Research and Development Statistics at a Glance 2019-20, Department of Science and Technology, Government of India

Another important aspect of R&D is the number of personnel engaged in the process of research itself. This involves the conception and creation of new knowledge, processes, methods, or systems, and the management of projects, which form a crucial part of research and development. As per Figure 3, countries such as Denmark, Sweden, and South Korea have a higher share of researchers in relation to their population. In comparison, India has a much lower share of researchers per million inhabitants.

Figure 3:

Research Per Million Inhabitants in 2018-19

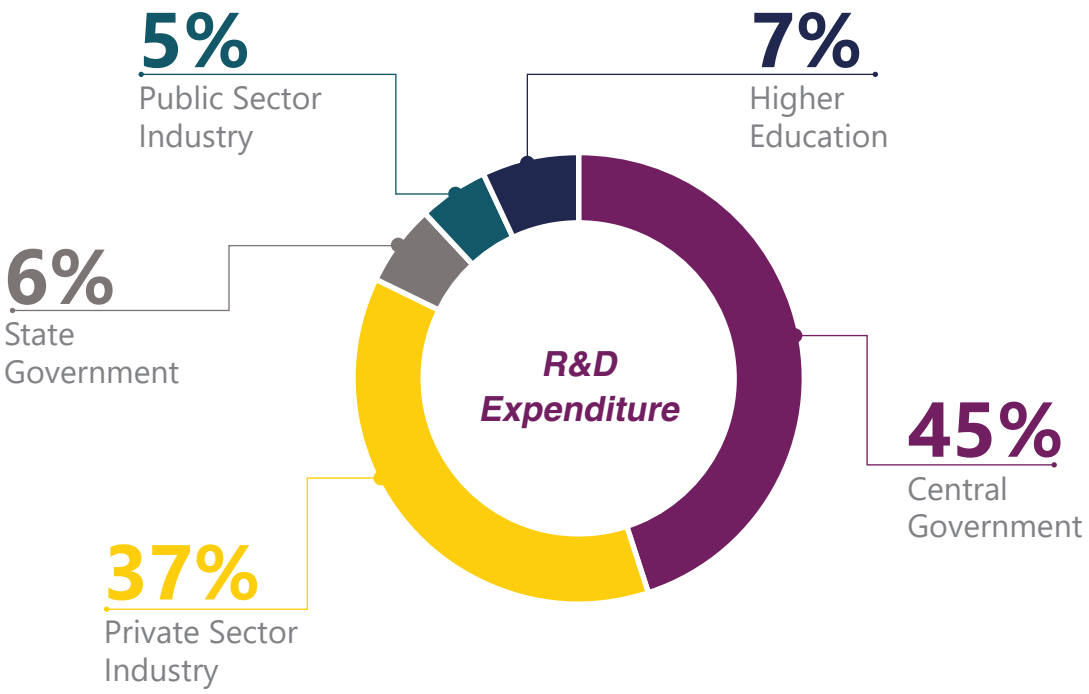


Source: UNESCO Institute for Statistics, June 2020

In India, the gross expenditure on R&D is primarily driven by the government. According to Figure 4, the central government holds the largest share at 45% of the total expenditure in 2017-18, followed by state governments at 6.4%. The business sector accounts for 41% of the total share in R&D expenditure, which is led by the private sector at 37% and public sector industries at 5%. The higher education sector stands at almost 7%.

Figure 4:

National R&D Expenditure by Sector, 2017-18

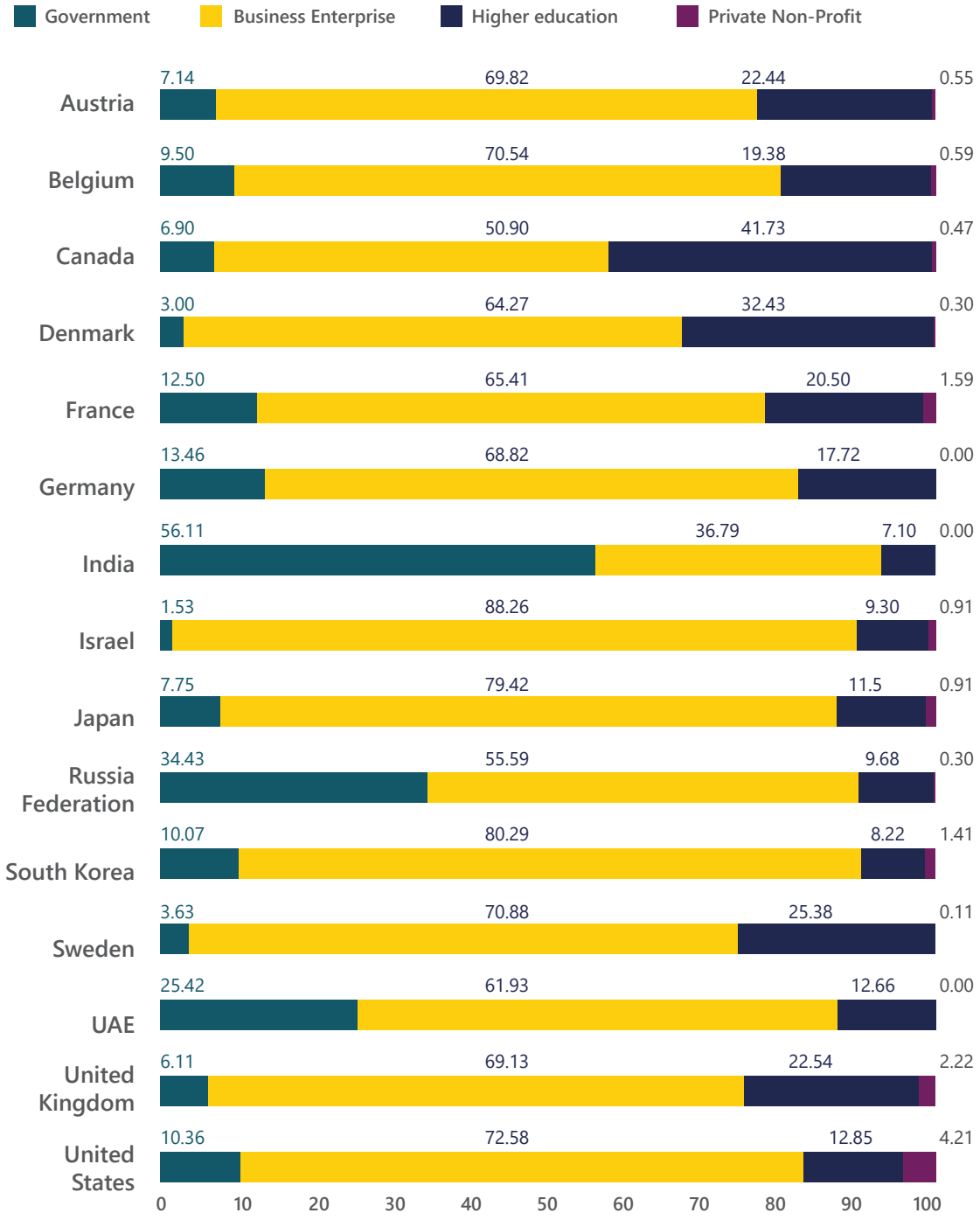


Source: Research and Development Statistics at a Glance 2019-20, Department of Science and Technology, Government of India

India's break-up of GERD stands in contrast with other countries, wherein it is the business sector, dominated by private enterprises, that lead the expenditure as shown in Figure 5. Countries such as Israel have 88.26% participation of business enterprises in the country's R&D expenditure, and the United States has 72.57%. Countries that do share a higher level of government spending in R&D are Russia at 34.43% and UAE at 25.42%. Most of the European countries have a higher participation of the higher education sector in the research space, such as France, Germany, Austria, Denmark, Sweden, and the United Kingdom. In the case of Canada, the higher education sector contributes 41.73% of the R&D expenditure but sees low participation of the government. In India, central agencies such as the Defence Research and Development Organisation (DRDO), Department of Space (DoS) take up the majority share at 31.6%, and 19% respectively.

Figure 5:

Sectoral Distribution in R&D Expenditure across Countries in 2018-19



Source: UNESCO Institute for Statistics, June 2020

05 India Innovation Index

This section provides the methodology followed to assess the innovation capacities and performance of Indian states.

The objective of the India Innovation Index is to scrutinize the innovation capacities and performance of Indian states. The index provides an extensive framework for the constant evaluation of the innovation ecosystem of the 28 Indian states and 9 union territories. The index intends to accomplish the following three functions:

- Rank all states and union territories based on their index score
- Identify opportunities and challenges
- Assist in modifying governmental policies to foster innovation

The framework has been shaped post discussions with experts in the domain of index creation and innovation. The consensus was to include input and output as the main dimensions for the index. Further, five inputs and two output pillars were created consisting of indicators that enable and epitomize innovation in India.

The India Innovation Index measures innovation inputs through 'Enablers' and innovation output as 'Performance.'

Five Enablers pillars capture elements of the state economy that act as inputs for the innovation environment

Human Capital

Investment

Knowledge Workers

Business Environment

Safety and Legal Environment

Two Performance pillars depict the performance

Knowledge Output

Knowledge Diffusion

Each pillar comprises relevant indicators. These indicators were carefully selected to ensure a fair and accurate analysis of their respective pillars. The indicators cover both macroeconomic (government) and microeconomic (private enterprise) aspects, by considering firms' capabilities to innovate as well as their activities and overall impact on innovation. Furthermore, this framework is an improved edition of the index as it incorporates new indicators and has a modified methodology for some indicators to capture accurate results.

Categorizing Inputs and Outputs

There is a difference between the inputs and outputs while gauging innovation in an economy. Inputs are variables that enable an economy to stimulate innovation while outputs are the outcomes of innovative activities within the economy. The India Innovation Index considers both Enablers (inputs) and Performance (outputs) as they are intricately related, and one drives the other.

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

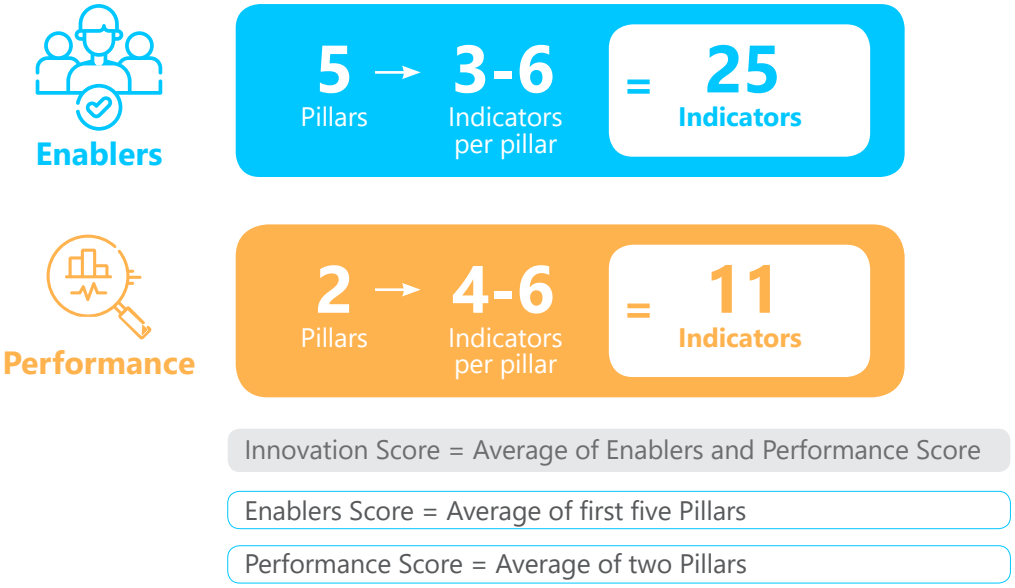
Conceptual Framework

The India Innovation Index intends to help in better understanding of a state's innovation ranking and relative performance. It incorporates key indicators relating to seven pillars that can be used to understand the performance of a state with regard to innovation capabilities. The pillar performance rankings can also serve to identify key areas where a state is under or over performing.

- **The India Innovation Index relies on two dimensions,** 'Enablers' and 'Performance', and within each dimension are pillars (see Figure1).
  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 this 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: This is the ratio of the two scores. It indicates the state's ability to efficiently leverage its investments and infrastructure to produce successful innovation output.

Table 2:

Measures of India Innovation Index



- **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. 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 to ask critical questions is the one that can foster innovation. The 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 capabilities of a nation.

  - **Investment:** Public and private funding gauges the financial standing of a state and the amount it spends on R&D. 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 R&D 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 that 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 enables 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 the ease of doing business ranking and governmental technological adoption. The Business Environment Pillar expands on aspects that affect private entrepreneurial endeavours and also measures the ability of the state to provide a supportive environment for innovation.

- **Safety and Legal Environment:** Governments that enact and enforce open and fair procedures, regulate markets efficiently, protect property rights, 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, their appeal increases across markets. This, in turn, benefits the region through enhanced competitiveness. The objective of adding variables like number of patents and trademarks filed is to capture the fruits 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 a more general move toward an innovation-driven economy. Knowledge Output pillar manifests itself particularly in hi-tech and manufacturing exports, commercialization of intellectual property, handicraft, handloom and Geographical Indications sales in the states. This pillar reflects the extent to which the state's economy has grown from been resource-driven to innovation driven.

- **Further,** the indicators were selected considering the state of the Indian economy, for instance, the fact that India is dominated by low-cost or frugal innovations, has been captured by incorporating the number of grassroots innovations.

Geographic Coverage

The Index is calculated for the Indian states. India comprises twenty-eight states and nine union territories, which are further sub-divided into districts and cities. The scope of this project covers all the twenty-eight states and nine union territories.[1]

For a country as large as India where her states have been divided based on language, their geographical sizes are highly varied. The size of state of the Uttar Pradesh, for instance, approximately matches that of the 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.

Given the difference in geographical sizes of Indian states and union territories, comparing them without spatial segregation introduces complexities. This is because the states vastly differ in terms of innovative capacities, and policy implications for large states are different from small ones. The states and union territories have thus been classified into three categories: Major States; NE and Hill States; and UT and City States. These regions are categorized based on the area, as spatial homogeneity across states makes for fair comparison for innovative capacity.

It must be noted that due to the aforementioned challenges of comparability across regions, the state of Goa has been incorporated into the category of "UT and City 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. Also, this year, Jammu and Kashmir is categorized under "UT and City States" rather than "NE and Hill States".

States Categorization

Major States	NE and Hill States	UT and City States
Andhra Pradesh	Arunachal Pradesh	Andaman & Nicobar Islands
Bihar	Assam	Chandigarh
Chhattisgarh	Himachal Pradesh	Dadra & Nagar Haveli
Gujarat	Manipur	Daman & Diu
Haryana	Meghalaya	Delhi
Jharkhand	Mizoram	Goa
Karnataka	Nagaland	Jammu & Kashmir
Kerala	Sikkim	Lakshadweep
Madhya Pradesh	Tripura	Puducherry
Maharashtra	Uttarakhand	
Odisha		
Punjab		
Rajasthan		
Tamil Nadu		
Telangana		
Uttar Pradesh		
West Bengal		

[1] The data for the union territory of Ladakh is included in Jammu and Kashmir due to lack of availability of separate data.

Index Calculation

Calculating the India Innovation Index involves a multistage process, which has been depicted in Table 3 and outlined below.

Table 3:

Index calculation steps

01 Indicator selection and data collection

02 Dealing with missing values

03 Data transformation

04 Data transformation

05 Dealing with missing values

Indicator Selection and Data Collection

The indicators for index were selected following discussions with NITI Aayog. 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, or from sources endorsed by NITI Aayog.

This year's India Innovation Index framework builds on its previous edition while incorporating newly available data for a more holistic assessment of innovation in India. The following three indicators have been added to this year's framework:

- National Achievement Survey (NAS) Scores (Class X)
- Expenditure on R&D (state government)
- New businesses registered

Detailed information on the indicators is available in Appendix A. A detailed table with data availability for each indicator is available in Appendix B. The final framework has been presented in Table 4.

After this, a descriptive analysis was performed on the selected set of indicators. A descriptive analysis can inform decisions on which variables to include in the analysis, and highlight data management issues, such as coding of variables and missing values (Vyas and Kumaranayake, 2006).

Table 4:

India Innovation Index Framework

Enablers

Human Capital

- Enrolment in PhD.
- Enrolment in engineering and technology
- Colleges connected through NMEICT
- Higher education institutions with NAAC grade A and above
- Pupil teacher ratio - Higher education
- Schools with ICT labs
- National Achievement Survey (NAS) Scores (Class X)

Investment

- Expenditure on higher and technical education
- Expenditure on research and development (state government)
- Expenditure on science, technology and environment
- FDI inflow
- Venture capital deals

Safety and Legal Environment

- Information Technology/ Intellectual Property related acts
- Cyber crime police stations
- Pendency of court cases

Business Environment

- Ease of doing business ranking
- Online services transactions
- Internet subscribers
- Incubator centres
- Common facility centres
- Cluster Strength

Knowledge Workers

- Knowledge-intensive employment
- NGOs involved in knowledge intensive areas
- Private R&D units
- State funded R&D units

Performance

Knowledge Output

- Grassroot innovations
- Patent applications filed
- Trademark applications filed
- Presence of start-ups
- Industrial design applications filed
- New businesses registered
- Publications

Knowledge Diffusion

- ICT exports
- High and medium hi-tech manufacturing entities
- Geographical Indications (GI) registered
- Citations

This edition of the index is an improvement on the existing framework by incorporating new indicators and modified methodology for some of the indicators to capture accurate results.

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.

There were a few indicators where updated data was not available. In such cases, the data was used from the previous edition of the index. The issue was experienced for the following indicators:

- **Venture capital deals**
- **Private R&D units**
- **State-funded R&D units**
- **High and medium hi-tech manufacturing entities**

The union territories of Dadra and Nagar Haveli, Daman and Diu, and Lakshadweep are missing data for the Gross State Domestic Product (GSDP). For the 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).

Indicator/Dimension	Missing Value Estimation
ENABLERS	
Enrolment in engineering and technology	The union territory of Lakshadweep is missing value for enrolment in engineering and technology. Zero was used to impute missing data.
Enrolment in PhD	Enrolment in PhD data is not available for the following union territories: Dadra & Nagar Haveli, Daman & Diu, and Lakshadweep. Zero was used to impute missing data.
National Achievement Survey (NAS) scores	Modern language scores are missing for the following states: Uttar Pradesh, Nagaland, Meghalaya and West Bengal. English scores are missing for the following states: Uttar Pradesh and West Bengal. Mathematics scores are missing for the following states: Uttar Pradesh and West Bengal. Science scores are missing for the following states: Uttar Pradesh and West Bengal. Social Studies scores are missing for the following states: Uttar Pradesh and West Bengal. Zero was used to impute the missing value.
Expenditure on science, technology, and environment	For the following union territories, expenditure on science, technology and environment data is not available for any year: Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, and Lakshadweep. And for 2016-17 and 2017-18, the data for Bihar is also not available. Zero was used to impute missing data for all the above states.

Expenditure on research and development (State govt.)	For the following states and union territories, expenditure on research and development data is not available for any year: Arunachal Pradesh, Delhi, Goa, Mizoram, Nagaland, Sikkim, Tripura, Andaman and Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep and Puducherry 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 for each year was used to impute the missing value.
Knowledge-intensive employment	Data for knowledge-intensive employment is not available for the state Mizoram and union territory of Lakshadweep as Annual Survey of Industries (ASI) does not cover these regions. 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.
Cluster Strength	Data for Cluster Strength is not available for the following states: Arunachal Pradesh, Mizoram, Andaman & Nicobar Islands and Lakshadweep. Zero 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	
Patents filed from state	Data for patents filed from state rates is not available for Lakshadweep. Zero was used to impute missing data.
Trademark applications filed	Data for patents filed from state rates is not available for Lakshadweep. Zero was used to impute missing data.
Industrial design applications filed	Industrial designs applications data is missing for the following states and union territories: Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Andaman & Nicobar Islands and Lakshadweep. Zero was used to impute missing data.
Geographical Indications (GI) registered	Data for Geographical Indications (GI) registered is not available for the following states: Jharkhand, Andaman & Nicobar Islands, Chandigarh and Lakshadweep. Zero was used to impute the missing values

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, the 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 available in Appendix C.**

In addition, for the case of FDI inflow into states, combined data was available for several state and union territories. To resolve this issue, the FDI data was proportionately distributed among the 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 variance but is measured on a larger scale as compared to other variables may appear to have much greater variation than it actually does. Standardization helps to solve this problem by making all the indicators unitless as it rescales using a mean of zero and a standard deviation of one.

Evaluating the Fit

The indicator selection process includes those that best describe the concept of the pillars 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 indicators. First, the 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 pillar. 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 Table 5.

Table 5:

Alpha Values

Dimension	Pillar	ALPHA
Enablers	Human Capital	0.78
	Investment	0.76
	Knowledge Workers	0.67
	Business Environment	0.79
Performance	Safety & Legal Environment	0.43
	Knowledge Output	0.84
	Knowledge Diffusion	0.76

Cronbach's alpha values for Safety and Legal Environment (0.43) are significantly lower. We acknowledge this shortcoming, but despite various attempts, we could not improve the pillar's performance.

Aggregation

The India Innovation Index uses the Principal Component Analysis (PCA) for calculating the weights of indicators within a pillar.[2] The pillar values are calculated by summing up the weighted scores using the following formula:

$$Pillar_s = \sum (w_i * indicator)$$

A complete list of indicator weights is available in Appendix D.
The last step of determining the pillar score involves transforming the values to a 0 to 100 scale. This is done by calculating the scores using the best and worst-case scenario in addition to the regional dataset. The best and worst-case scenario are the actual best, and worst-case values from the dataset are considered.

See Appendix E for the worst and best-case scenarios.
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.

[2] 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 and Mixon 2000), panel data (Bai 1993, Reichlin 2002), forecasting (Stock and 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 and Pearce 2013).

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 weigh any of the pillars higher than the others.

$$Dimension_d = 1/i \sum Pillar_c$$

I=5 or 2

Index Scores

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

$$India\ Innovation\ Index = 1/2 \sum Dimension_d$$

After calculating each pillar, the goodness of fit is evaluated using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy.[3] The KMO index ranges from 0 to 1, as a rule of thumb, KMO scores should be above 0.5 (Williams, Onsman, and Brown 2010). The results of this analysis are shown in Table 6. The KMO of all the pillars are above the set standards.

Table 6:

KMO Values

Dimension	Pillar	ALPHA
Enablers	Human Capital	0.65
	Investment	0.67
	Knowledge Workers	0.62
	Business Environment	0.66
Performance	Safety & Legal Environment	0.54
	Knowledge Output	0.72
	Knowledge Diffusion	0.62

Relative Performance of States

The absolute scores are unable to distinguish states on the basis of their economic development. In some cases, it is more insightful 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. On the other hand, 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.

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

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

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

To determine the relative strength and weakness of a state, the first step is to identify a peer group. We define a 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. Strength is a performance significantly greater than the mean score, while a weakness is a performance significantly lower than the mean score. Neutral performance is neither strong nor weak, but within the same range as the 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.

Year-on-year comparison between scores

The India Innovation Index 2020 framework calculates scores to access the innovation ecosystem across Indian states and union territories. The 2020 edition presents changes in the rankings over time.

It is important to understand that the scores and rankings are not directly comparable from one year to another. Several factors affect the scores each year. Therefore, inferences about the performance of the states and union territories based on a year-on-year ranking can be misleading. Each year's ranking reflects the relative positioning of a particular state or union territory based on the conceptual framework and data coverage, for that given year, also reflecting changes in the underlying indicators at source and in data availability.

Some factors that influence the scores and ranking every year are:

- The performance of the state or union territory
- Changes in the India Innovation Index framework
- Data source changes and treatment of missing values
- Movement of states and union territories across state categorization

It is important to understand that the scores and rankings are not directly comparable from one year to another. There are a number of factors that affect the scores each year. Therefore, inferences about the performance of the states and union territories based on a year-on-year ranking can be misleading.

Technical Notes

Changes in India Innovation Index 2020 framework

India Innovation Index 2019	Adjustment	India Innovation Index 2020
State government expenditure on higher and technical education	Methodology change: Three-year average	Expenditure on higher and technical education
Expenditure on science, technology and environment	Methodology change: Three-year average	Expenditure on science, technology and environment
Ease of Doing Business: Implementation score	Indicator changed at source	Ease of Doing Business ranking
Number of industrial clusters	Replaced	Cluster strength
Number of cyber and social media monitoring cells	Indicator changed at source	Cyber-crime police stations
Pendency of court cases (2-5 years)	Methodology change	Pendency of court cases (10 years and above)
Number of publications	Methodology change	Publications
Number of citations	Methodology change	Citations

Composite Indicators

The India Innovation Index 2020 framework consists of 36 indicators, which includes hard data (32 indicators) and composite indicators (4 indicators). Following is the list of composite indicators in the framework:

- Ease of Doing Business Ranking
- Cluster Strength
- Publications
- Citations

06

India Innovation Index: Key Findings

This section outlines interesting insights to help understand the innovation landscape of the country.

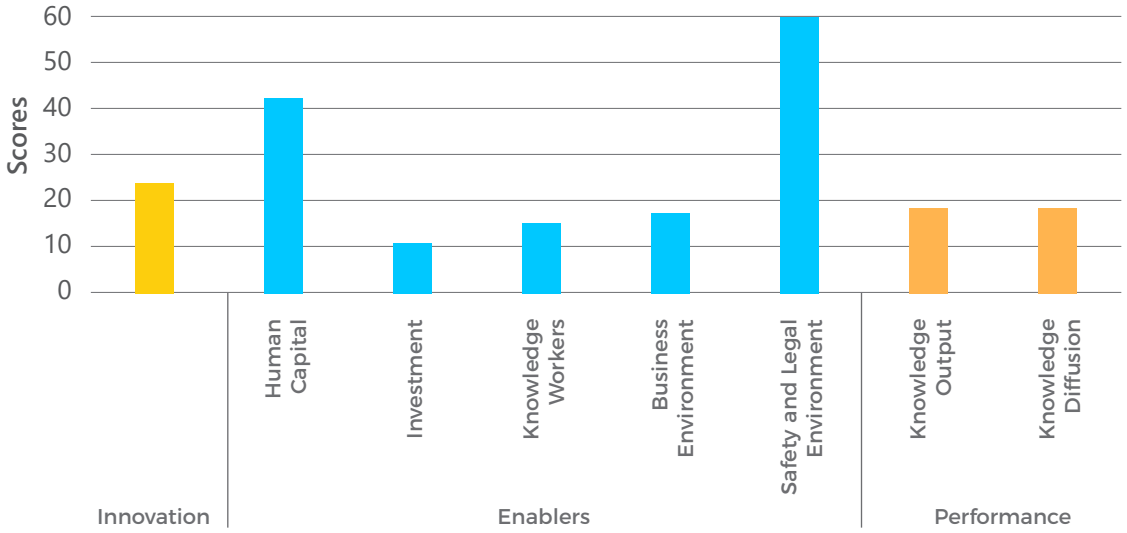
The India Innovation Index is a combination of two dimensions —Enablers and Performance—with seven pillars and 36 indicators between them. The findings from the index provide some interesting insights that would help in understanding the innovation landscape of the country at both national and sub-national levels.

Country-Level Analysis

The country-level analysis offers a macroscopic view of the Indian innovation ecosystem. The analysis presents an overview of the country's strengths and weaknesses on the innovation front, which can help appraise policies, strategies and related action plans at the national level.

Figure 6:

Country-Level Analysis of India Innovation Index



The country's innovative capabilities are mostly carried by its Safety and Legal Environment (60.3) and Human Capital (score of 42.3), while Investment scores the lowest at 10.9.

Indian states have achieved an average score of 23.4 in the Innovation Index that ranges from a scale of 0 (worst-case scenario) to 100 (best-case scenario). The score shows that India has immense scope for improvement in the space of innovation, but it needs to be put into perspective by analysing the factors making up the score.

The level of innovation in a country can be determined by its innovation capabilities and the outcome of leveraging those capabilities, which are categorised as Enablers and Performance

in the index, respectively. The Innovation score of 23.4 is an aggregation of the Enablers score of 29 and the Performance score of 17.9. A score of 29 on the Enablers dimension shows the level of India's innovation capabilities, which are measured by the five pillars of Human Capital, Investment, Knowledge Workers, Business Environment, and Safety and Legal Environment. Delving deeper shows that the country's innovative capabilities are mostly carried by its Safety and Legal Environment (60.3) and Human Capital (score of 42.3), while Investment scores the lowest at 10.9.

The robust and agile cybersecurity ecosystem in India could be one of the reasons behind the high score for Safety and Legal Environment. India's National Cyber Security Policy 2013, Indian Computer Emergency Response Team (CERT-In), National Critical Information Infrastructure Protection Centre (NCIIPC), and the National Cyber Security Coordinator together ensure secure cyberspace for businesses and innovators. Evidently, India was ranked 23rd above 164 countries in the UN's Global Cybersecurity Index (GCI) in 2017. Additionally, the enabling policy framework and initial incentives that fostered the growth of the Information Technology and IT-enabled Services (ITeS) industry have also contributed toward creating an encouraging environment for innovation in the country. With its huge young population, India also does not fall short of a talent pool. The sustained expansion in the higher education sector over the decades implies a rise in skilled labour in the economy. Further, the rapid rise of the IT industry since liberalisation saw a corresponding rise in the number of engineering and technology institutes in the country, which can also explain the high innovation capabilities of the country in terms of its human capital.

However, the Performance score of 17.9 falling below Enablers indicates that the innovation capabilities of the country are not utilised to their optimum level. For example, despite the high number of engineering graduates in the country, their low employability in the knowledge economy results in a level of Knowledge Output and knowledge diffusion that does not correspond with the level of human capital available to be leveraged for innovation. Besides the deficiency in knowledge workers, the low expenditure in R&D, higher education, science, technology and environment, and the lack of venture capital investment also thwart innovation in India.

The rapid rise of the IT industry since liberalisation saw a corresponding rise in the number of engineering and technology institutes in the country, which can also explain the high innovation capabilities of the country in terms of its human capital.

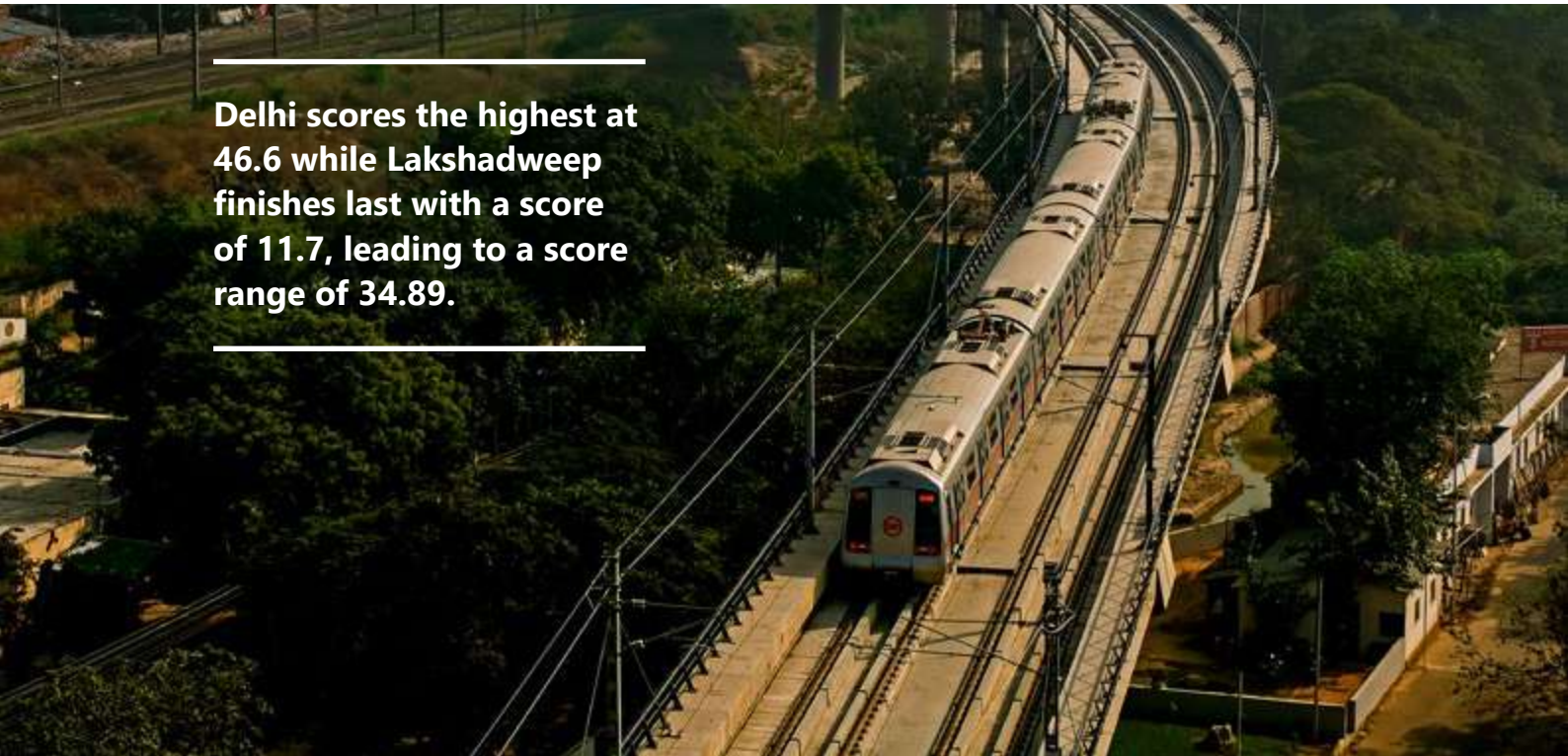
State-Level Analysis

The Indian states display a wide range of scores on the index. Delhi scores the highest at 46.6 while Lakshadweep finishes last with a score of 11.7, leading to a score range of 34.89. To ensure a fair comparison, states have been categorised under three segments, viz. NE and Hill States, UT and City States, and Major States. The first two categories are segregated from the rest of the Indian states (or Major States) due to their geographical categories, varied sizes and administrative capabilities.

Amongst the Major States, the average innovation score is 25.35. Karnataka tops at 42.5, which is attributable to its strong number of venture capital deals, registered GIs and ICT exports. Karnataka's high FDI inflow has also enhanced the innovation capabilities of the state. Maharashtra follows second at 38, while Bihar finishes last at 14.5. The case for the southern states as the top performers has also become stronger as four of them occupy the top-five spots within the Major States.

The NE and Hill states achieve an average innovation score of 17.89, with Himachal Pradesh as the best performer with a score of 25, followed by Manipur (22.77) and Sikkim (22.28), respectively. With 31.9% of its total employment generated being knowledge-intensive, Himachal Pradesh benefits from a high number of knowledge workers. Another characteristic that boosts the state's level of innovation is its industry-friendly policies and incentives, which are reflected in its high rank (7) in the Ease of Doing Business Index. However, Himachal Pradesh still has a lot of untapped potential, since the high score gap of 23.4 between Enablers and Performance shows that its innovation capabilities are not harnessed efficiently.

The innovation score of UT and City States averages at 26.01. Delhi, the best performer among all groups, naturally tops the ranking in the group of union territories as well. Chandigarh follows second with a score of 38.57, whereas Lakshadweep and Jammu and Kashmir occupy the last two positions in the group respectively. Having recorded the highest number of trademark and patent applications, along with the establishment of new start-ups and companies in the last financial year, the national capital has managed to deliver superior results in the domain of



Delhi scores the highest at 46.6 while Lakshadweep finishes last with a score of 11.7, leading to a score range of 34.89.

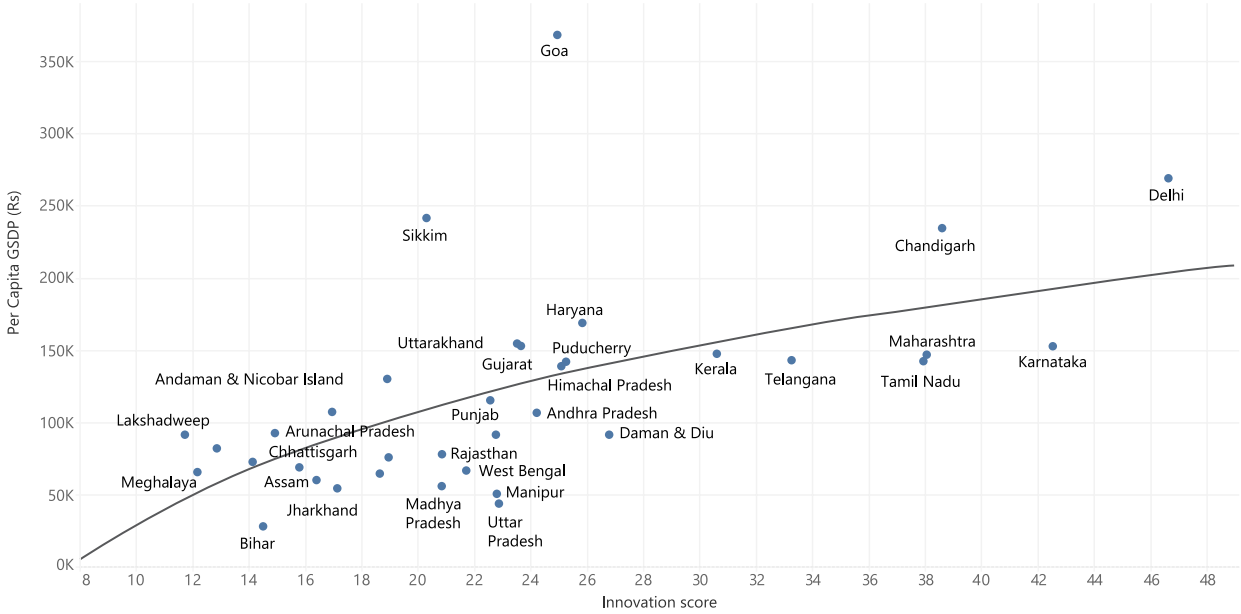
Knowledge Output. Delhi's performance is attributable to its conducive business environment, especially in terms of internet penetration, which is the highest in the country. The national capital also has 202.71 internet subscribers per 100 population.

Interestingly, many of the high-scoring states score higher on Performance than on Enablers, suggesting that their innovation output surpasses their ability. On the other hand, low-scoring states reveal a pattern of scoring better on Enablers than on Performance, suggesting that they are not able to translate their innovation abilities into the desired outcome. It is especially the case with NE and Hill States, for whom the gap between the average Enablers score and the Performance score is the highest at 21.41.

The innovation scores also show a positive correlation with the Gross State Domestic Product (GSDP), meaning higher economic growth leads to more innovation and vice-versa.

Figure 7:

Correlation between states' GDP and innovation scores



The innovation scores also show a positive correlation with the Gross State Domestic Product (GSDP), meaning higher economic growth leads to more innovation and vice-versa. Nevertheless, there are exceptions in the form of states that are underperforming for their level of economic growth, and therefore have the resources to improve their innovation capabilities and performance. At the same time, there can be many factors causing high GDP growth for a state, resulting in innovation efforts taking a backseat. Goa, for example, has a high per capita GDP, higher than Delhi, despite having an innovation score of 24.92, which is much lower than Delhi's. It is because Goa's large tourism sector contributes immensely to the state's economy. Hence, it is not a perfectly linear correlation, but there is a generally positive relationship between the level of innovation in a state and its economic growth, suggesting that innovation is one of the essential elements for a prosperous economy.

Innovation:

Rank	Major States	Score
1	KARNATAKA	42.50
2	MAHARASHTRA	38.03
3	TAMIL NADU	37.91
4	TELANGANA	33.23
5	KERALA	30.58
6	HARYANA	25.81
7	ANDHRA PRADESH	24.19
8	GUJARAT	23.63
9	UTTAR PRADESH	22.85
10	PUNJAB	22.54
11	WEST BENGAL	21.69
12	RAJASTHAN	20.83
13	MADHYA PRADESH	20.82
14	ODISHA	18.94
15	JHARKHAND	17.12
16	CHHATTISGARH	15.77
17	BIHAR	14.48

Rank	NE and Hill States	Score
1	HIMACHAL PRADESH	25.06
2	UTTARAKHAND	23.50
3	MANIPUR	22.78
4	SIKKIM	20.28
5	MIZORAM	16.93
6	ASSAM	16.38
7	ARUNACHAL PRADESH	14.90
8	NAGALAND	14.11
9	TRIPURA	12.84
10	MEGHALAYA	12.15

Rank	UT and City States	Score
1	DELHI	46.60
2	CHANDIGARH	38.57
3	DAMAN & DIU	26.76
4	PUDUCHERRY	25.23
5	GOA	24.92
6	DADRA & NAGAR HAVELI	22.74
7	ANDAMAN & NICOBAR ISLANDS	18.89
8	JAMMU & KASHMIR	18.62
9	LAKSHADWEEP	11.71

Enablers

Rank	Major States	Score
1	KERALA	36.97
2	TAMIL NADU	36.57
3	KARNATAKA	34.81
4	MAHARASHTRA	34.71
5	ANDHRA PRADESH	33.14
6	HARYANA	32.59
7	TELANGANA	31.00
8	PUNJAB	30.03
9	GUJARAT	29.28
10	CHHATTISGARH	25.76
11	RAJASTHAN	25.70
12	MADHYA PRADESH	25.40
13	JHARKHAND	22.63
14	ODISHA	20.93
15	WEST BENGAL	18.25
16	UTTAR PRADESH	16.53
17	BIHAR	14.43

Rank	NE and Hill States	Score
1	SIKKIM	38.98
2	MANIPUR	37.32
3	HIMACHAL PRADESH	36.28
4	UTTARAKHAND	29.68
5	MIZORAM	27.79
6	ARUNACHAL PRADESH	27.46
7	NAGALAND	26.11
8	TRIPURA	23.37
9	ASSAM	19.75
10	MEGHALAYA	19.23

Rank	UT and City States	Score
1	CHANDIGARH	41.52
2	DELHI	40.08
3	GOA	39.76
4	PUDUCHERRY	34.83
5	ANDAMAN & NICOBAR ISLANDS	30.16
6	JAMMU & KASHMIR	26.83
7	DAMAN & DIU	26.63
8	DADRA & NAGAR HAVELI	26.63
9	LAKSHADWEEP	21.70

Performance

Rank	Major States	Score
1	KARNATAKA	50.19
2	MAHARASHTRA	41.35
3	TAMIL NADU	39.25
4	TELANGANA	35.47
5	UTTAR PRADESH	29.18
6	WEST BENGAL	25.13
7	KERALA	24.20
8	HARYANA	19.03
9	GUJARAT	17.98
10	ODISHA	16.94
11	MADHYA PRADESH	16.24
12	RAJASTHAN	15.96
13	ANDHRA PRADESH	15.25
14	PUNJAB	15.05
15	BIHAR	14.53
16	JHARKHAND	11.60
17	CHHATTISGARH	5.78

Rank	NE and Hill States	Score
1	UTTARAKHAND	17.31
2	HIMACHAL PRADESH	13.85
3	ASSAM	13.00
4	MANIPUR	8.23
5	MIZORAM	6.08
6	MEGHALAYA	5.07
7	ARUNACHAL PRADESH	2.35
8	TRIPURA	2.32
9	NAGALAND	2.11
10	SIKKIM	1.58

Rank	UT and City States	Score
1	DELHI	53.12
2	CHANDIGARH	35.62
3	DAMAN & DIU	26.89
4	DADRA & NAGAR HAVELI	18.86
5	PUDUCHERRY	15.63
6	JAMMU & KASHMIR	10.41
7	GOA	10.09
8	ANDAMAN & NICOBAR ISLANDS	7.62
9	LAKSHADWEEP	1.71

Human Capital

Rank	Major States	Score
1	TAMIL NADU	62.80
2	KERALA	59.72
3	KARNATAKA	54.27
4	PUNJAB	53.09
5	ANDHRA PRADESH	47.43
6	HARYANA	47.22
7	MAHARASHTRA	46.43
8	TELANGANA	45.90
9	GUJARAT	44.97
10	ODISHA	42.10
11	RAJASTHAN	41.65
12	CHHATTISGARH	35.77
13	MADHYA PRADESH	32.70
14	JHARKHAND	23.16
15	BIHAR	20.98
16	WEST BENGAL	20.43
17	UTTAR PRADESH	18.23

Rank	NE and Hill States	Score
1	SIKKIM	45.76
2	HIMACHAL PRADESH	44.58
3	MIZORAM	42.62
4	UTTARAKHAND	41.89
5	TRIPURA	40.02
6	MANIPUR	40.01
7	NAGALAND	36.01
8	ARUNACHAL PRADESH	35.08
9	ASSAM	32.08
10	MEGHALAYA	30.73

Rank	UT and City States	Score
1	CHANDIGARH	74.82
2	PUDUCHERRY	72.39
3	GOA	55.84
4	DELHI	49.81
5	DAMAN & DIU	42.27
6	ANDAMAN & NICOBAR ISLANDS	41.32
7	LAKSHADWEEP	38.27
8	DADRA & NAGAR HAVELI	32.13
9	JAMMU & KASHMIR	31.04

Investment

Rank	Major States	Score
1	KARNATAKA	33.01
2	JHARKHAND	26.05
3	HARYANA	16.49
4	MAHARASHTRA	13.04
5	TAMIL NADU	11.43
6	GUJARAT	10.81
7	KERALA	9.18
8	TELANGANA	7.90
9	MADHYA PRADESH	7.47
10	CHHATTISGARH	6.15
11	UTTAR PRADESH	5.21
12	PUNJAB	5.10
13	RAJASTHAN	5.00
14	ANDHRA PRADESH	4.10
15	ODISHA	3.24
16	WEST BENGAL	2.98
17	BIHAR	2.49

Rank	NE and Hill States	Score
1	MANIPUR	41.18
2	ARUNACHAL PRADESH	33.66
3	SIKKIM	13.53
4	HIMACHAL PRADESH	10.49
5	MIZORAM	10.00
6	UTTARAKHAND	7.01
7	NAGALAND	6.76
8	ASSAM	5.44
9	MEGHALAYA	3.93
10	TRIPURA	2.29

Rank	UT and City States	Score
1	DELHI	19.72
2	ANDAMAN & NICOBAR ISLANDS	18.70
3	GOA	13.43
4	JAMMU & KASHMIR	12.99
5	DADRA & NAGAR HAVELI	7.91
6	CHANDIGARH	6.62
7	LAKSHADWEEP	5.53
8	DAMAN & DIU	3.42
9	PUDUCHERRY	1.43

Knowledge Workers

Rank	Major States	Score
1	MAHARASHTRA	22.81
2	KARNATAKA	22.58
3	GUJARAT	21.16
4	ANDHRA PRADESH	20.86
5	TELANGANA	16.22
6	TAMIL NADU	16.09
7	HARYANA	15.57
8	KERALA	15.34
9	PUNJAB	9.86
10	MADHYA PRADESH	8.36
11	RAJASTHAN	8.25
12	WEST BENGAL	7.33
13	UTTAR PRADESH	6.75
14	ODISHA	5.66
15	CHHATTISGARH	4.28
16	BIHAR	3.51
17	JHARKHAND	2.77

Rank	NE and Hill States	Score
1	HIMACHAL PRADESH	36.86
2	SIKKIM	32.67
3	MANIPUR	29.87
4	UTTARAKHAND	22.62
5	MEGHALAYA	10.92
6	ARUNACHAL PRADESH	7.77
7	NAGALAND	6.58
8	TRIPURA	6.22
9	ASSAM	5.69
10	MIZORAM	1.02

Rank	UT and City States	Score
1	GOA	33.52
2	CHANDIGARH	30.04
3	DELHI	28.35
4	PUDUCHERRY	20.17
5	JAMMU & KASHMIR	16.84
6	DADRA & NAGAR HAVELI	13.11
7	DAMAN & DIU	9.81
8	ANDAMAN & NICOBAR ISLANDS	1.18
9	LAKSHADWEEP	0.00

Business Environment

Rank	Major States	Score
1	KERALA	37.12
2	TAMIL NADU	31.84
3	ANDHRA PRADESH	30.06
4	MAHARASHTRA	29.26
5	GUJARAT	26.87
6	UTTAR PRADESH	26.35
7	TELANGANA	26.16
8	KARNATAKA	24.43
9	WEST BENGAL	20.16
10	HARYANA	18.96
11	RAJASTHAN	17.21
12	CHHATTISGARH	15.17
13	MADHYA PRADESH	14.79
14	PUNJAB	14.20
15	JHARKHAND	11.63
16	ODISHA	8.94
17	BIHAR	5.17

Rank	NE and Hill States	Score
1	HIMACHAL PRADESH	22.91
2	UTTARAKHAND	14.83
3	ASSAM	9.41
4	MIZORAM	4.57
5	NAGALAND	4.36
6	MEGHALAYA	4.33
7	TRIPURA	4.09
8	MANIPUR	4.04
9	SIKKIM	3.73
10	ARUNACHAL PRADESH	2.78

Rank	UT and City States	Score
1	DELHI	39.72
2	GOA	36.90
3	ANDAMAN & NICOBAR ISLANDS	23.72
4	LAKSHADWEEP	15.47
5	DAMAN & DIU	14.90
6	DADRA & NAGAR HAVELI	13.47
7	CHANDIGARH	10.03
8	JAMMU & KASHMIR	9.99
9	PUDUCHERRY	8.18

Safety and Legal Environment

Rank	Major States	Score
1	PUNJAB	67.91
2	CHHATTISGARH	67.46
3	HARYANA	64.69
4	MADHYA PRADESH	63.66
5	KERALA	63.46
6	ANDHRA PRADESH	63.24
7	MAHARASHTRA	62.01
8	TAMIL NADU	60.68
9	TELANGANA	58.81
10	RAJASTHAN	56.40
11	JHARKHAND	49.54
12	ODISHA	44.71
13	GUJARAT	42.59
14	WEST BENGAL	40.35
15	BIHAR	40.02
16	KARNATAKA	39.75
17	UTTAR PRADESH	26.09

Rank	NE and Hill States	Score
1	SIKKIM	99.20
2	MIZORAM	80.73
3	NAGALAND	76.86
4	MANIPUR	71.52
5	HIMACHAL PRADESH	66.54
6	TRIPURA	64.22
7	UTTARAKHAND	62.04
8	ARUNACHAL PRADESH	58.02
9	MEGHALAYA	46.26
10	ASSAM	46.15

Rank	UT and City States	Score
1	CHANDIGARH	86.11
2	PUDUCHERRY	71.97
3	DADRA & NAGAR HAVELI	66.52
4	ANDAMAN & NICOBAR ISLANDS	65.87
5	JAMMU & KASHMIR	63.31
6	DELHI	62.80
7	DAMAN & DIU	62.75
8	GOA	59.09
9	LAKSHADWEEP	49.25

Knowledge Output

Rank	Major States	Score
1	MAHARASHTRA	34.57
2	TELANGANA	28.22
3	KARNATAKA	28.13
4	TAMIL NADU	25.77
5	HARYANA	22.85
6	UTTAR PRADESH	21.37
7	KERALA	17.86
8	WEST BENGAL	17.76
9	GUJARAT	17.07
10	PUNJAB	16.65
11	MADHYA PRADESH	13.74
12	BIHAR	13.41
13	RAJASTHAN	12.85
14	JHARKHAND	12.60
15	ODISHA	10.82
16	ANDHRA PRADESH	9.35
17	CHHATTISGARH	6.00

Rank	NE and Hill States	Score
1	UTTARAKHAND	18.04
2	HIMACHAL PRADESH	14.39
3	MANIPUR	13.97
4	ASSAM	10.28
5	MIZORAM	8.02
6	MEGHALAYA	4.35
7	ARUNACHAL PRADESH	4.07
8	TRIPURA	4.01
9	NAGALAND	2.36
10	SIKKIM	2.31

Rank	UT and City States	Score
1	DELHI	82.83
2	CHANDIGARH	55.10
3	DAMAN & DIU	43.48
4	DADRA & NAGAR HAVELI	19.96
5	PUDUCHERRY	19.21
6	GOA	18.39
7	ANDAMAN & NICOBAR ISLANDS	15.23
8	JAMMU & KASHMIR	8.90
9	LAKSHADWEEP	3.43

Knowledge Diffusion

Rank	Major States	Score
1	KARNATAKA	72.26
2	TAMIL NADU	52.73
3	MAHARASHTRA	48.12
4	TELANGANA	42.71
5	UTTAR PRADESH	36.98
6	WEST BENGAL	32.51
7	KERALA	30.54
8	ODISHA	23.06
9	ANDHRA PRADESH	21.14
10	RAJASTHAN	19.07
11	GUJARAT	18.90
12	MADHYA PRADESH	18.75
13	BIHAR	15.66
14	HARYANA	15.22
15	PUNJAB	13.46
16	JHARKHAND	10.61
17	CHHATTISGARH	5.55

Rank	NE and Hill States	Score
1	UTTARAKHAND	16.58
2	ASSAM	15.73
3	HIMACHAL PRADESH	13.31
4	MEGHALAYA	5.79
5	MIZORAM	4.13
6	MANIPUR	2.48
7	NAGALAND	1.86
8	SIKKIM	0.85
9	ARUNACHAL PRADESH	0.62
10	TRIPURA	0.62

Rank	UT and City States	Score
1	DELHI	23.42
2	DADRA & NAGAR HAVELI	17.76
3	CHANDIGARH	16.14
4	PUDUCHERRY	12.05
5	JAMMU & KASHMIR	11.93
6	DAMAN & DIU	10.31
7	GOA	1.79
8	ANDAMAN & NICOBAR ISLANDS	0.00
9	LAKSHADWEEP	0.00

Pillar-Level Analysis

Enablers

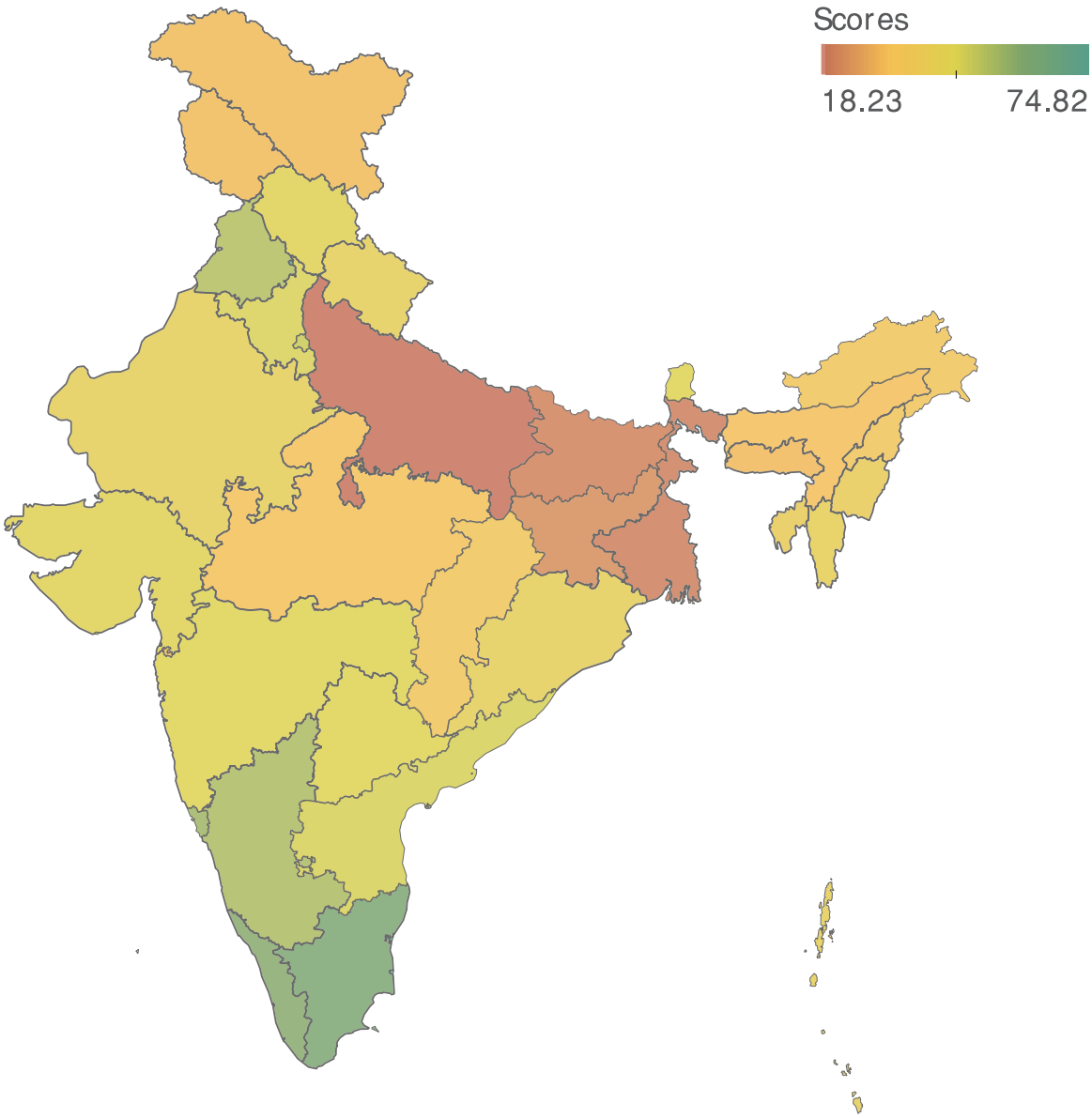
Human Capital

Average pillar score: 42.3

Highest scoring states: Chandigarh, Puducherry, Tamil Nadu, Kerala, Goa
Lowest scoring states: Uttar Pradesh, West Bengal, Bihar, Jharkhand, Meghalaya

Figure 8:

Regional mapping of Human Capital scores



Human capital has emerged as the second-best performing pillar, among both Enablers and Performance, with an average score of 42.3. Chandigarh emerged as the best performer with a score of 74.82, owing to the high enrolment rate in PhD programs and provision of quality education in schools and colleges. Tamil Nadu scored the highest among the Major States and Mizoram, among the NE and Hill States. Uttar Pradesh (18.23) lagged behind the rest of the states, while Meghalaya finished last among NE and Hill States. The newest union territory, Jammu and Kashmir performed the lowest among the UT and City States.

Looking at the distribution of scores across the subcontinent, southern states have performed well overall. In fact, the more developed states have predictably done better in human capital development. The better-performing states are also noted to be either union territories or high/upper-middle income states.

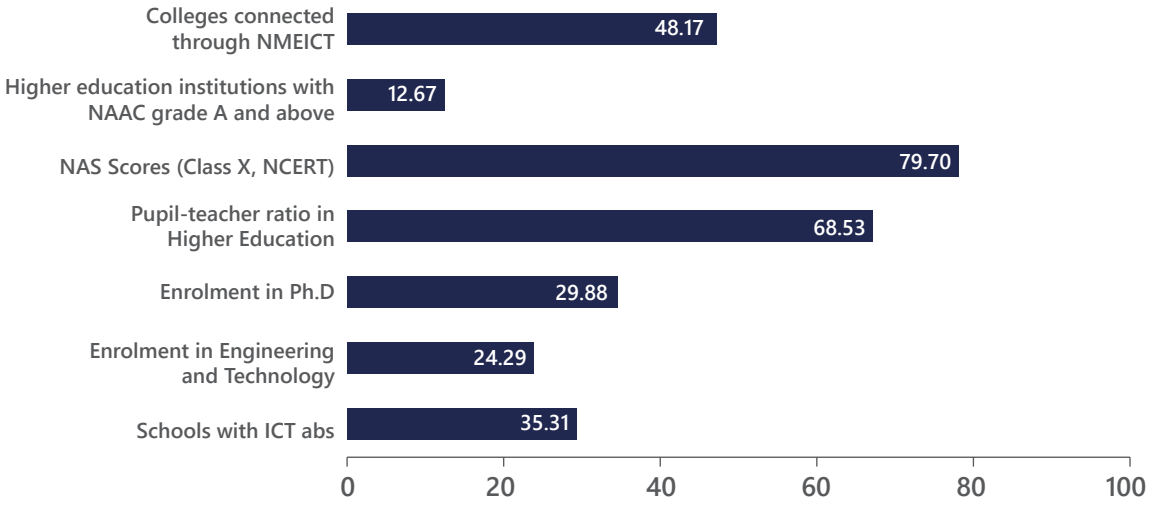
On the other hand, eastern parts of the country are lagging. Given the potential workforce and demographic advantage, there lies tremendous potential in states such as Bihar, West Bengal and Uttar Pradesh, and thus urgent attention is needed to enable improvement.

Human capital has been measured on the basis of seven indicators, namely enrolment in PhD programs; enrolment in engineering and technology, colleges connected through the National Mission on Education through Information and Communication Technology (NMEICT); higher education institutions with National Assessment and Accreditation Council (NAAC) grade A and above; pupil-teacher ratio (higher education), schools with ICT labs and National Achievement Survey (NAS) Scores (Class X).

Given the potential workforce and demographic advantage, there lies tremendous potential in states such as Bihar, West Bengal and Uttar Pradesh, and thus urgent attention is needed to allow improvement.

Figure 9:

Indicator scores under Human Capital



Given Delhi's high income levels as well as the landmark transformation of the government school system, the national capital reported the highest NAS score (44.73).

Among all pillars under Human Capital, the states have performed the best on NAS scores (Class X), wherein the average NAS score achieved by all states is 35.66. There is also a low variance in scores seen among the states. The income-level in a state also plays a major role as pupils belonging to middle and higher-income groups are more likely to be studying in private schools and having access to better learning options outside of school. States ensuring good quality of education in government-aided schools can also help raise the NAS score significantly. Given Delhi's high-income levels as well as the landmark transformation of the government school system, the national capital reported the highest NAS score (44.73). Since the quality of education is also a function of the pupil-teacher ratio, it was the second best-performing indicator under Human Capital.

On the other hand, the pillar score was weighed down by the low number of higher education institutions ensuring high-quality education, wherein only 3.37% of the institutions had a NAAC grade A and above. With 40.74% of institutions in Chandigarh having grade A and above, the state topped the ranking in that particular indicator. Enrolment in engineering and technology also showed a drop across India, albeit disproportionately. Data shows students enrolled in engineering and technology programs are concentrated in southern parts of the country, whereas the figures are low in the North-Eastern states, which instead perform better in PhD enrolment rates.

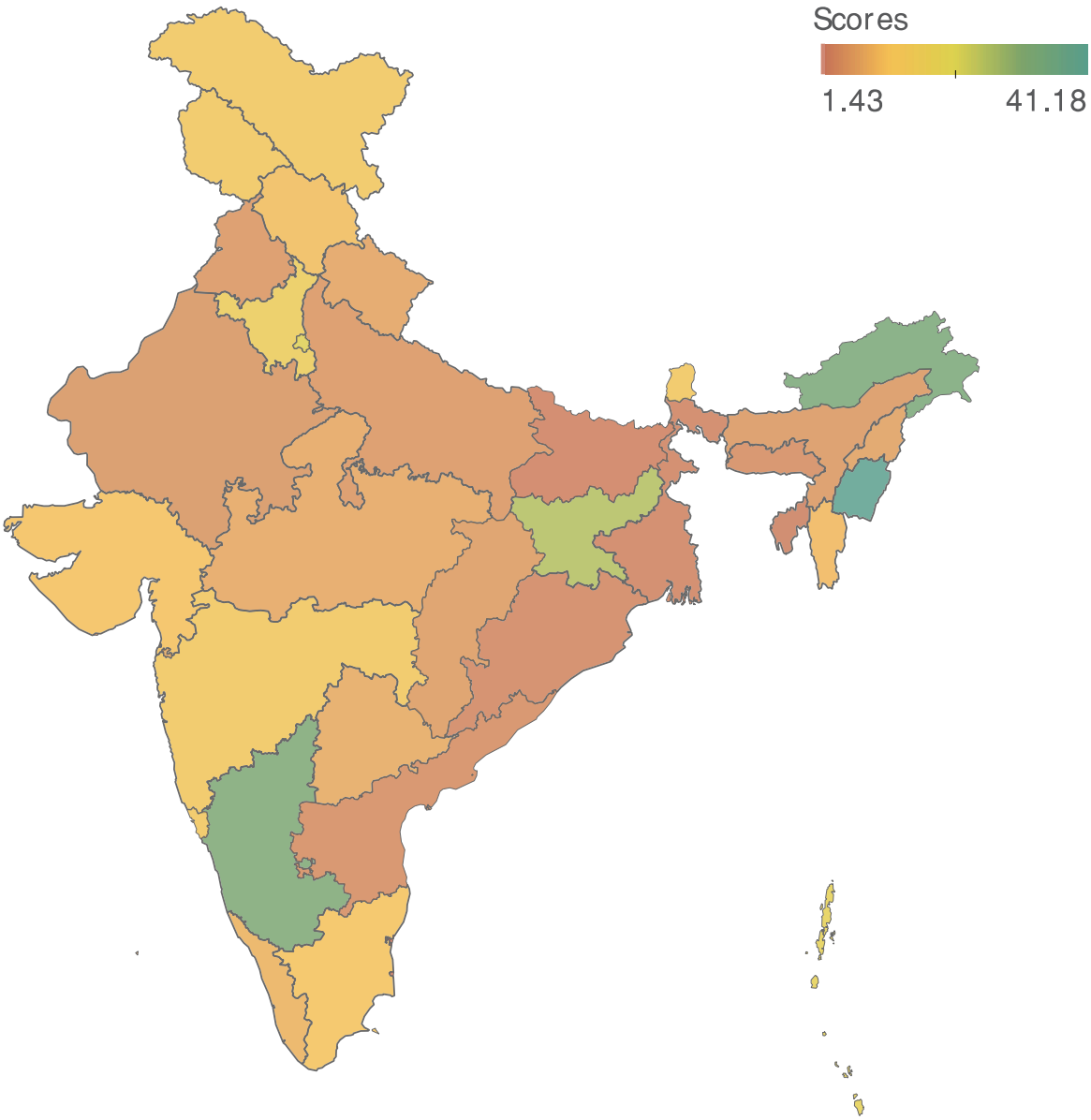
Investment

Average pillar score: 10.9

Highest scoring states: Manipur, Arunachal Pradesh, Karnataka, Jharkhand, Delhi
Lowest scoring states: Puducherry, Tripura, Bihar, West Bengal, Odisha

Figure 10:

Regional mapping of Investment scores



Investment is the lowest scoring pillar in the index with an average score of 10.9, suggesting that the country's innovation capabilities are restricted heavily by lack of resources. Manipur emerged as the best performer among all states with a score of 41.18, on the strength of its high

expenditure on science, technology, and environment and high public expenditure on research and development. Karnataka was the highest scorer among Major States, and Delhi among UT and City States. Puducherry ranked at the bottom of the overall ranking; Bihar stood last among Major States and Tripura among NE and Hill States.

Clearly, only a few states performed better in this pillar. Additionally, the states' scores on the pillar do not show any predictable pattern as even the more prosperous states have underperformed in comparison to their less-developed counterparts, with the exception of Karnataka, which reported high amounts of FDI inflows and ventures capital deals. Despite having adequate resources to bring in investment, the majority of high/upper-middle income states' underperformance on the pillar is a cause of concern.

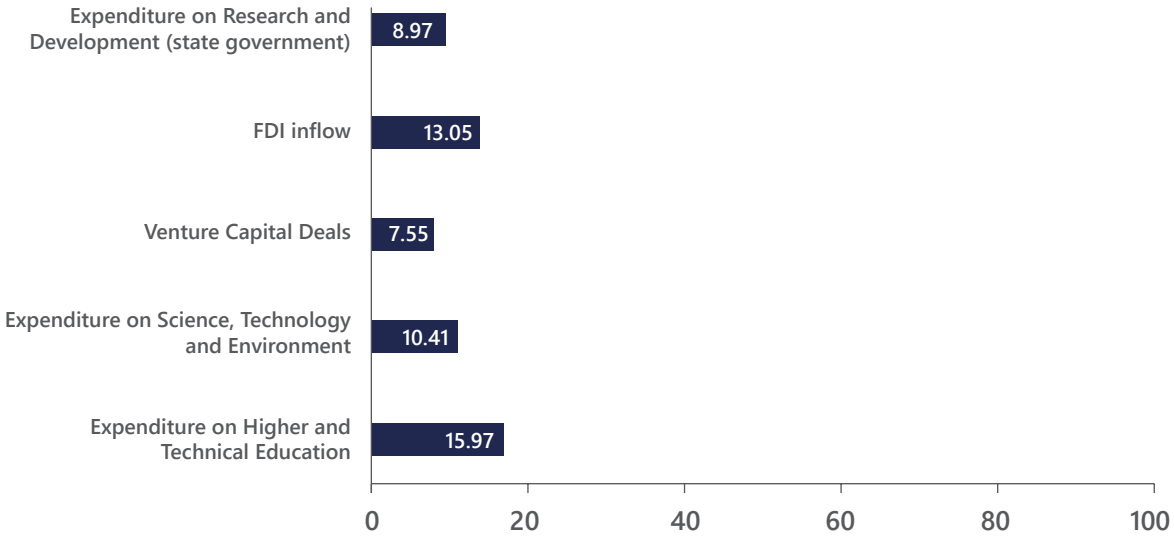
Other well-performing states are Manipur and Arunachal Pradesh. While Manipur has excelled in spending on public R&D and also attracted a significant inflow of FDI, Arunachal Pradesh allotted the highest proportionate expenditure for science, technology, and the environment. Jharkhand emerged as an exceptional achiever in this pillar by managing to score better than Maharashtra and Gujarat, which are considered to be the preferred destinations for investment. The state has managed to create itself as an attractive FDI destination and has allotted significant amounts of expenditure toward science, technology, and the environment.

The pillar score is measured on the basis of five indicators, namely expenditure on higher and technical education, expenditure on research and development (state government), expenditure on science, technology and environment, FDI inflow, and venture capital deals.

The states' scores on the pillar do not show any predictable pattern as even the more prosperous states have underperformed in comparison to their less-developed counterparts, with the exception of Karnataka, which reported high amounts of FDI inflows and venture capital deals.

Figure 11:

Indicator scores under Investment



Since Investment is the lowest scoring pillar, the corresponding indicators also demonstrate low scores, but the states' performances are particularly concerning in terms of the volume of Venture Capital Deals, which are negligible in majority of the states. Karnataka is the only state to perform well on this indicator, thanks to its strong start-up ecosystem that is driving the country's start-up growth story.

Data also shows low investment in R&D and science, technology, and the environment, which the states can improve upon to enhance their innovation capabilities. States have performed relatively better in terms of expenditure on higher and technical education, the benefits of which also seem to carry over to human capital development, one of the higher scoring pillars in the index. Andaman and Nicobar Islands and Arunachal Pradesh have emerged as the overperformers in this area, while states in the mainland underperformed, especially Maharashtra, Punjab, West Bengal and Rajasthan.

FDI inflow is another area that shows potential for greater improvement. Although prosperous states like Delhi, Maharashtra, and Karnataka have performed well on this indicator, Jharkhand is leading the score. One of the richest mineral zones in the country, Jharkhand's high availability of metals and minerals like steel and coal make it an attractive destination for investment, thus endowing it with immense potential to boost its innovation landscape.

States have performed relatively better in terms of expenditure on higher and technical education, the benefits of which have also seemed to carry over to human capital development, one of the higher scoring pillars in the index.

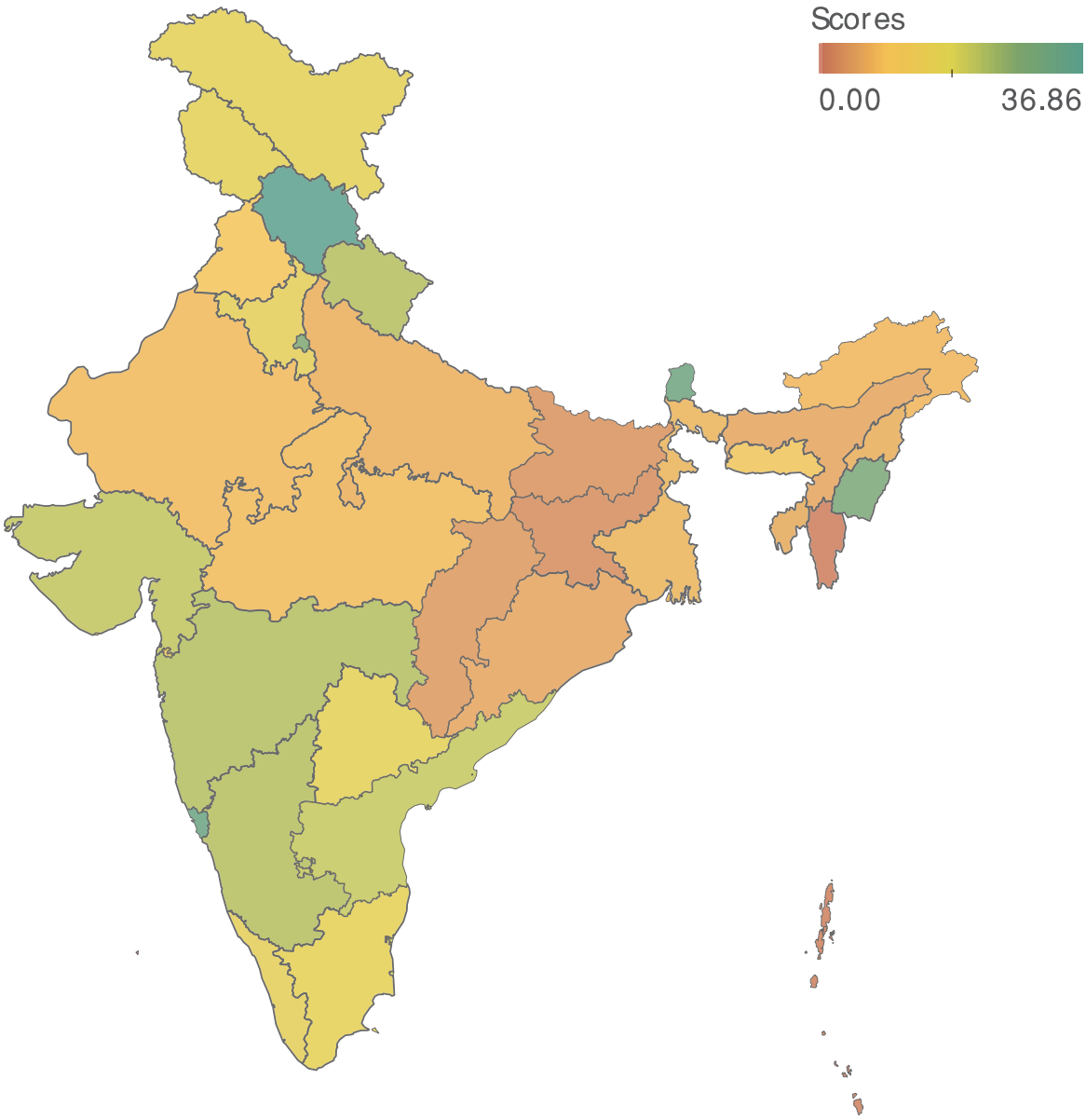
Knowledge workers

Average pillar score: 14.46

Highest scoring states: Himachal Pradesh, Goa, Sikkim, Chandigarh, Manipur
Lowest scoring states: Lakshadweep, Mizoram, Andaman and Nicobar Islands, Jharkhand, Bihar

Figure 12:

Regional mapping of Knowledge Workers scores



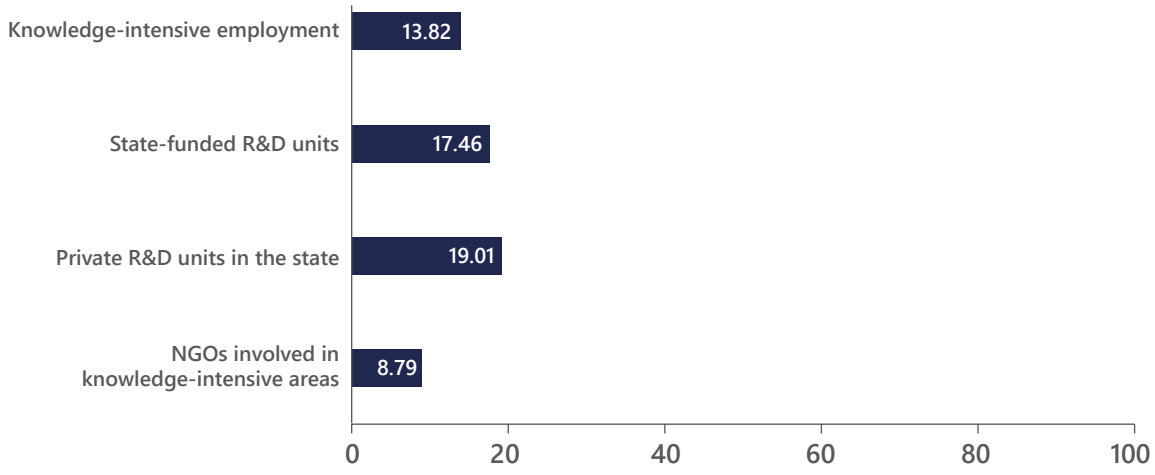
The average score in Knowledge Workers (14.46) is significantly lesser than that in Human Capital (42.32), indicating a vital gap between educational attainment and employability among Indian graduates in knowledge-intensive activities. Among all the states, Himachal Pradesh has performed the best in this pillar, with a score of 36.86, a major part of which is attributable to its high number of state-funded R&D units. Among the Major States, Maharashtra is the best performer, and among the UT and City States, Goa secured the highest score. Lakshadweep finished last with a score of 0, while Jharkhand secured the lowest score among Major States and Mizoram among NE and Hill States.

The regional mapping of scores shows a fairly visible regional disparity, wherein central and north-east India have relatively lower scores than the rest of the states. Although they are not the top scorers, the southern states show greater uniformity in their scores. Major States also do not have a strong presence in the top states under this pillar. Maharashtra, which is the highest scorer among Major States, is quite distant from the top-scorer, Himachal Pradesh. Better-performing states mostly belong to UT and City States and a few of the NE and Hill States. However, the success of such states must be read with caution as the data is only available for the organized sector and, therefore, the proportionate presence of knowledge workers can inflate in states where the presence of the organized sector is lesser in volume. This also makes cross-country comparisons a major challenge.

Since it is one of the low-scoring pillars, the corresponding indicators also demonstrate low scores. The pillar is made up of four indicators, namely knowledge-intensive employment, NGOs involved in knowledge-intensive areas, private R&D units, and state-funded R&D units. Amongst them, the states have performed relatively better in terms of private R&D units, wherein 0.43 private R&D units per lakh population were reported on average. UT and City States have performed better than the rest, with Chandigarh at the top (2.27 private R&D units per lakh population), followed by Delhi and Goa, respectively. However, in terms of state-funded R&D units, these states have lagged, while Himachal Pradesh has emerged as the relatively better performer with 0.50 state-funded R&D units per lakh population. It must be noted that the scores of the bigger and more populous states are lower because of their high population, which deflates the proportionate number of R&D units vis-à-vis the population.

Figure 13:

Indicator scores under Knowledge Workers



The low expenditure in R&D and subsequent paucity of resources are bound to restrict businesses from innovating and further expanding their activities. The low expenditure is also reflected in the low involvement of NGOs in knowledge-intensive areas. Moreover, graduates of the country face the issue of poor employability. All these factors result in low knowledge-intensive employment generation, and the data reflects as much. It is especially concerning in light of India's better performance in human capital, which indicates that we are losing out on a lot of innovation potential by not being able to utilize our human capital toward knowledge work.

The average score in Knowledge Workers (14.46) is significantly lesser than that in Human Capital (42.32), indicating a vital gap between educational attainment and employability among Indian graduates in knowledge-intensive activities.

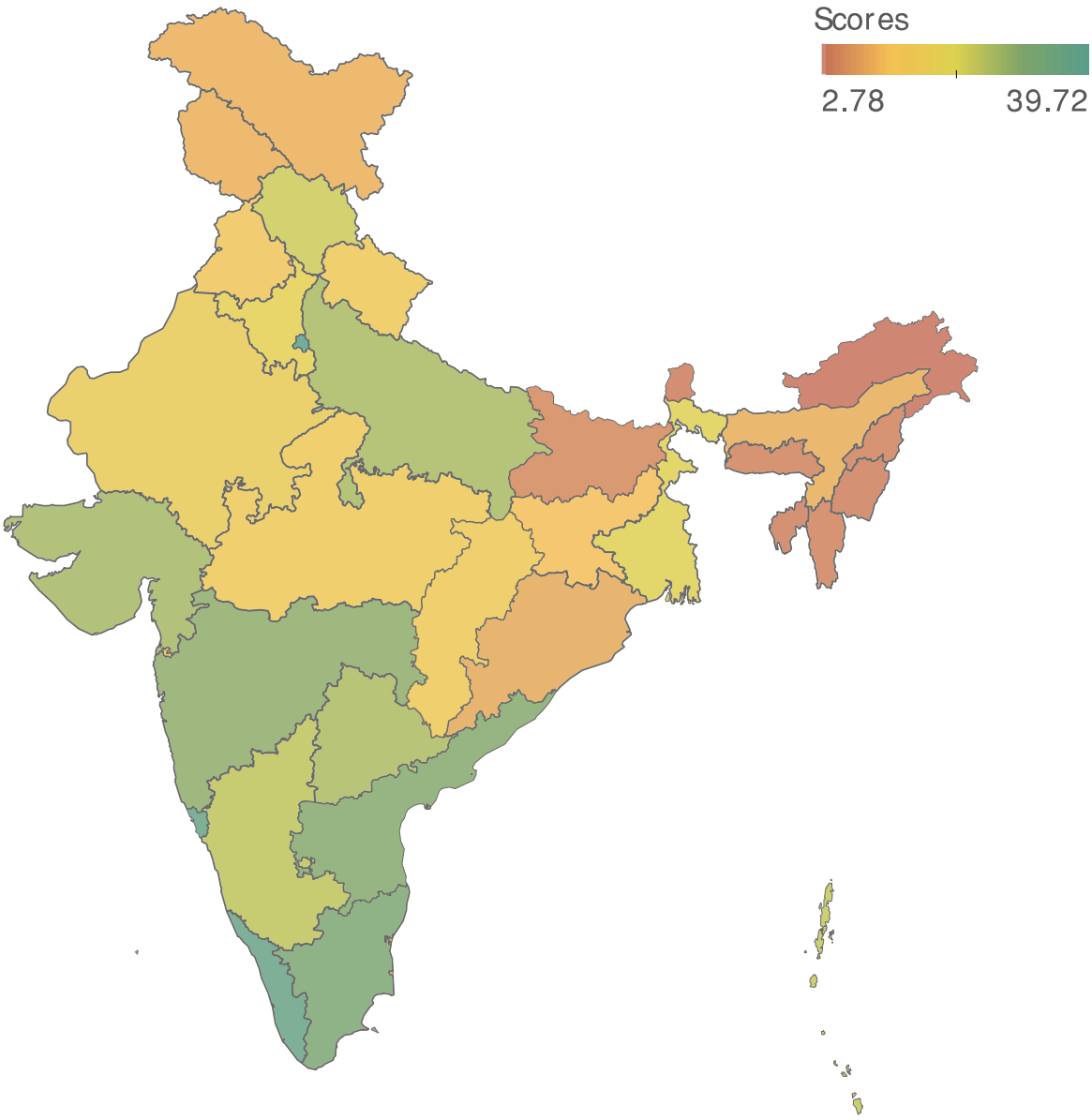
Business Environment

Average pillar score: 16.8

Highest scoring states: Delhi, Kerala, Goa, Tamil Nadu, Andhra Pradesh
Lowest scoring states: Arunachal Pradesh, Sikkim, Manipur, Tripura, Meghalaya

Figure 14:

Regional mapping of Business Environment scores



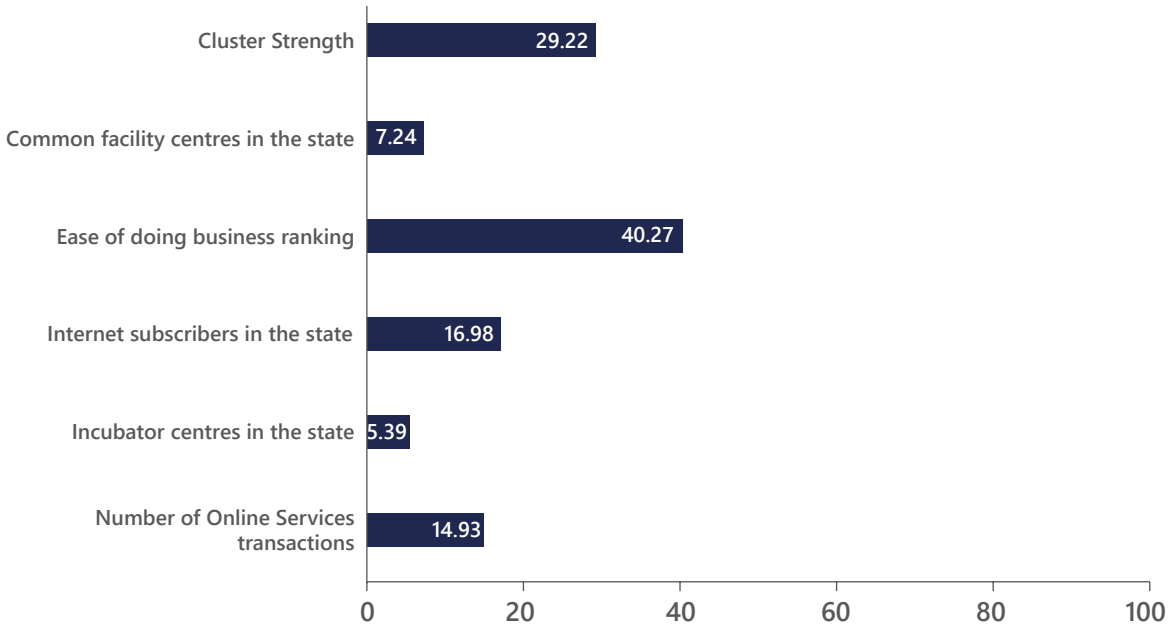
India's average score on the Business Environment pillar is 16.8, with Delhi yielding a score of 39.7, placing it at the top spot. Kerala (37.1) has emerged as the best performer among Major States, and Himachal Pradesh (22.9) among NE and Hill States. On the other hand, Arunachal Pradesh (2.8) finished last overall and among NE and Hill States, Bihar (5.2) among Major States, and Puducherry (8.2) among UT and City States.

The regional imbalance is clearly reflected in this pillar as all the North-east states except Assam feature at the bottom. Most of these states don't have any incubation centres or common facility centres, which means that there is an absence of a business nurturing ecosystem where start-ups can emerge and fledgling businesses can be provided necessary facilities. Delhi, Goa, Tamil Nadu, and Kerala are strong performers and positively deviate from the means of their respective categories.

The pillar score consists of six indicators, namely, the ease of doing business ranking, online service transactions, internet subscribers, incubator centres, common facility centres, and cluster strength.

Figure 15:

Indicator scores under Business Environment



The business environment of the country is particularly held back by the lack of incubator centres and common facility centres. There is a significant gap between the scores of Major States and that of the other two categories as the number of incubator centres per lakh of the population is likely to get inflated in union territories and small states due to their low population. This is why the range of scores is high, and all the Major States are concentrated at the bottom of the ranking. As a result, it has brought down the average score on the pillar. Nevertheless, there is still some room for improvement. As Micro, Small and Medium Enterprises (MSMEs) and start-ups are already driving the growth engine of the economy, the establishment of more incubator centres and common facility centres can catapult them to even greater heights.

On the positive side, India has significantly improved its position in the Ease of Doing Business Index over the last five years, from a rank of 142 in 2014 to 63 in 2019, which it has maintained in 2020. Hence, relatively better performance is seen in the corresponding indicator. Within the country, Andhra Pradesh has secured the first rank, and interestingly, many of the historically backward states have performed better than some of the more developed states. Uttar Pradesh,

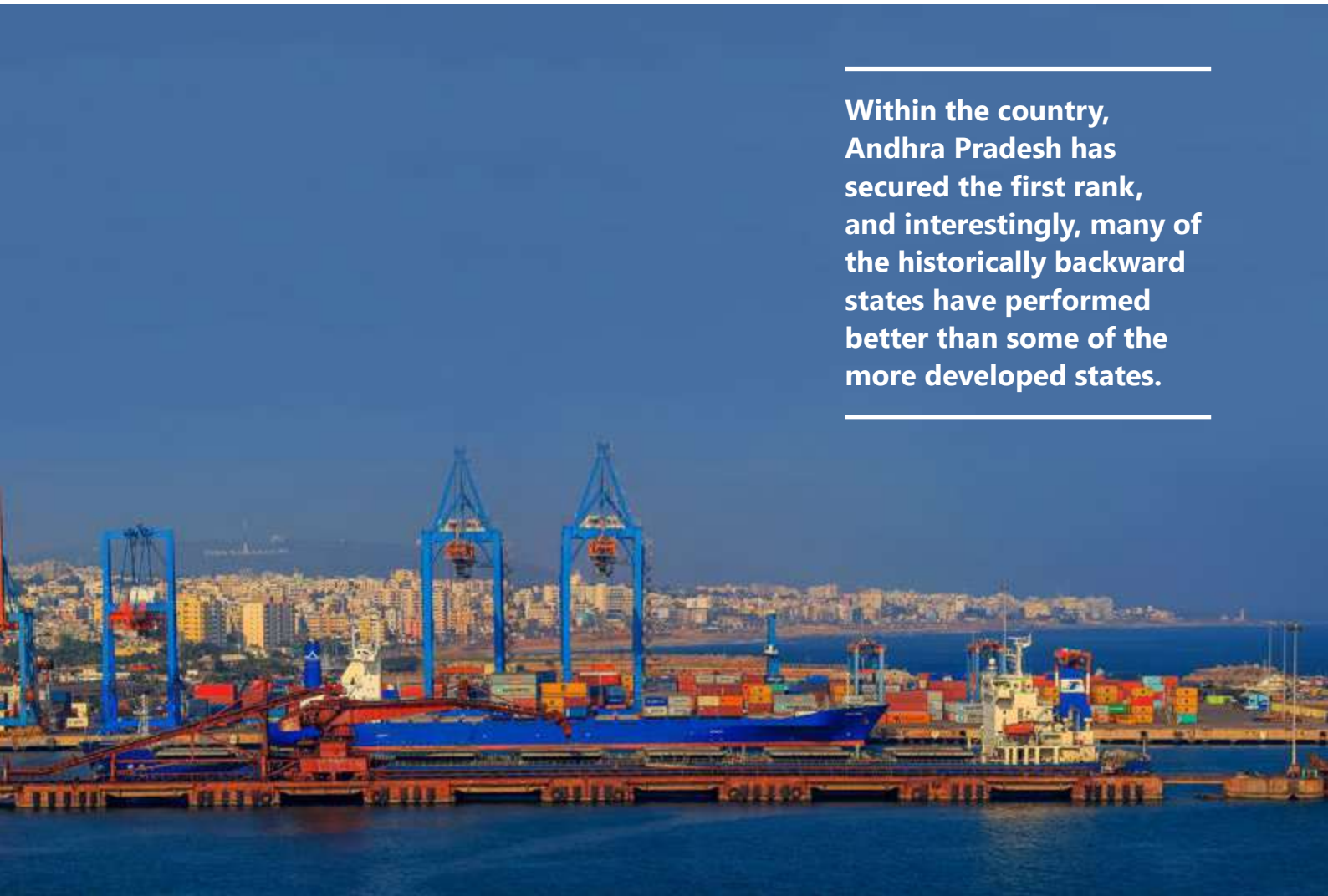
Madhya Pradesh, and Jharkhand managed to secure the 2nd, 4th and 5th positions, respectively, which was possible because they implemented many of the reforms recommended under the Business Reforms Action Plan, such as the single-window system, access to information, and practicing transparency, labour reforms, etc.

India has also performed satisfactorily on cluster strength, though the North-eastern states and some of the UT and City States have lagged behind the rest. Endowed with natural resources, Northeast India holds immense potential for developing industrial clusters but also faces challenges in the form of difficult geographical terrains, logistical challenges, and in-adequate physical and financial infrastructure. Government of India's Act East Policy (AEP) has redirected development efforts in the region, but there is still a lot of ground to cover. In addition, for the development of clusters, states need to identify potential areas of growth and handhold existing industries to help them grow and expand.

In order to make the business environment more conducive, internet penetration and digital literacy are another areas that states can improve to ensure better facilitation of digital activities and online transactions.

As MSMEs and start-ups are already driving the growth engine of the economy, establishment of more incubator centres and common facility centres can catapult them to even greater heights.

Within the country, Andhra Pradesh has secured the first rank, and interestingly, many of the historically backward states have performed better than some of the more developed states.



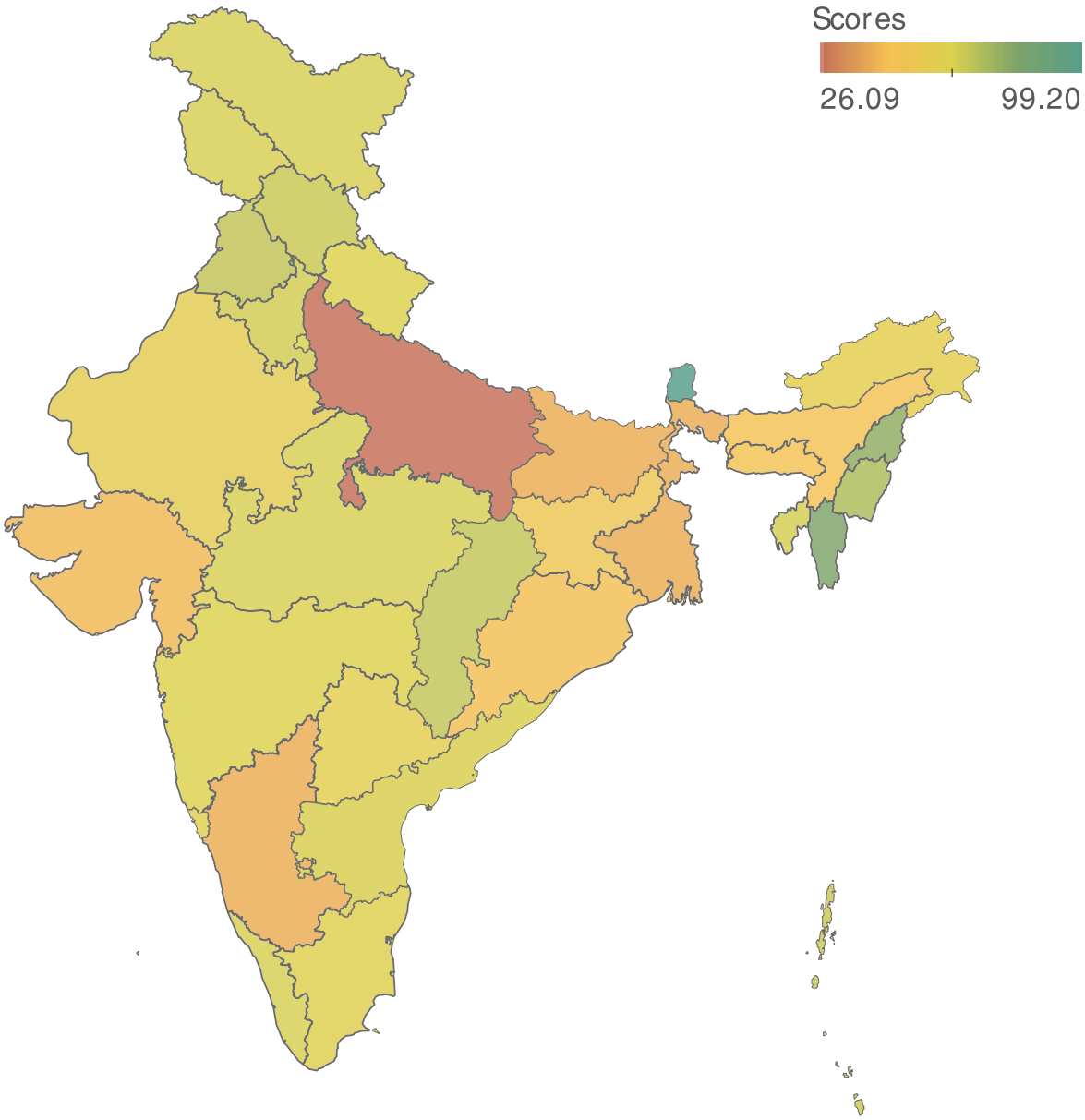
Safety and Legal Environment

Average pillar score: 60.29

Highest scoring states: Sikkim, Chandigarh, Mizoram, Nagaland, Puducherry
Lowest scoring states: Uttar Pradesh, Karnataka, Bihar, West Bengal, Gujarat

Figure 16:

Regional mapping of Safety and Legal Environment scores

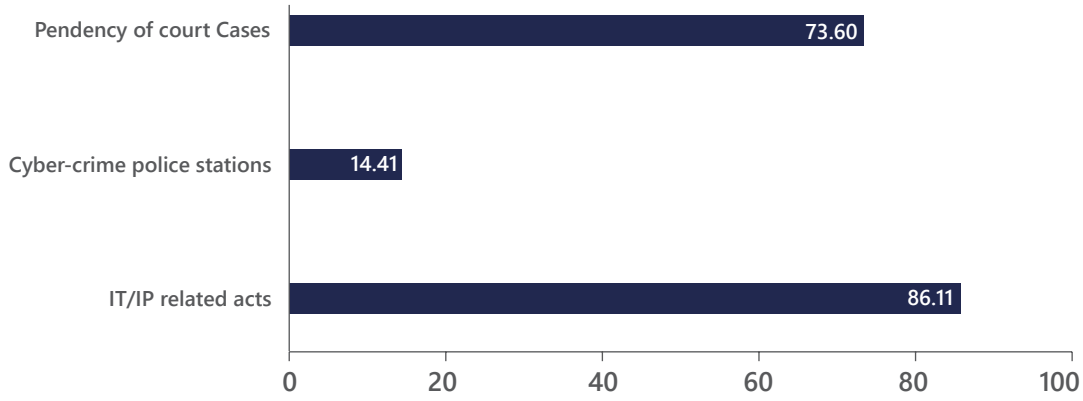


Safety and Legal Environment is the highest scoring amongst all the pillars. The country's average score stands at 60.29, with 14 states having scored below the national average. The regional parity of this pillar is visible with most Indian states scoring higher than the national average. Interestingly, this is the only pillar wherein the positive outliers emerge from three north-eastern states, and Sikkim. The eastern states of Odisha, West Bengal, and Bihar, along with the more economically prosperous states of Karnataka and Gujarat have scored below the national average. Uttar Pradesh is the only negative outlier in this mapping, having scored the lowest in this pillar.

The three indicators that determine the pillar's score are the number of offenses against Information Technology and Intellectual Property (IT/IP) related Acts, cyber-crime police stations, and pendency of court cases.

Figure 17:

Indicator scores under Safety and Legal Environment



The safety and legal environment of the country has been strengthened with a significantly low proportion of pending court cases, and a higher number of offenses being registered under relevant IT/IP Acts. This implies a strong law and order system, which is accessible to businesses and society and has been used to resolve conflicts. However, a low score in the number of cyber-crime police stations is troubling, especially with the increasing number of cyber-security attacks that could potentially threaten the financial security of businesses.

The highest performing states such as Chandigarh, Mizoram, Nagaland, and Puducherry have performed consistently well across these indicators. Sikkim secured the top position in indicators such as the highest proportion of cyber-crime police stations, and lowest pendency of court cases. This further evidences Sikkim as the only positive outlier in the pillar performance.

The performance of the lowest-scoring states, namely Karnataka, Bihar, West Bengal, and Gujarat, with Uttar Pradesh at the bottom of the score table, cannot be attributed to any single indicator. In the offenses under IT/IP related acts, Bihar has tied for the top position with the lowest proportion of such offenses, which can be accrued to low reporting of such cases. Bihar has, however, scored significantly less in this pillar, attributed to its lowest number of cyber-crime police stations, and a high proportion of pending court cases.

Karnataka, on the other hand, has tied for the top position in the number of cyber-crime police stations. Despite this good performance, Karnataka also has one of the highest proportion of offenses under IT/IP related Acts, and pending court cases. While the number of offenses can be justified through higher reporting of such offenses (-9.1), the high pendency of court cases is a matter of concern and can be a sign of reluctance in seeking legal relief because of its time-consuming nature. The latter can be a detrimental factor in the innovation landscape.

Major top-performing states, such as Maharashtra, Delhi, Tamil Nadu, Kerala, and Telangana do not feature among the top in this pillar, which is a concern from an investment and business standpoint. Traditional industrial hubs such as Gujarat, Uttar Pradesh, and West Bengal occupy the last positions in this pillar, which is also a matter of great concern.

In comparison to the 2019 India Innovation Index, the more economically developed regions have scored below the national average in this pillar. Without a strong safety and legal environment, which specifically focuses on deterring cyber crime, many emerging businesses and industries will be discouraged from completely utilizing the resources available in the innovation landscape.

The safety and legal environment of the country has been strengthened with a significantly low proportion of pending court cases, and higher number of offenses being registered under relevant IT/IP Acts.

Performance

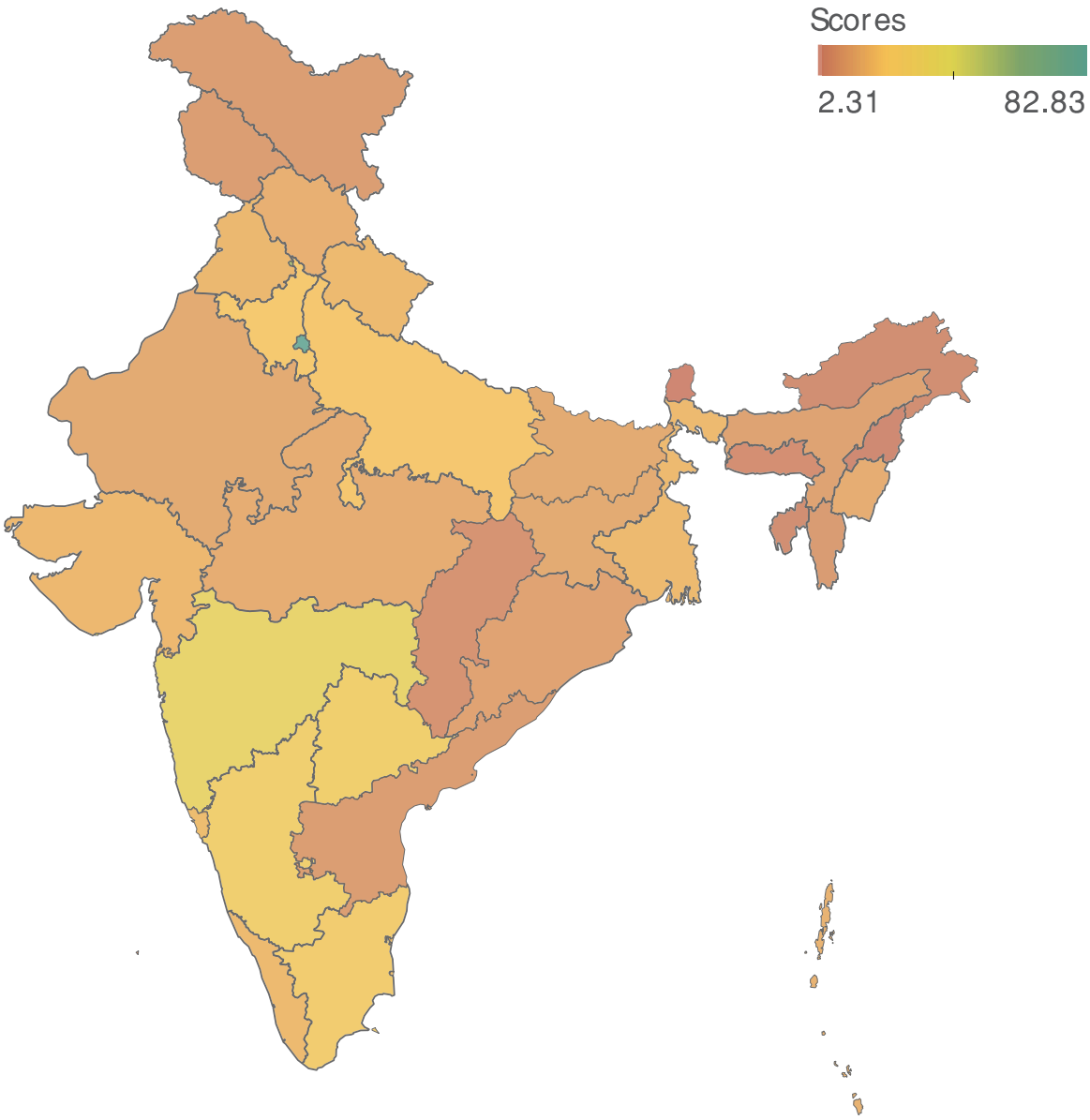
Knowledge Output

Average pillar score: 18.3

Highest scoring states: Delhi, Chandigarh, Daman and Diu, Maharashtra, Telangana
Lowest scoring states: Sikkim, Nagaland, Lakshadweep, Tripura, Arunachal Pradesh

Figure 18:

Regional mapping of Knowledge Output scores



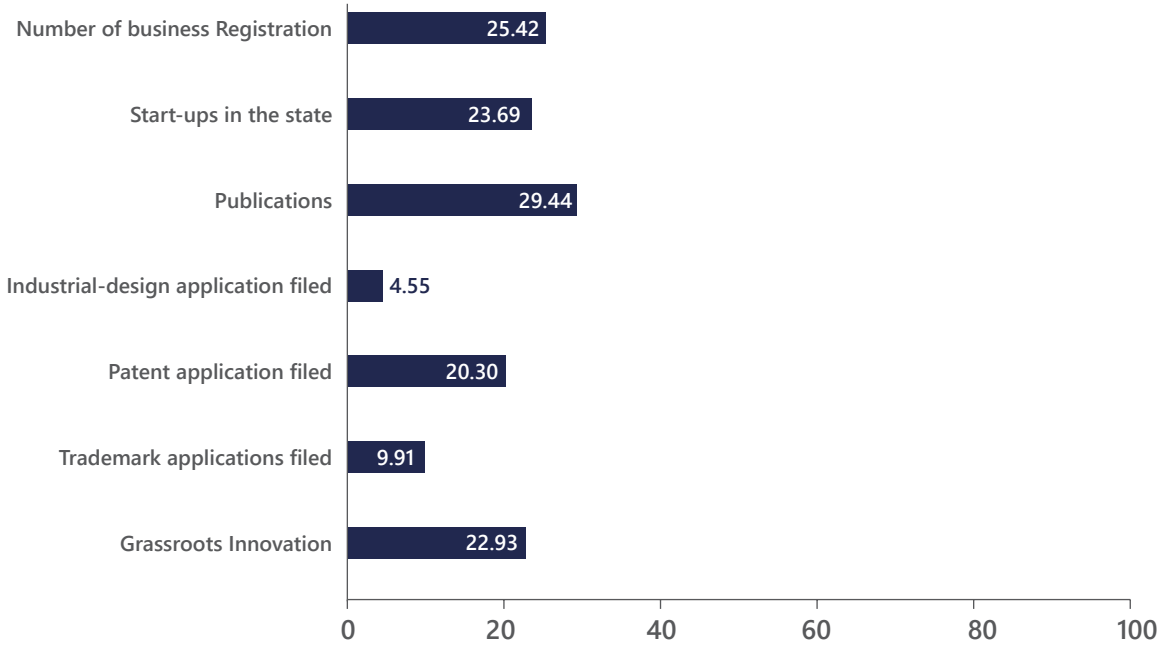
Knowledge Output is one of the two performance pillars having the widest difference between the highest-scoring state, Delhi (82.82) and the lowest-scoring state, Sikkim (2.31). This pillar also observes three positive outliers, with union territories such as Delhi, Chandigarh, and Daman and Diu securing the top positions. While the national average of this pillar stands at 18.23, the majority of the states fall below this threshold. The north-eastern states, eastern states, and the heartland region have scored the lowest in Knowledge Output. A comparatively higher score can be observed in the economically prosperous southern and western states such as Maharashtra, Karnataka, Telangana, and Tamil Nadu.

The following seven indicators determine the Knowledge Output score:

a) Grassroots Innovation
b) Number of Trademark Applications filed
c) Number of Patents applications filed
d) Number of Industrial Design Applications filed
e) Number of Publications
f) Number of Start-ups in the State
g) Number of New Business Registrations

Figure 19:

Indicator scores under Knowledge Output



The Knowledge Output in the country can be mainly attributed to new business registrations, start-ups, publications, and grassroots innovation. This development is an outcome of several business-friendly policies that have encouraged many to undertake new ventures. The number of publications is the highest contributing indicator to the pillar score and is indicative of research-based activities in the domain. However, a significantly low score in the number of industrial-design applications filed, and trademark applications imply a slow conversion of this research into industrial products and processes that can be used in practice.

Delhi has scored the highest in almost all indicators, with the highest numbers in trademark applications, patent applications, start-ups, and new businesses registered in the last financial year. This high score can be accrued to Delhi's position as the national capital and administration hub, which allows for the majority of patents and trademarks to be filed.

The other Major States that have also performed well include Chandigarh, Daman and Diu, Maharashtra, and Telangana. Much of the high scores attained by these states can be attributed to the good performance across all indicators, barring grassroots innovation. Daman and Diu has also secured the highest score in the number of industrial design applications filed. This performance is consistent with the states being major industrial hubs.

NE and Hill States such as Arunachal Pradesh, Sikkim, and Nagaland, have performed exceptionally well in grassroots innovation and have secured the top scores, offering a contradictory trend as they have not fared well when it comes to research and development expenditure and in other indicators. With a low frequency of trademark and patent applications, industrial design applications, start-ups, and new businesses, these states have secured a significantly low score in Knowledge Output.

Andaman and Nicobar Islands have scored the highest in grassroots innovation and performed well with new start-ups in the state. However, along with Lakshadweep islands, the states are negative outliers, having scored the lowest in trademark applications, industrial design applications and publications.

The knowledge output in the country can be mainly attributed to new business registrations, start-ups, publications and grassroots innovation.

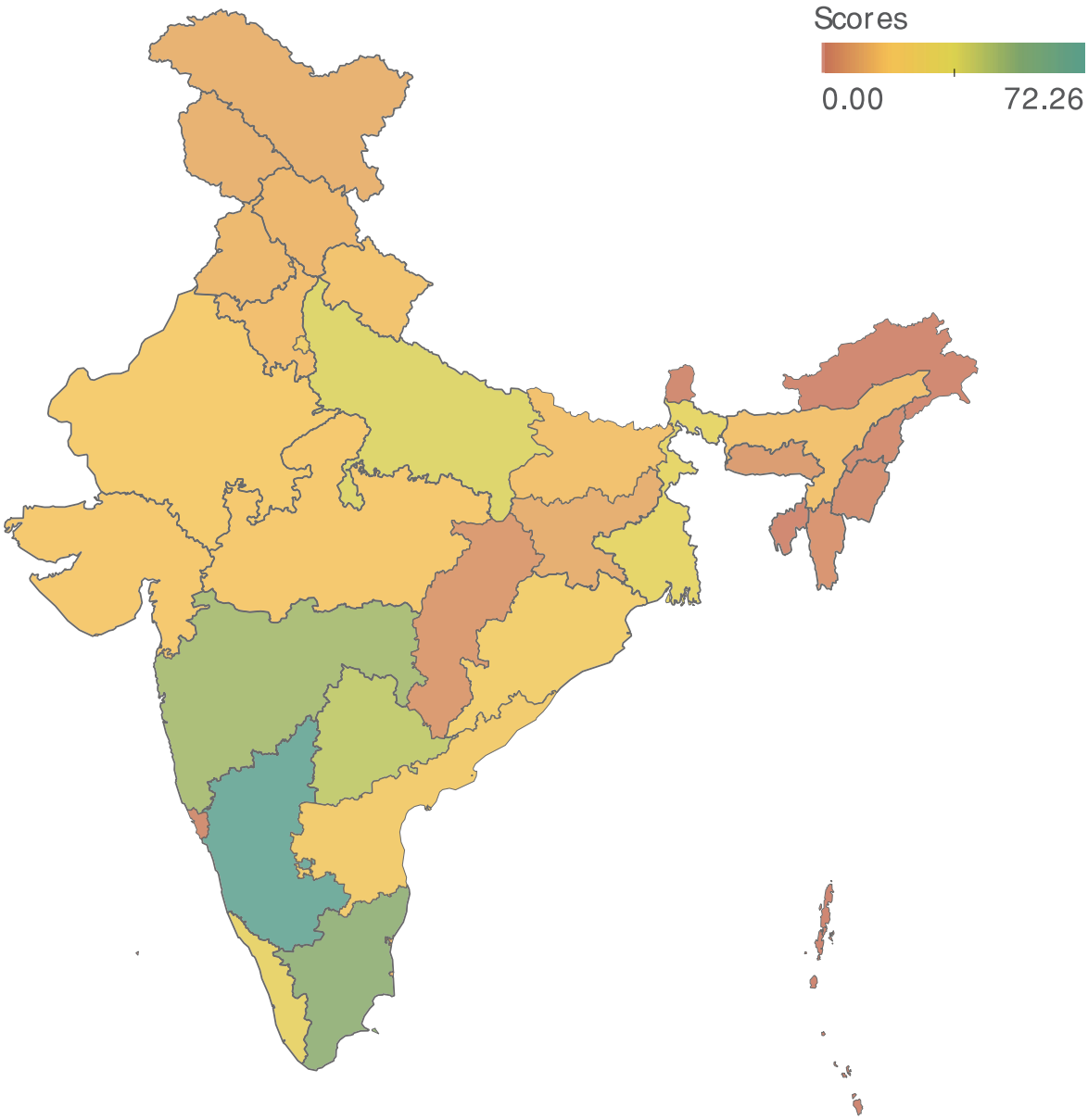
Knowledge Diffusion

Average pillar score: 17.6

Highest scoring states: Karnataka, Maharashtra, Tamil Nadu, Telangana, Uttar Pradesh
Lowest scoring states: Lakshadweep, Andaman and Nicobar Islands, Tripura, Arunachal Pradesh, Sikkim

Figure 20:

Regional mapping of Knowledge Diffusion scores

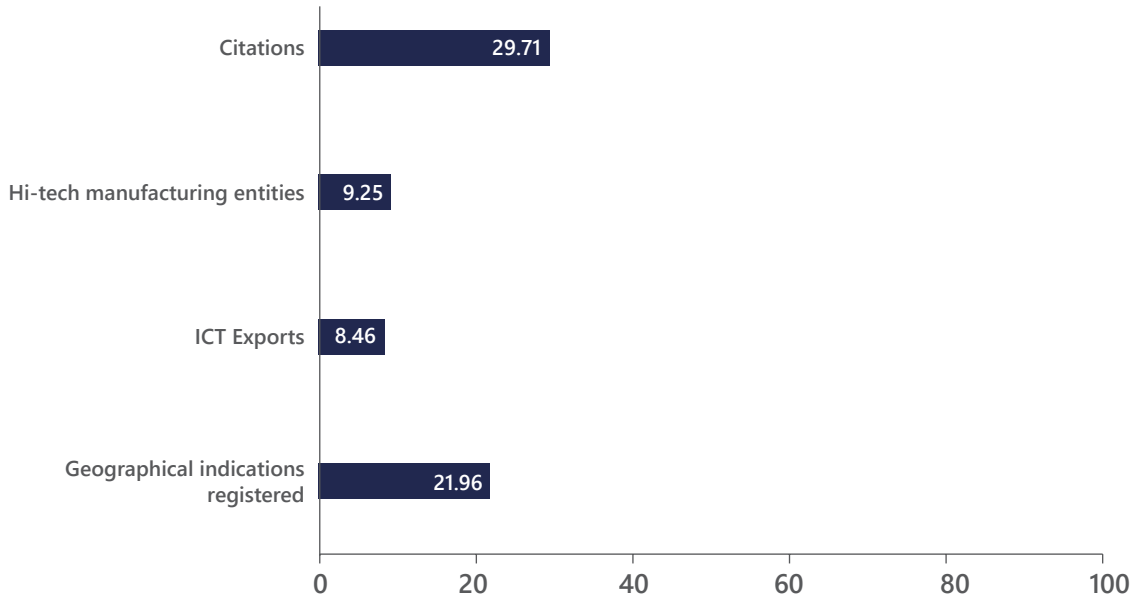


Knowledge Diffusion reflects a state's ability to apply knowledge to increase the value-added components of products and services and in general its aspiration toward an innovation-driven economy. The pillar also indicates the extent to which a state's economy has evolved from a resource-driven to an innovation-driven one. The majority of Indian states, concentrated mostly in the north-eastern and central parts of the country lie below the national average of 17.6. The top-scorers in this pillar are the Major States, with three positive outliers, Karnataka, Tamil Nadu, and Maharashtra. The performance of other states such as Telangana, Uttar Pradesh, and West Bengal closely follow suit.

The indicators used for this pillar include hi-tech manufacturing entities, ICT exports, geographical indications registered, and citations.

Figure 21:

Indicator scores under Knowledge Diffusion



Knowledge diffusion across the country has been affected by the low levels of ICT exports and hi-tech manufacturing entities. It appears that the levels of ICT exports and hi-tech manufacturing have not permeated uniformly in different regions of the country, beyond the IT hubs. On the other hand, a much higher score in geographical indications registered implies widened access to knowledge, especially in the MSME sector. Citations appear to be the highest-scoring indicator in this pillar, wherein it is indicative of quality research output in higher educational institutions.

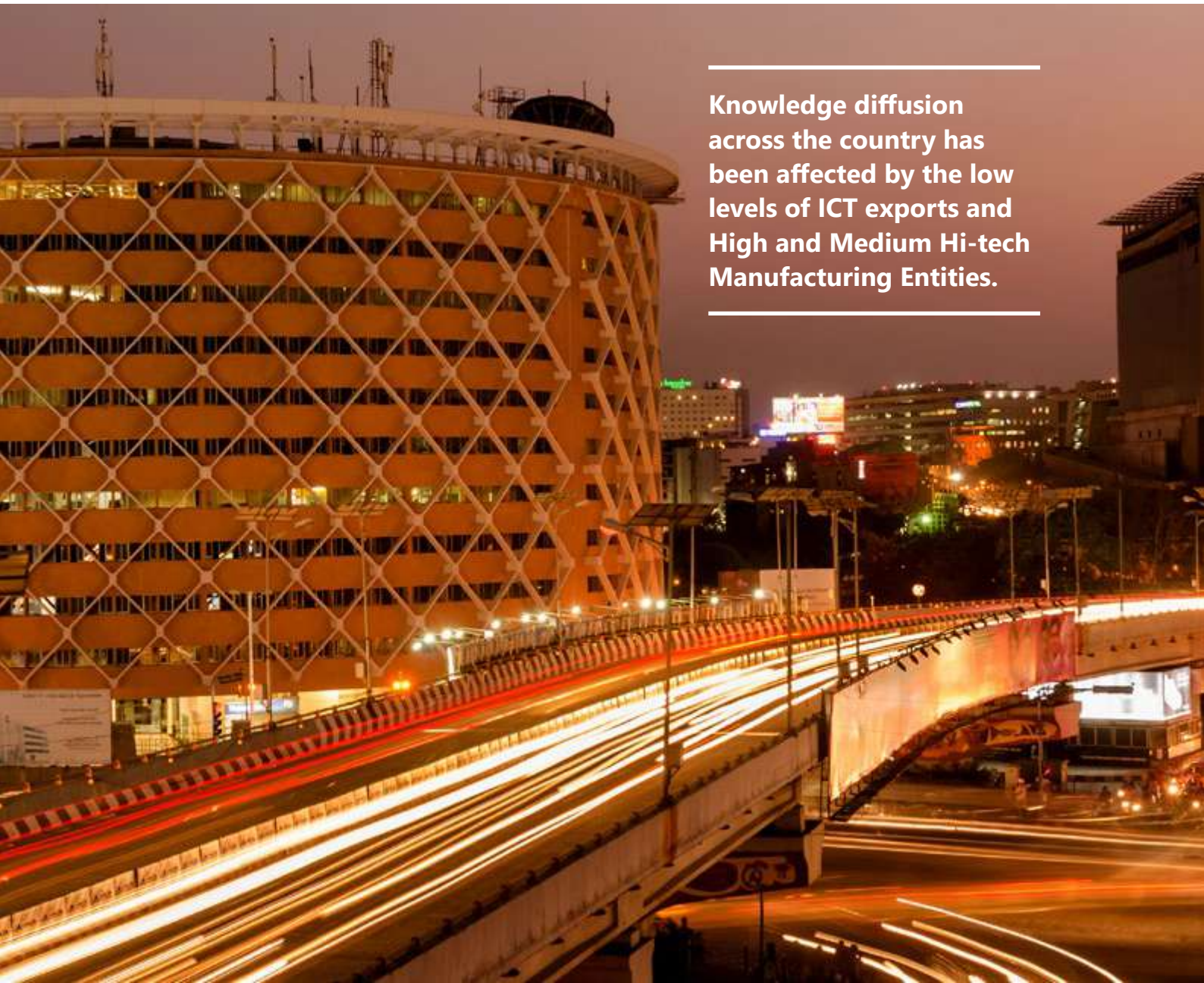
Karnataka is the top scorer in this pillar and has the highest score in two indicators with the highest margin it has a score of 44 at geographical indications registered (whose national average is 9.66); and a score of 13.54 at ICT Exports (wherein the national average is 1.14). Tamil Nadu and Maharashtra have performed more consistently, with Tamil Nadu securing the top position in the number of citations, followed by Maharashtra. Both states are among the top performers in GI registrations and ICT exports.

The top performers in this pillar are dominated by Major States, with nine out of ten representatives. Of these nine states, there are three positive outliers, namely, Karnataka, Tamil Nadu, and Maharashtra. Karnataka has recorded the highest number of registered GIs and ICT exports, while Tamil Nadu has the highest number of citations.

States such as Dadra and Nagar Haveli and Daman and Diu have performed well in the High and Medium Hi-tech Manufacturing Entities indicator, but have a much poor performance in ICT exports, and citations, thus affecting its overall score.

The scores in this pillar strongly reflect the regional imbalances in the development narrative of the country. The lowest scorers in all the indicators of this pillar are the north-eastern states, Lakshadweep and Andaman and Nicobar Islands, specifically in ICT exports and High and Medium Hi-tech Manufacturing Entities. This shows the absence of an export ecosystem in the states at the bottom, and thus resulting in them missing out on long-term potential economic gains.

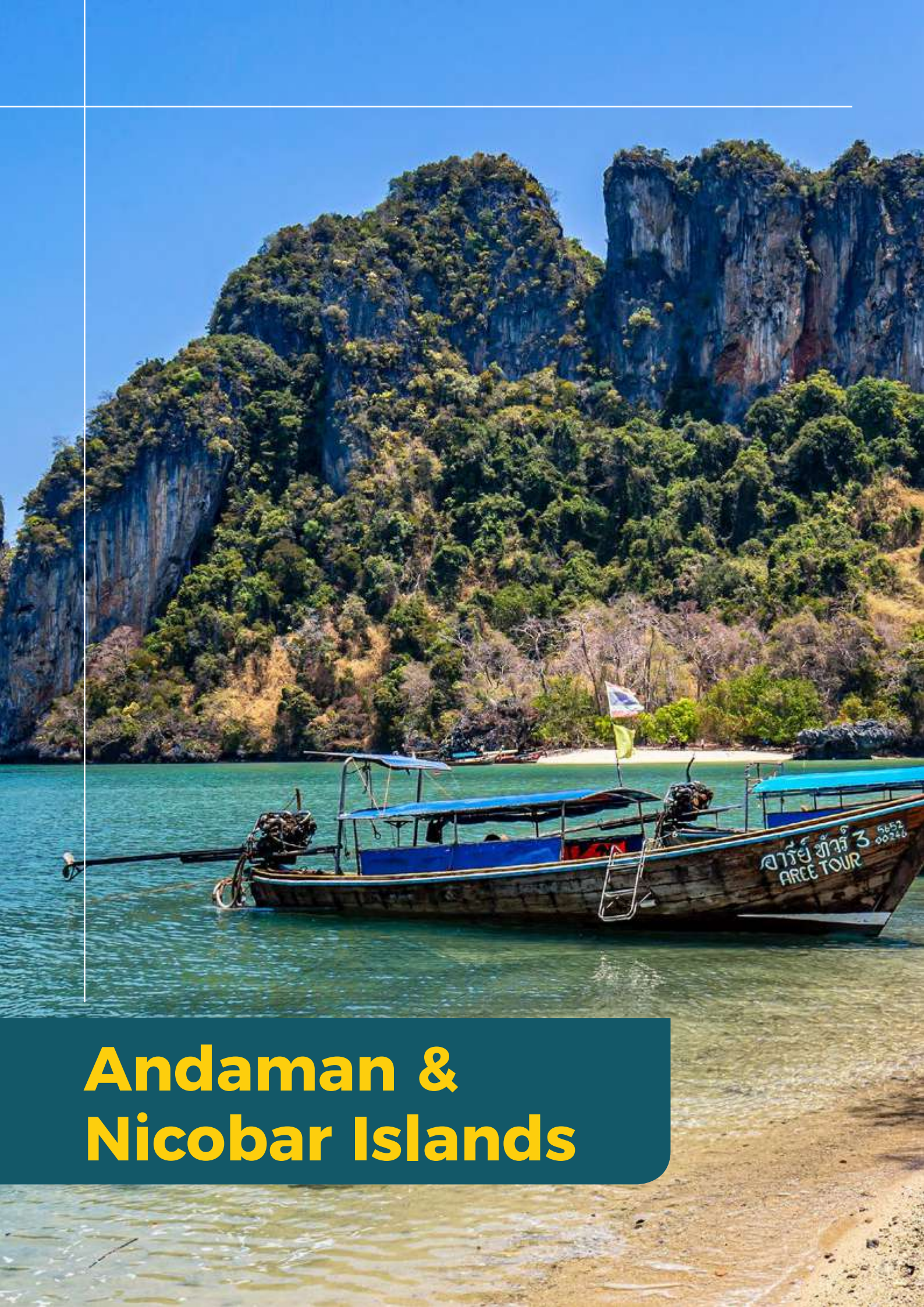
Another troubling issue noticed in this pilar is the absence of citations in almost one-third of all the states, with 12 states constituting the negative outliers. This reflects the poor quality of research output across the country and reiterates the need for a conducive environment for research and development to further the innovation landscape.



Knowledge diffusion across the country has been affected by the low levels of ICT exports and High and Medium Hi-tech Manufacturing Entities.

07

Profiles of States



Andaman & Nicobar Islands

Rank

07

Category

UT / City State

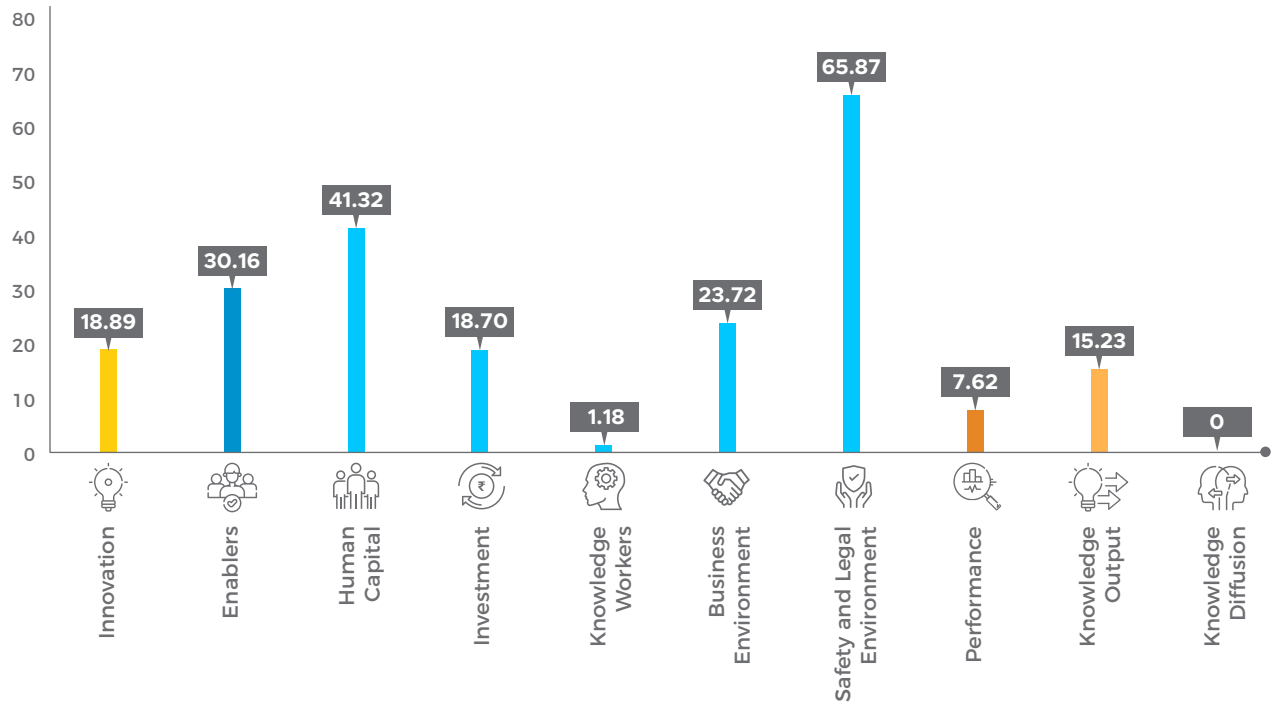
Efficiency Ratio

0.25

GSDP* Per Capita

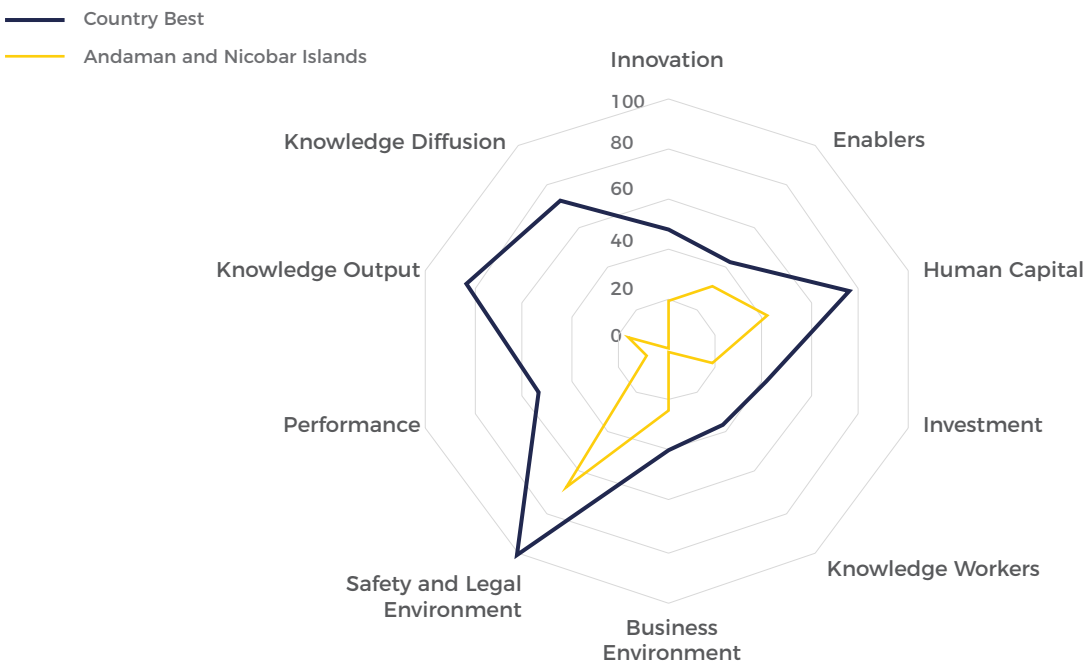
₹ 1,30,670

Scores

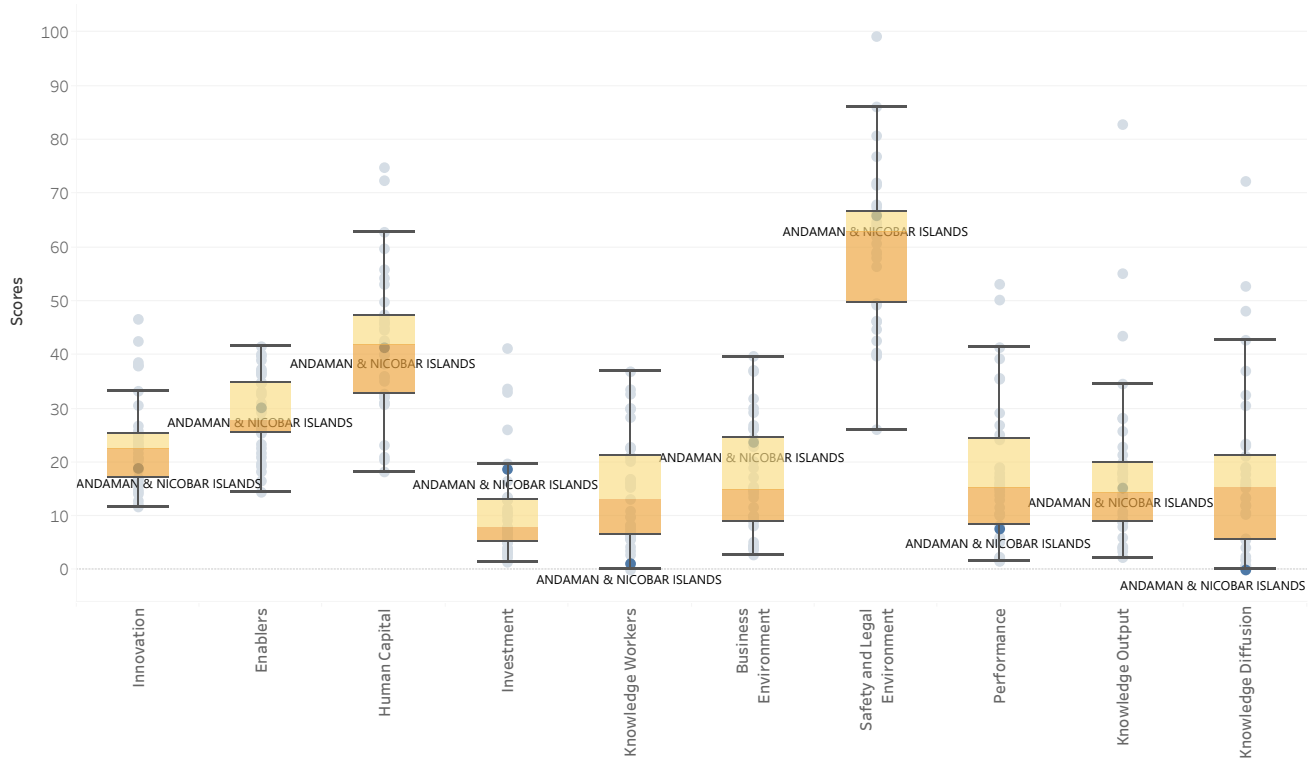


*Gross/Net State Domestic Product

Country Comparison



Relative Performance



Innovation

18.89

Enablers 30.16

Human Capital 41.32

Enrolment in Ph.D.	21.58
Enrolment in engineering and technology	15.31
Colleges connected through NMEICT	32.47
Higher education institutions with NAAC grade A and above	35.06
Pupil teacher ratio- Higher education	73.47
Schools with ICT labs	18.66
National Achievement Survey (NAS) Scores (Class X)	88.92

Investment 18.70

Expenditure on higher and technical education	100
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	0
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 1.18

Knowledge-intensive employment	0
NGOs involved in knowledge intensive areas	4.6
Private R&D units	0
State funded R&D units	0

Business Environment 23.72

Ease of doing business ranking	25
Online services transactions	7.48
Internet subscribers	14.37
Incubator centres	100
Common facility centres	0
Cluster Strength	0

Safety and Legal Environment 65.87

Information Technology/Intellectual Property related acts	89.01
Cyber crime police stations	0
Pendency of court cases	100

Performance 7.62

Knowledge Diffusion 0

ICT exports	0
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	0
Citations	0

Knowledge Output 15.23

Grassroot innovations	100
Patent applications filed	6.67
Trademark applications filed	2.96
Presence of startups	57.48
Industrial Design applications filed	0
New businesses registered	14.75
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Andhra Pradesh

Rank

07

Category

Major State

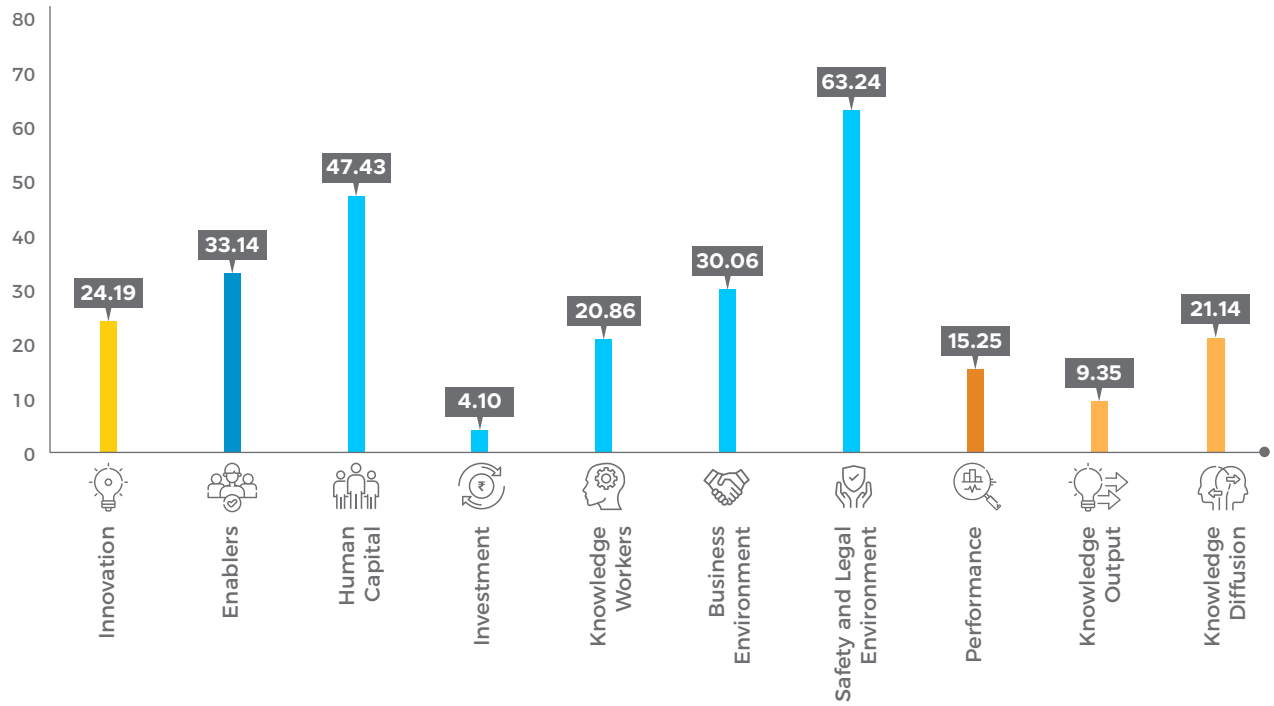
Efficiency Ratio

0.46

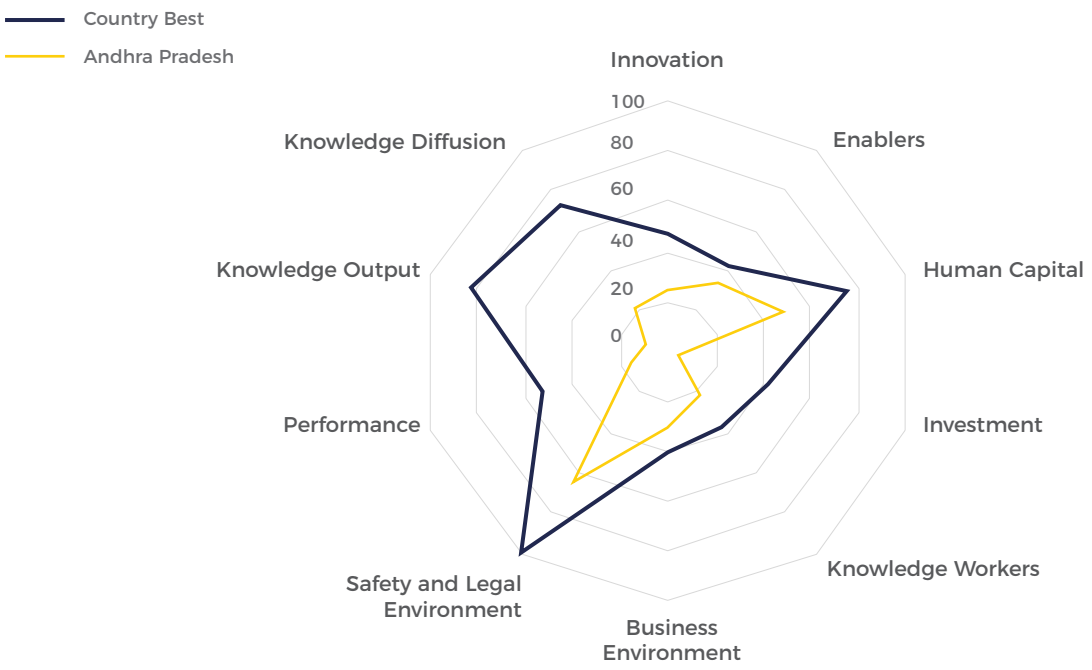
GSDP Per Capita

₹ 1,07,241

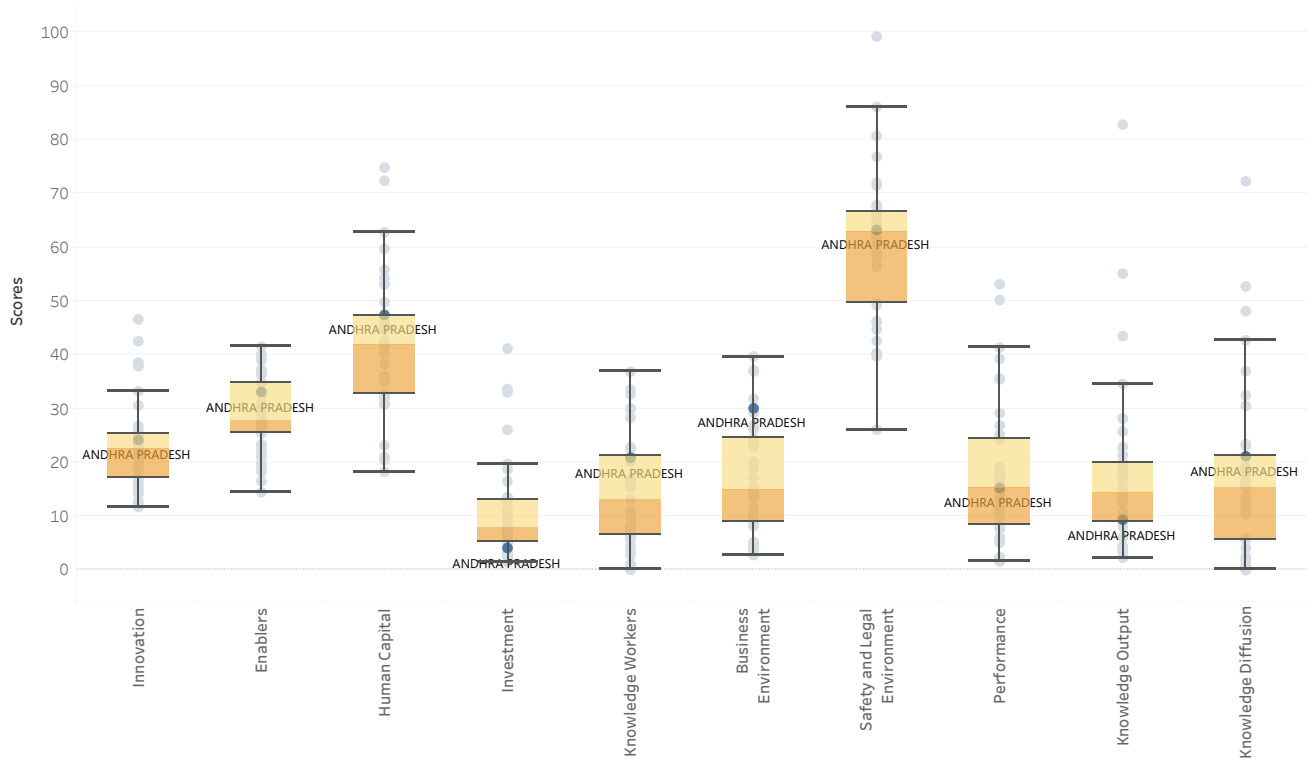
Scores



Country Comparison



Relative Performance



Innovation

24.19

Enablers 33.14

Human Capital 47.43

Enrolment in Ph.D.	12.29
Enrolment in engineering and technology	64.44
Colleges connected through NMEICT	38.44
Higher education institutions with NAAC grade A and above	9.27
Pupil teacher ratio- Higher education	87.76
Schools with ICT labs	17.91
National Achievement Survey (NAS) Scores (Class X)	94.11

Investment 4.10

Expenditure on higher and technical education	4.71
Expenditure on research and development (State govt.)	11.92
Expenditure on science, technology and environment	0.36
FDI inflow	3.07
Venture capital deals	0

Knowledge Workers 20.86

Knowledge-intensive employment	12.63
NGOs involved in knowledge intensive areas	5.68
Private R&D units	35.86
State funded R&D units	34.96

Business Environment 30.06

Ease of doing business ranking	100
Online services transactions	55.25
Internet subscribers	20.19
Incubator centres	1.28
Common facility centres	4.13
Cluster Strength	38.21

Safety and Legal Environment 63.24

Information Technology/Intellectual Property related acts	89.01
Cyber crime police stations	1.23
Pendency of court cases	91.07

Performance 15.25

Knowledge Diffusion 21.14

ICT exports	0.83
High and medium high-tech manufacturing entities	8.25
Geographical Indications (GI) registered	43.18
Citations	30.84

Knowledge Output 9.35

Grassroot innovations	0.37
Patent applications filed	8.26
Trademark applications filed	2.22
Presence of startups	7.5
Industrial Design applications filed	0.31
New businesses registered	15.25
Publications	32.04

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Arunachal Pradesh

Rank

07

Category

North East and Hill State

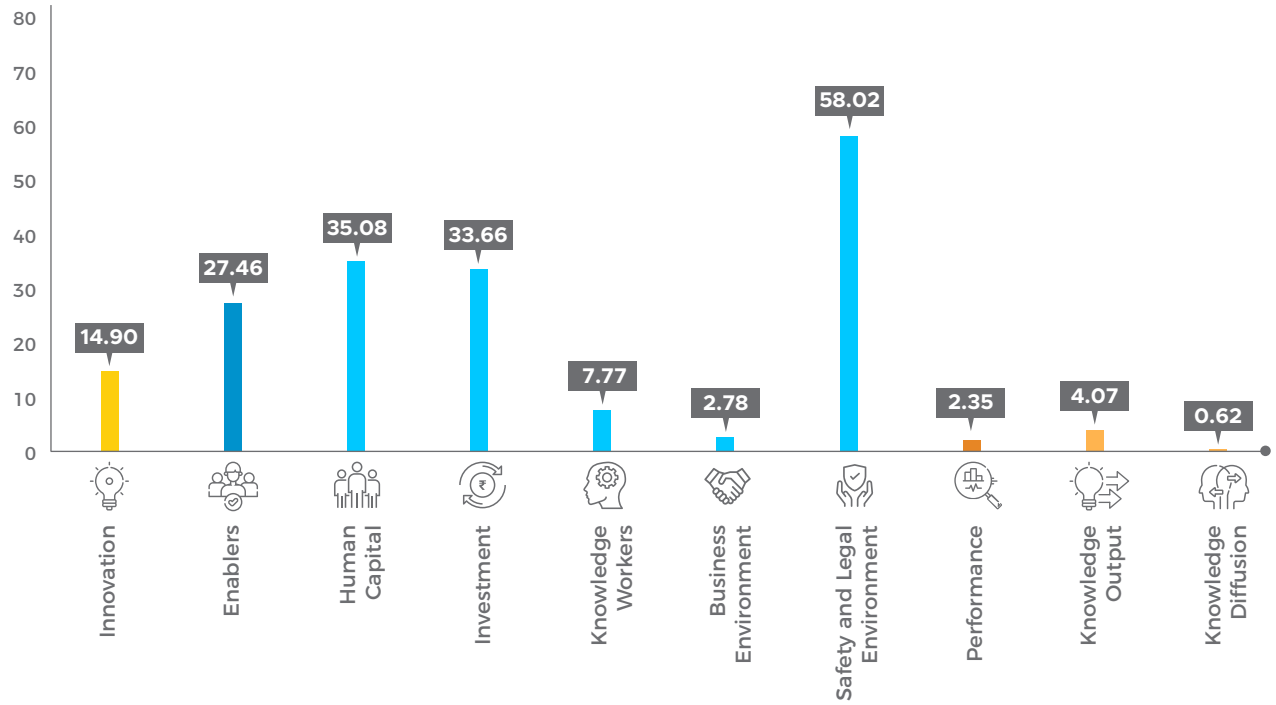
Efficiency Ratio

0.08

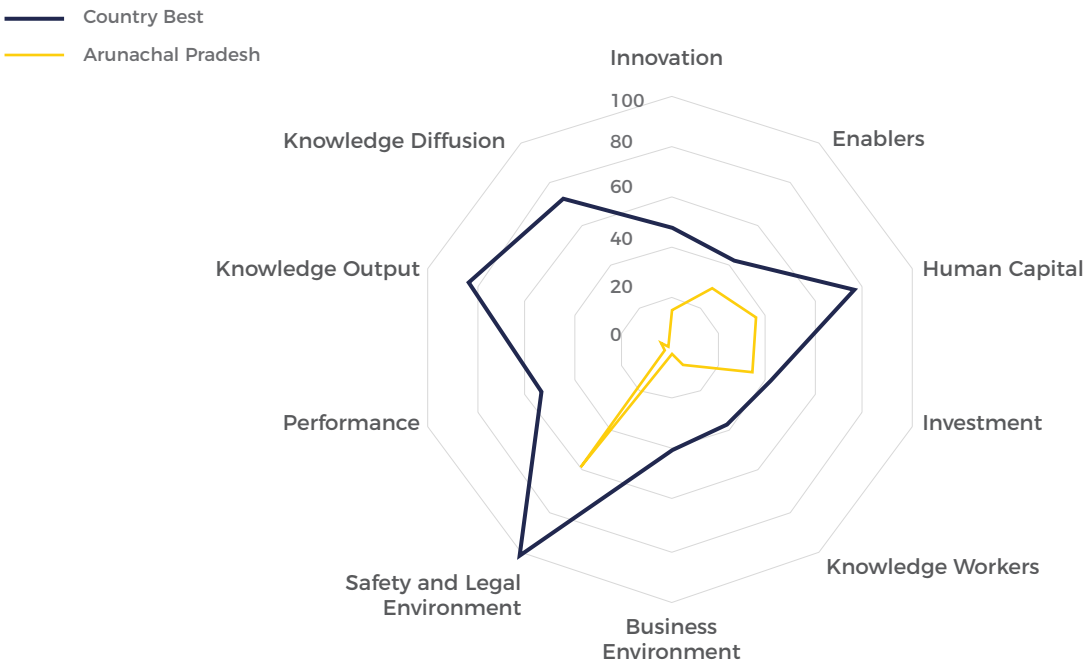
GSDP Per Capita

₹ 93,191

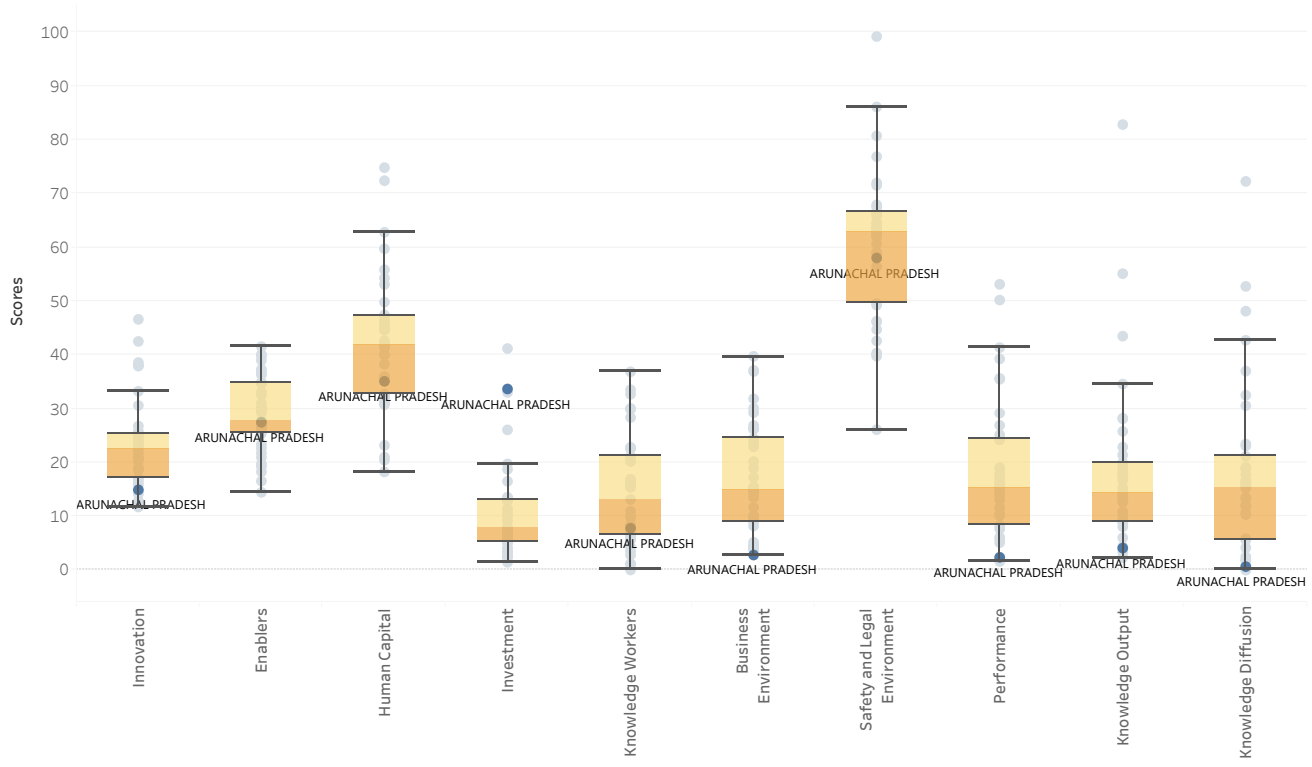
Scores



Country Comparison



Relative Performance



Innovation

14.9

Enablers 27.46

Human Capital 35.08

Enrolment in Ph.D.	59.89
Enrolment in engineering and technology	13.01
Colleges connected through NMEICT	7.27
Higher education institutions with NAAC grade A and above	9.09
Pupil teacher ratio- Higher education	61.22
Schools with ICT labs	16.54
National Achievement Survey (NAS) Scores (Class X)	82.46

Investment 33.66

Expenditure on higher and technical education	71.75
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	100
FDI inflow	0.32
Venture capital deals	0

Knowledge Workers 7.77

Knowledge-intensive employment	0
NGOs involved in knowledge intensive areas	30.39
Private R&D units	0
State funded R&D units	0

Business Environment 2.78

Ease of doing business ranking	0
Online services transactions	0.02
Internet subscribers	12.56
Incubator centres	0
Common facility centres	0
Cluster Strength	0

Safety and Legal Environment 58.02

Information Technology/Intellectual Property related acts	91.21
Cyber crime police stations	0
Pendency of court cases	74.26

Performance 2.35

Knowledge Diffusion 0.62

ICT exports	0
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	2.27
Citations	0

Knowledge Output 4.07

Grassroot innovations	91.11
Patent applications filed	4.59
Trademark applications filed	0.61
Presence of startups	6.15
Industrial Design applications filed	0.18
New businesses registered	5.53
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Assam

Rank

06

Category

North East and Hill State

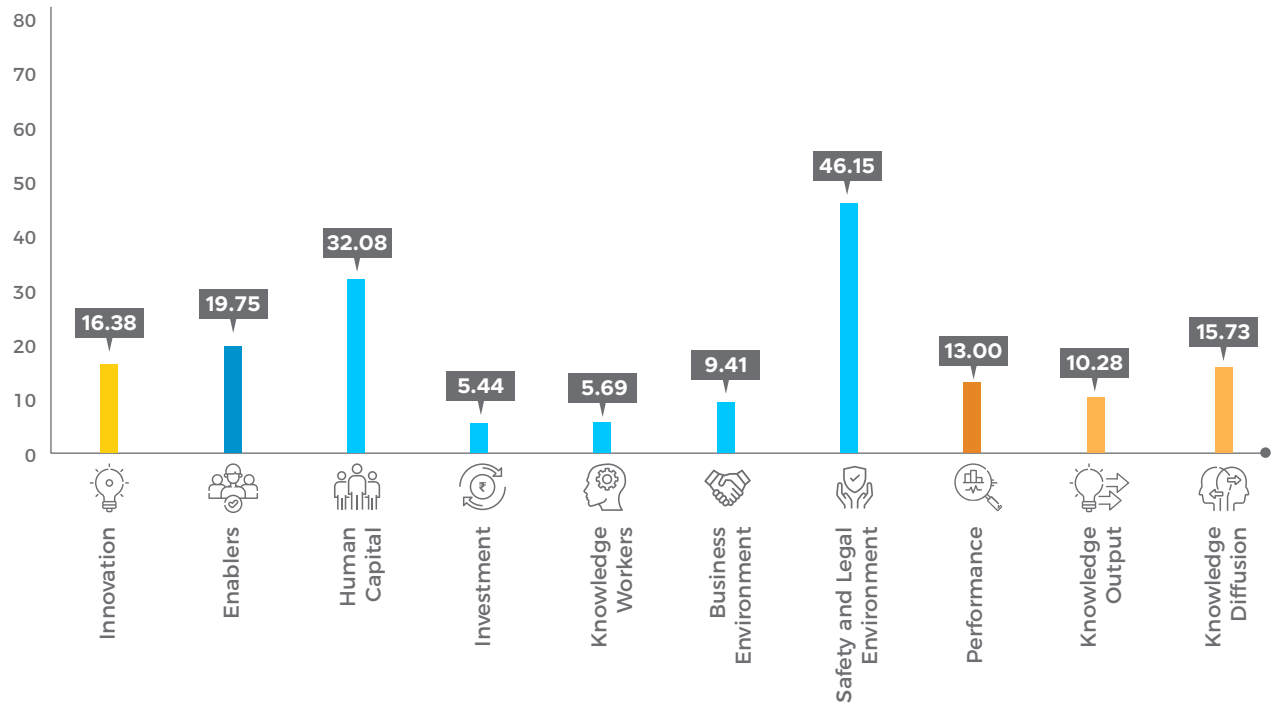
Efficiency Ratio

0.65

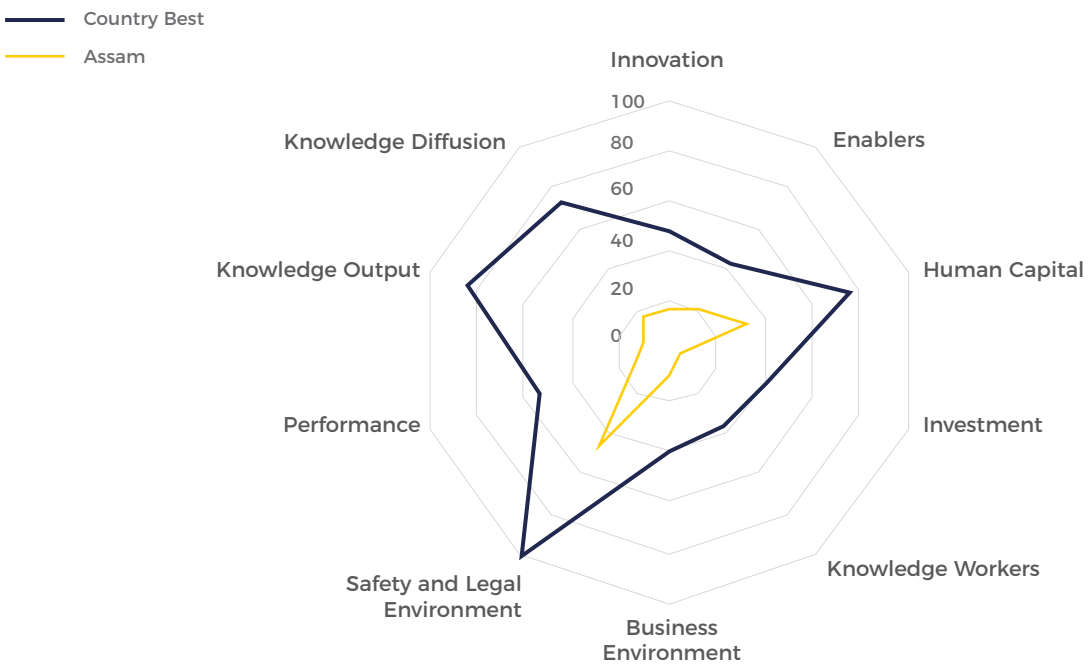
GSDP Per Capita

₹ 60,695

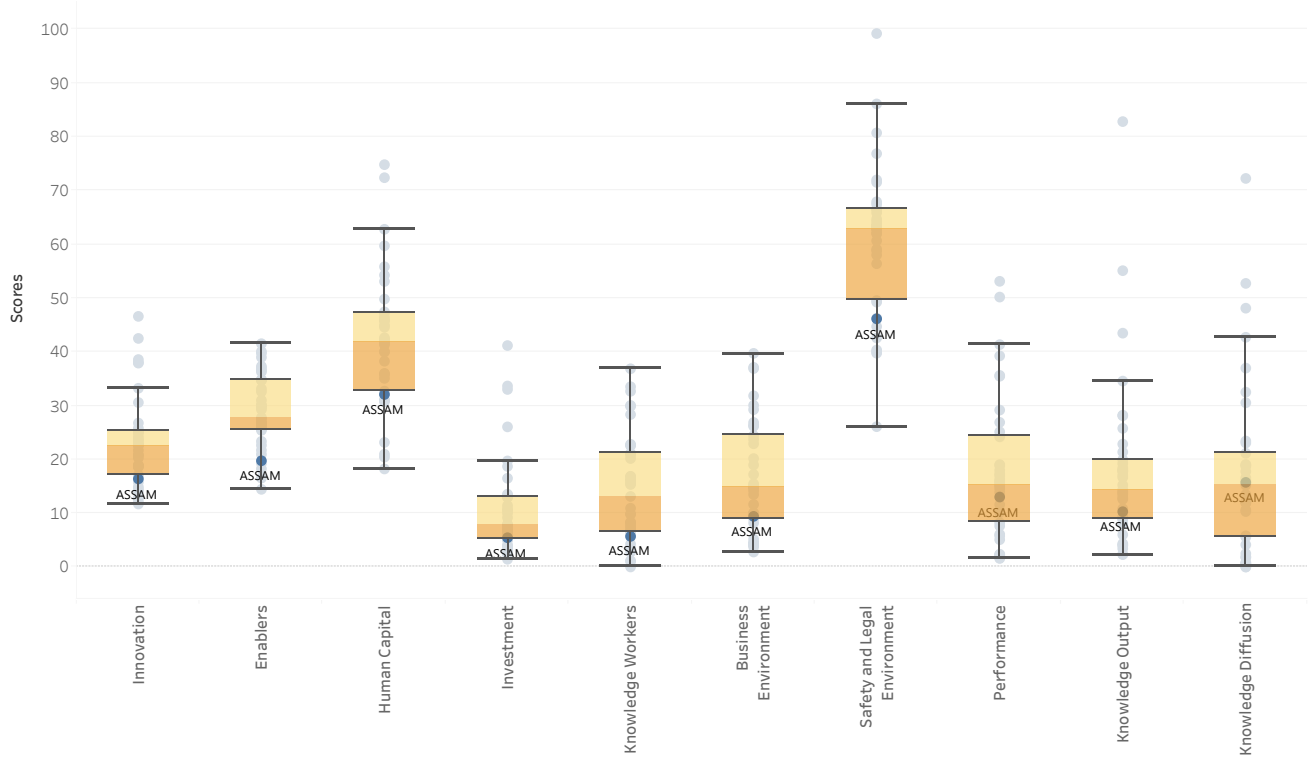
Scores



Country Comparison



Relative Performance



Innovation

16.38

Enablers 19.75

Human Capital 32.08

Enrolment in Ph.D.	19.41
Enrolment in engineering and technology	3.65
Colleges connected through NMEICT	32.21
Higher education institutions with NAAC grade A and above	6.84
Pupil teacher ratio- Higher education	61.22
Schools with ICT labs	5.72
National Achievement Survey (NAS) Scores (Class X)	94.57

Investment 5.44

Expenditure on higher and technical education	0.08
Expenditure on research and development (State govt.)	20.41
Expenditure on science, technology and environment	3.82
FDI inflow	0.2
Venture capital deals	0

Knowledge Workers 5.69

Knowledge-intensive employment	1.83
NGOs involved in knowledge intensive areas	6.15
Private R&D units	1.83
State funded R&D units	13.59

Business Environment 9.41

Ease of doing business ranking	32.14
Online services transactions	2.94
Internet subscribers	6.21
Incubator centres	0.68
Common facility centres	5.77
Cluster Strength	21.95

Safety and Legal Environment 46.15

Information Technology/Intellectual Property related acts	43.96
Cyber crime police stations	0
Pendency of court cases	89.93

Performance 13.0

Knowledge Diffusion 15.73

ICT exports	0.07
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	15.91
Citations	45.71

Knowledge Output 10.28

Grassroot innovations	9.26
Patent applications filed	4.44
Trademark applications filed	1.29
Presence of startups	12.09
Industrial Design applications filed	0.05
New businesses registered	13.2
Publications	45.69

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
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- 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

Bihar

Rank

17

Category

Major State

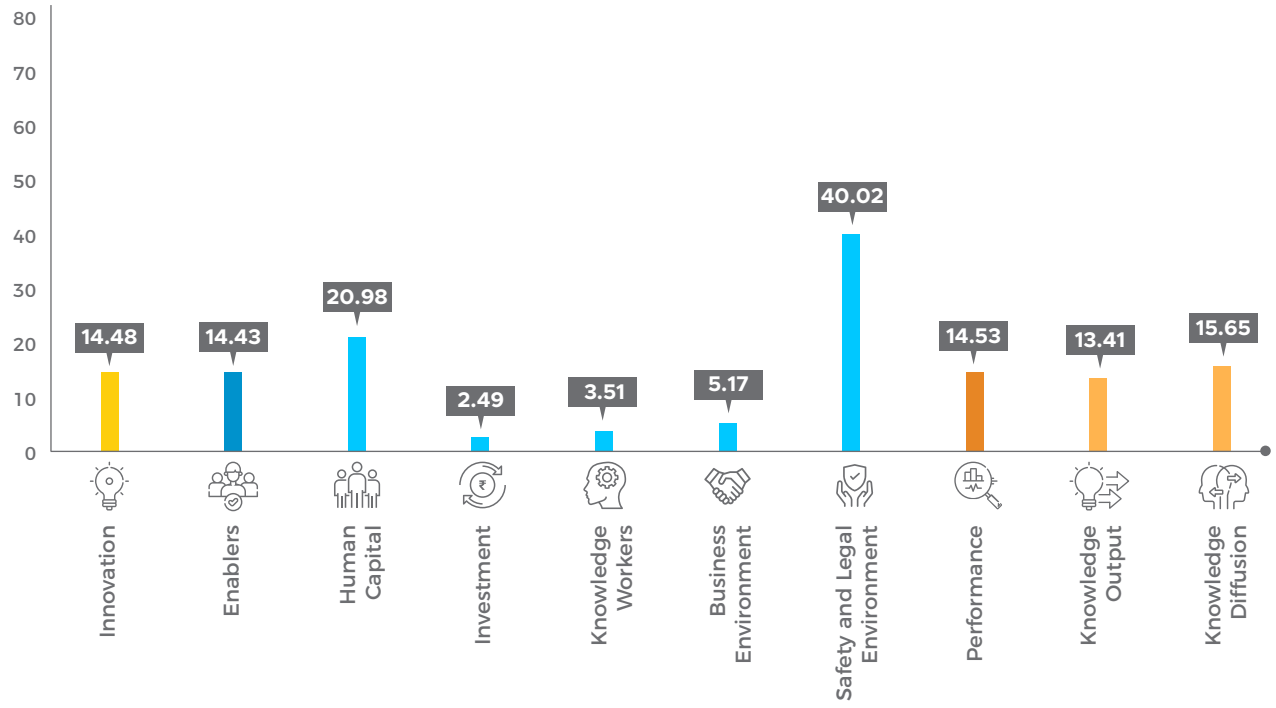
Efficiency Ratio

1.0

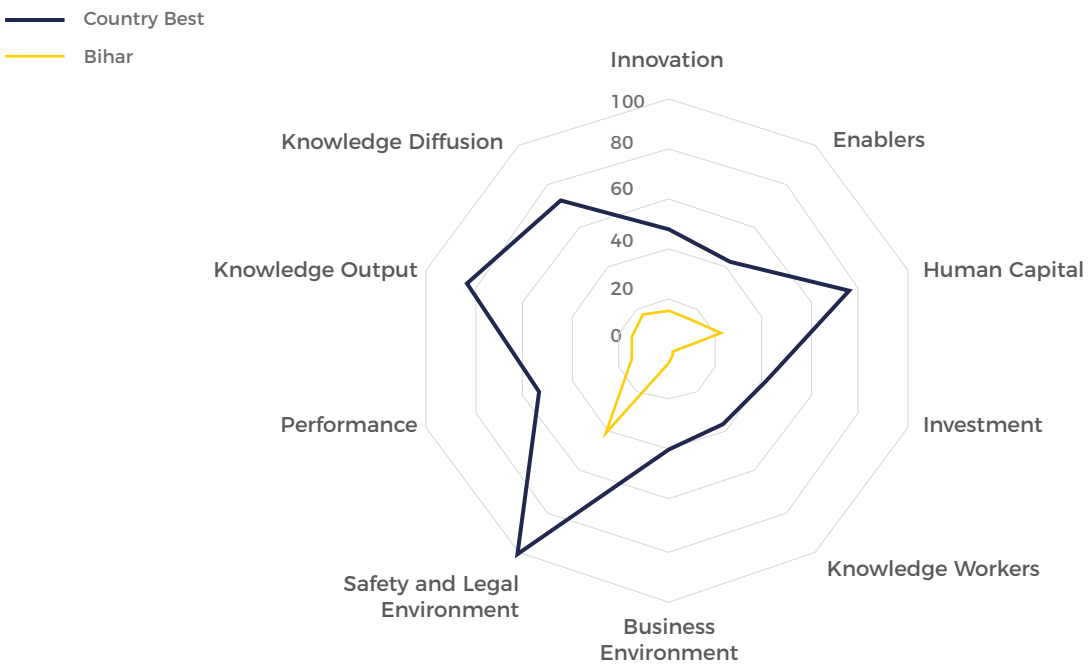
GSDP Per Capita

₹ 28,668

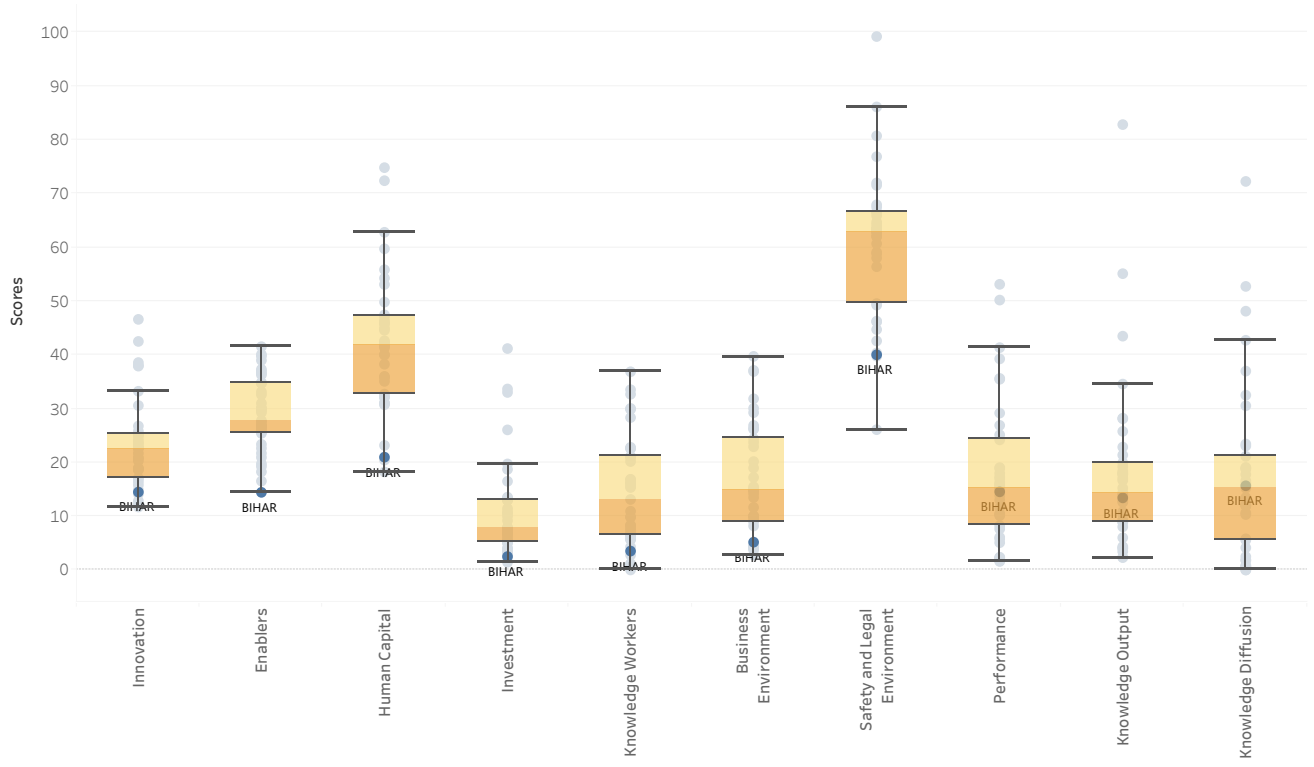
Scores



Country Comparison



Relative Performance



Innovation 14.48

Enablers 14.43

Human Capital 20.98

Enrolment in Ph.D.	3.96
Enrolment in engineering and technology	4.15
Colleges connected through NMEICT	45.71
Higher education institutions with NAAC grade A and above	2.68
Pupil teacher ratio- Higher education	0
Schools with ICT labs	10.7
National Achievement Survey (NAS) Scores (Class X)	78.77

Investment 2.49

Expenditure on higher and technical education	9.22
Expenditure on research and development (State govt.)	4.15
Expenditure on science, technology and environment	0
FDI inflow	0.37
Venture capital deals	0

Knowledge Workers 3.51

Knowledge-intensive employment	1.95
NGOs involved in knowledge intensive areas	4.54
Private R&D units	0.17
State funded R&D units	7.37

Business Environment 5.17

Ease of doing business ranking	10.71
Online services transactions	1.32
Internet subscribers	0
Incubator centres	0.32
Common facility centres	2.03
Cluster Strength	22.76

Safety and Legal Environment 40.02

Information Technology/Intellectual Property related acts	100
Cyber crime police stations	0.59
Pendency of court cases	10.64

Performance 14.53

Knowledge Diffusion 15.66

ICT exports	0
High and medium high-tech manufacturing entities	0.17
Geographical Indications (GI) registered	29.55
Citations	30.4

Knowledge Output 13.41

Grassroot innovations	11.48
Patent applications filed	0.6
Trademark applications filed	1.17
Presence of startups	12.92
Industrial Design applications filed	0.02
New businesses registered	35.15
Publications	36.15

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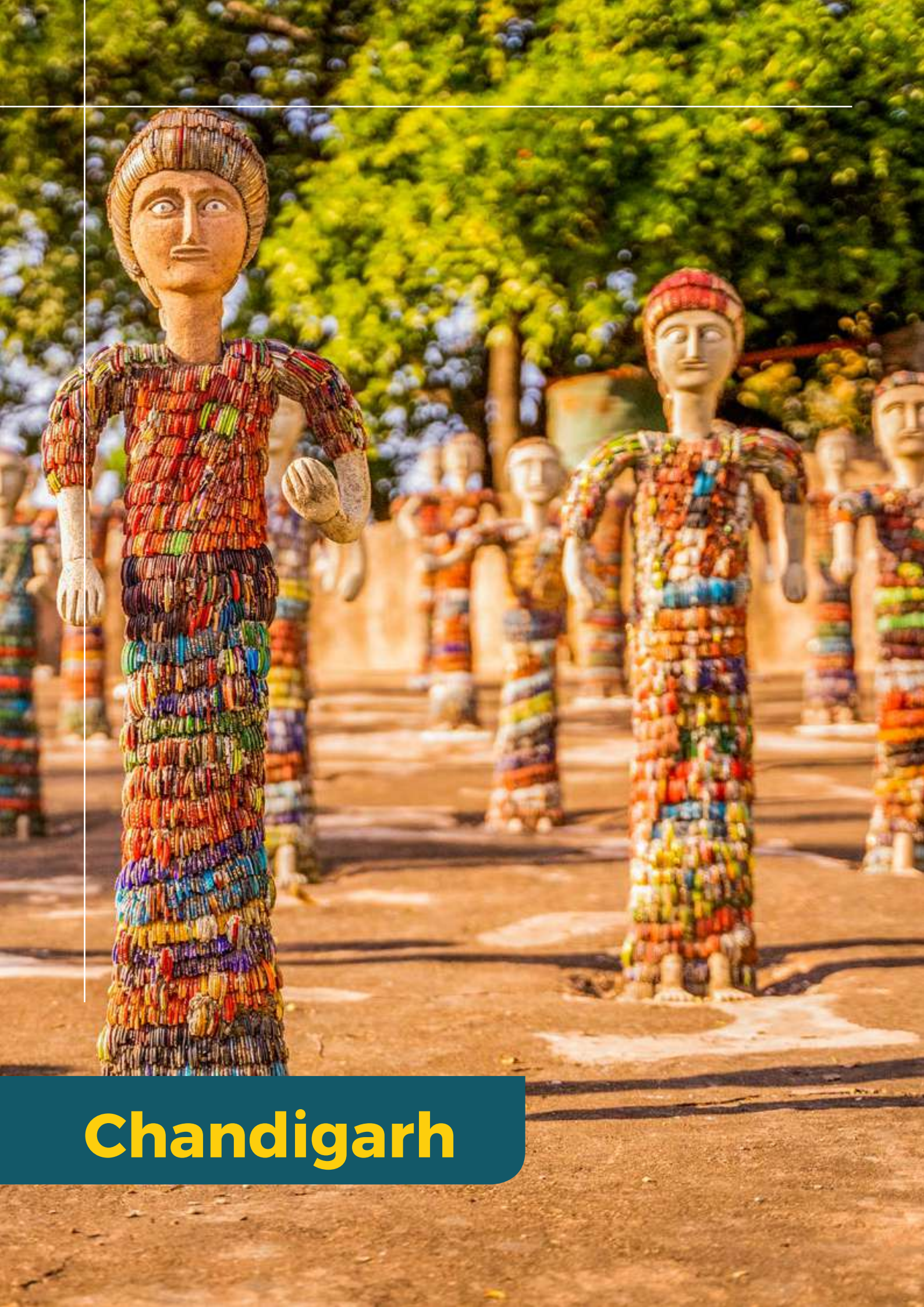
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Chandigarh

Rank

02

Category

UT / City State

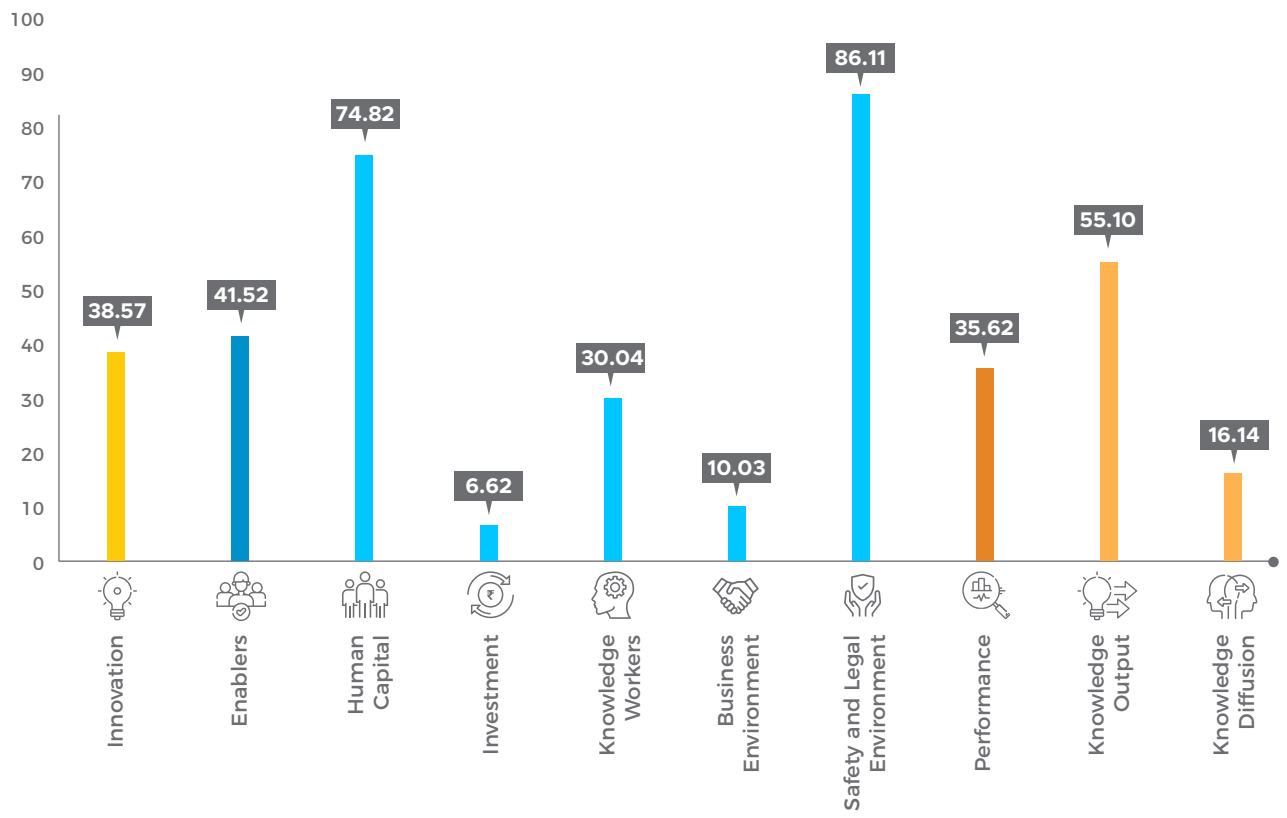
Efficiency Ratio

0.85

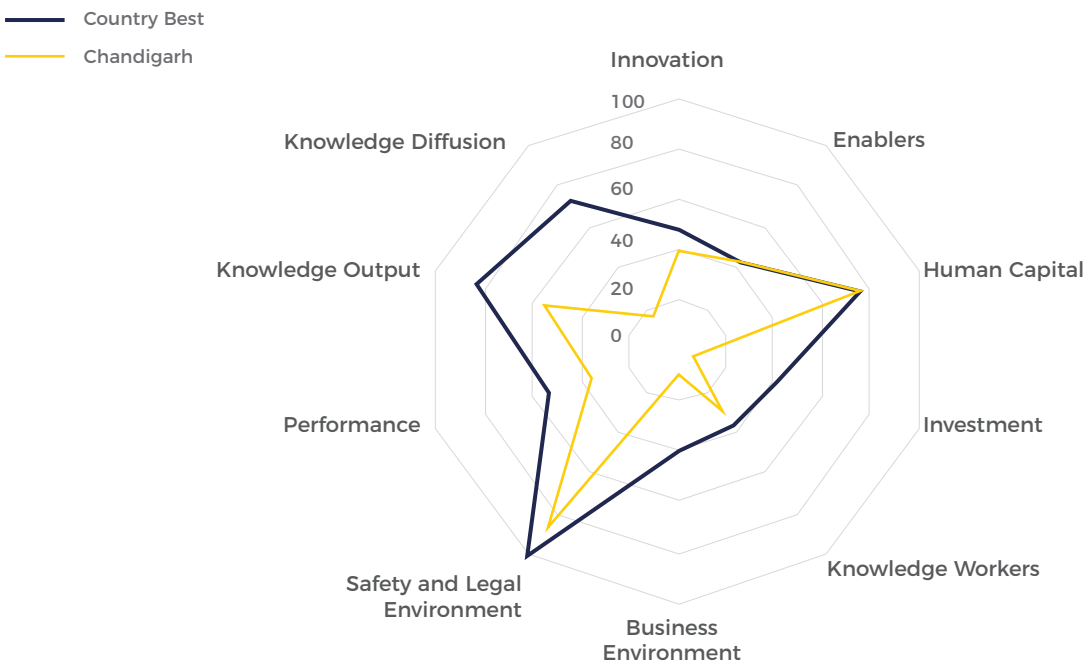
GSDP Per Capita

₹ 2,34,998

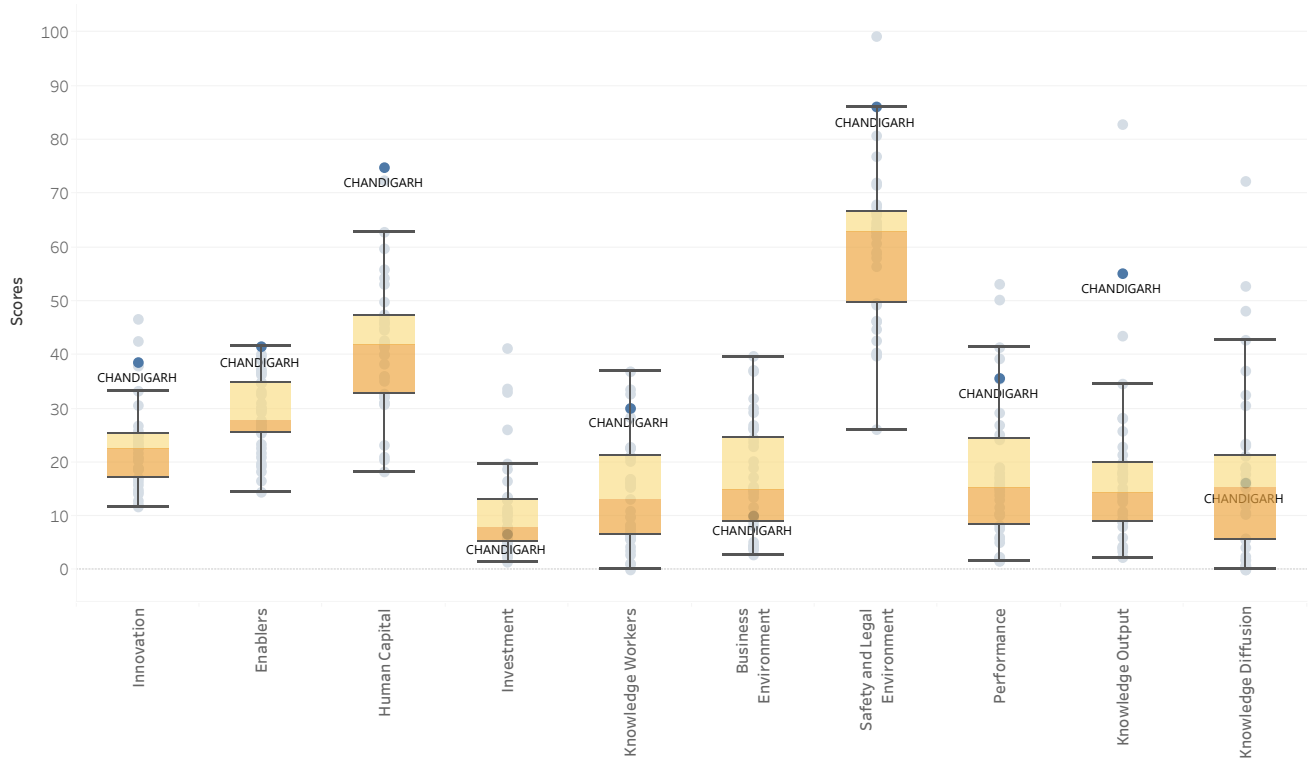
Scores



Country Comparison



Relative Performance



Innovation

38.57

Enablers 41.52

Human Capital 74.82

Enrolment in Ph.D.	100
Enrolment in engineering and technology	25.81
Colleges connected through NMEICT	72.73
Higher education institutions with NAAC grade A and above	100
Pupil teacher ratio- Higher education	67.35
Schools with ICT labs	65.8
National Achievement Survey (NAS) Scores (Class X)	95.81

Investment 6.62

Expenditure on higher and technical education	37.97
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	0
FDI inflow	2.36
Venture capital deals	0

Knowledge Workers 30.04

Knowledge-intensive employment	29.65
NGOs involved in knowledge intensive areas	1.66
Private R&D units	100
State funded R&D units	0

Business Environment 10.03

Ease of doing business ranking	0
Online services transactions	13.87
Internet subscribers	14.37
Incubator centres	12.02
Common facility centres	0
Cluster Strength	15.45

Safety and Legal Environment 86.11

Information Technology/Intellectual Property related acts	97.8
Cyber crime police stations	57.85
Pendency of court cases	98.86

Performance 35.62

Knowledge Diffusion 16.14

ICT exports	15.82
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	0
Citations	45.42

Knowledge Output 55.1

Grassroot innovations	11.11
Patent applications filed	91.44
Trademark applications filed	62.94
Presence of startups	65.82
Industrial Design applications filed	4.7
New businesses registered	61.31
Publications	34.78

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Chhattisgarh

Rank

16

Category

Major State

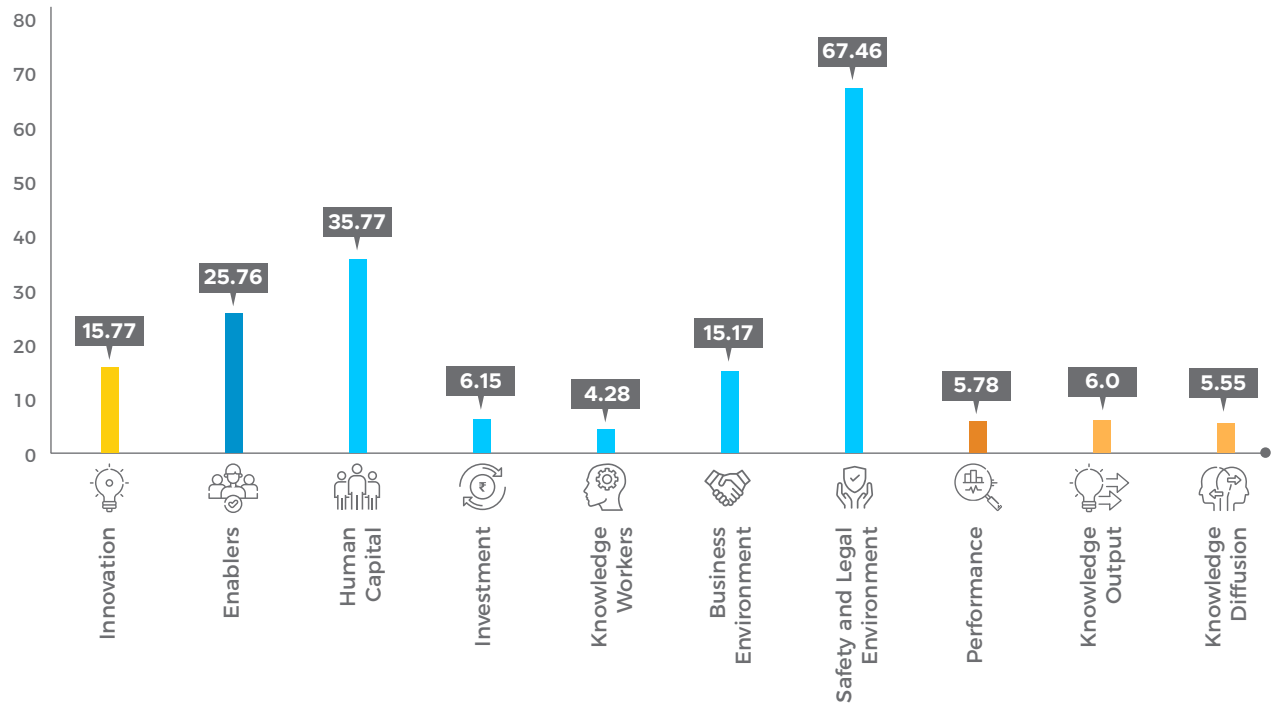
Efficiency Ratio

0.22

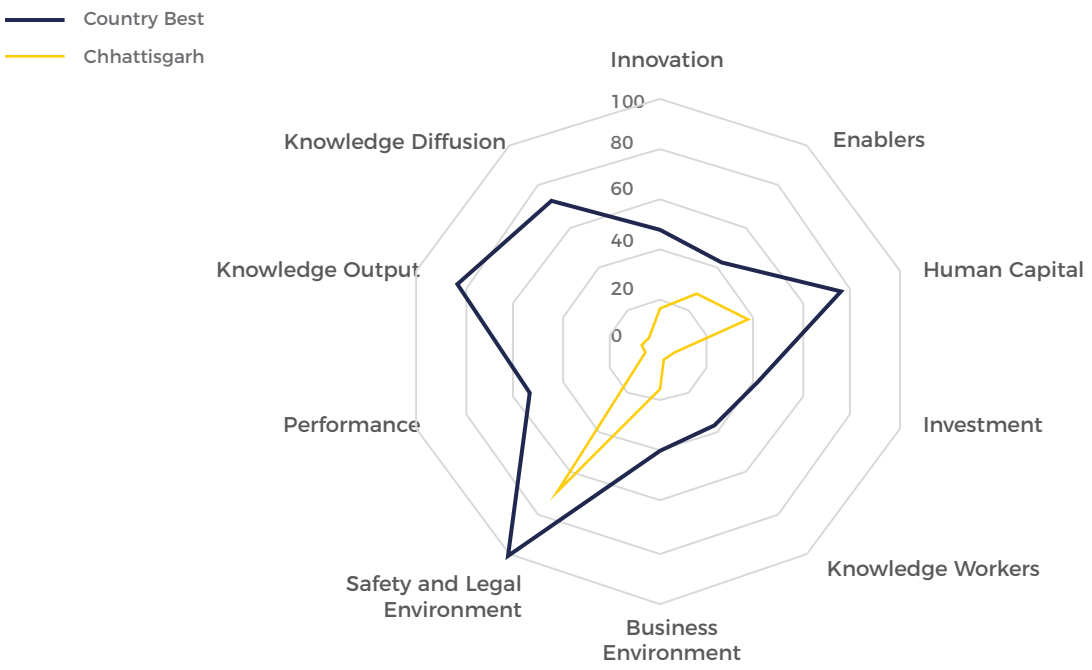
GSDP Per Capita

₹ 69,500

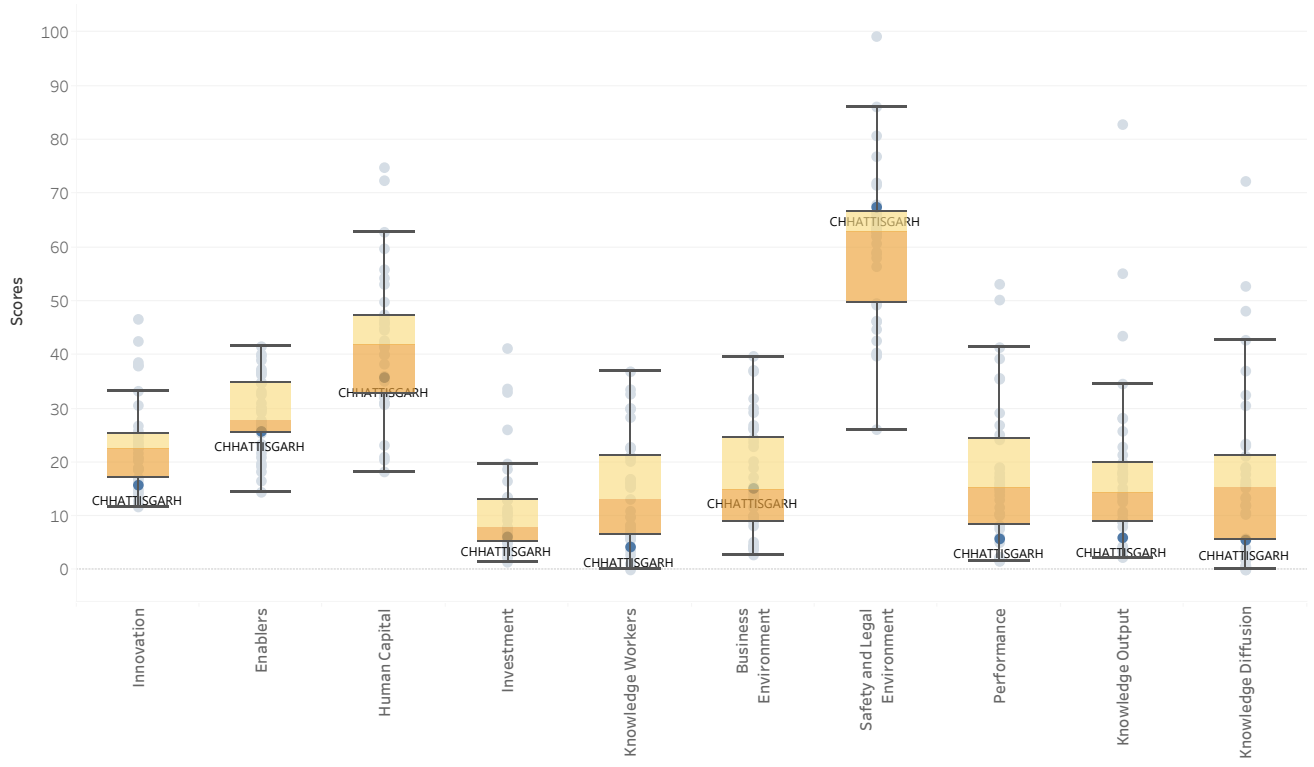
Scores



Country Comparison



Relative Performance



Innovation

15.77

Enablers 25.76

Human Capital 35.77

Enrolment in Ph.D.	7.07
Enrolment in engineering and technology	13.67
Colleges connected through NMEICT	47.27
Higher education institutions with NAAC grade A and above	2.45
Pupil teacher ratio- Higher education	67.35
Schools with ICT labs	33.58
National Achievement Survey (NAS) Scores (Class X)	80.84

Investment 6.15

Expenditure on higher and technical education	17.57
Expenditure on research and development (State govt.)	12.77
Expenditure on science, technology and environment	2.04
FDI inflow	0
Venture capital deals	0

Knowledge Workers 4.28

Knowledge-intensive employment	4.3
NGOs involved in knowledge intensive areas	3.7
Private R&D units	1.72
State funded R&D units	7.11

Business Environment 15.17

Ease of doing business ranking	82.14
Online services transactions	18.36
Internet subscribers	7.49
Incubator centres	1.32
Common facility centres	0
Cluster Strength	17.07

Safety and Legal Environment 67.46

Information Technology/Intellectual Property related acts	96.7
Cyber crime police stations	2.39
Pendency of court cases	94.29

Performance 5.78

Knowledge Diffusion 5.55

ICT exports	2.13
High and medium high-tech manufacturing entities	6.85
Geographical Indications (GI) registered	13.64
Citations	0

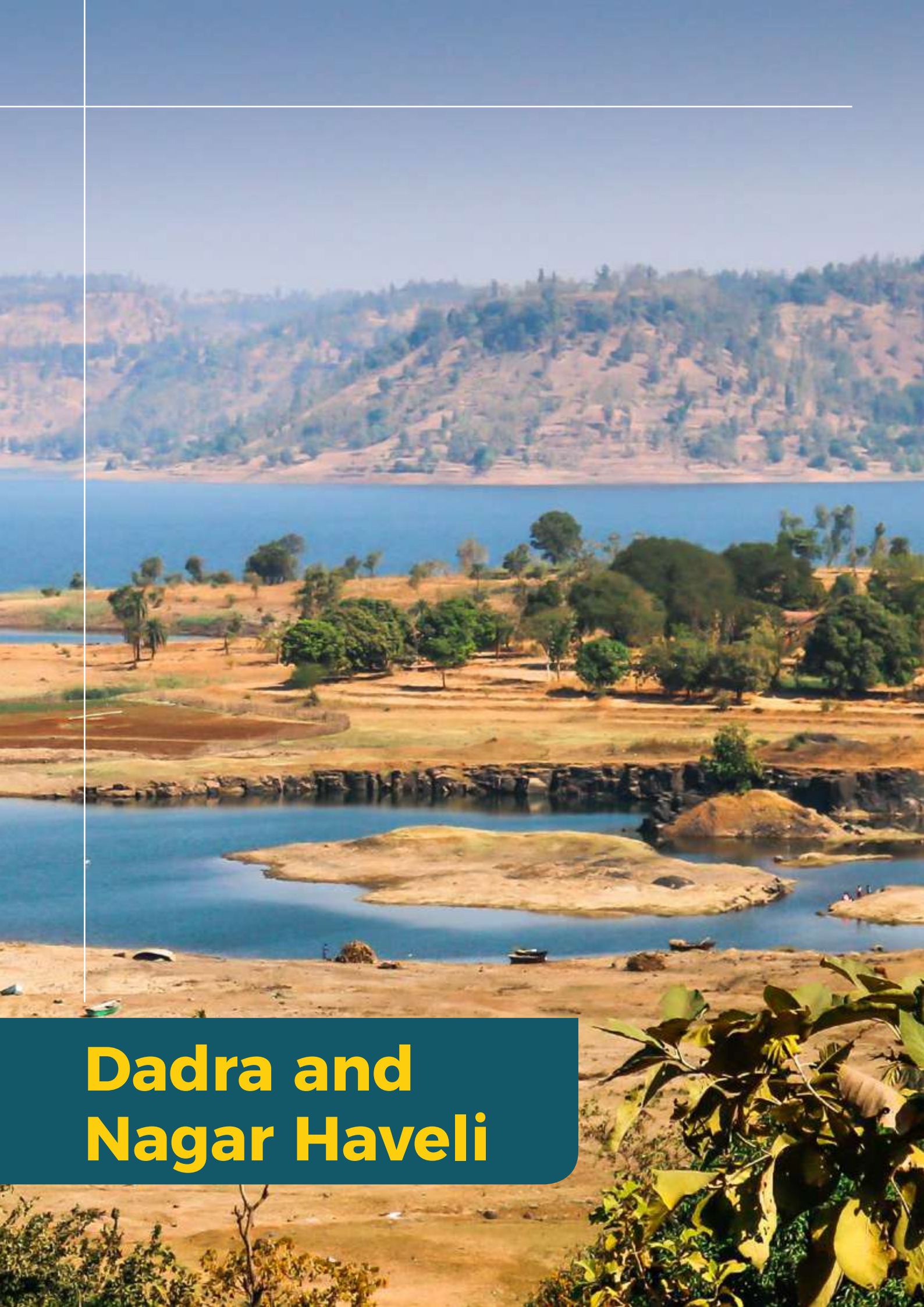
Knowledge Output 6.0

Grassroot innovations	11.85
Patent applications filed	2.09
Trademark applications filed	2.41
Presence of startups	14.83
Industrial Design applications filed	0.2
New businesses registered	12.49
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Dadra and Nagar Haveli

Rank

06

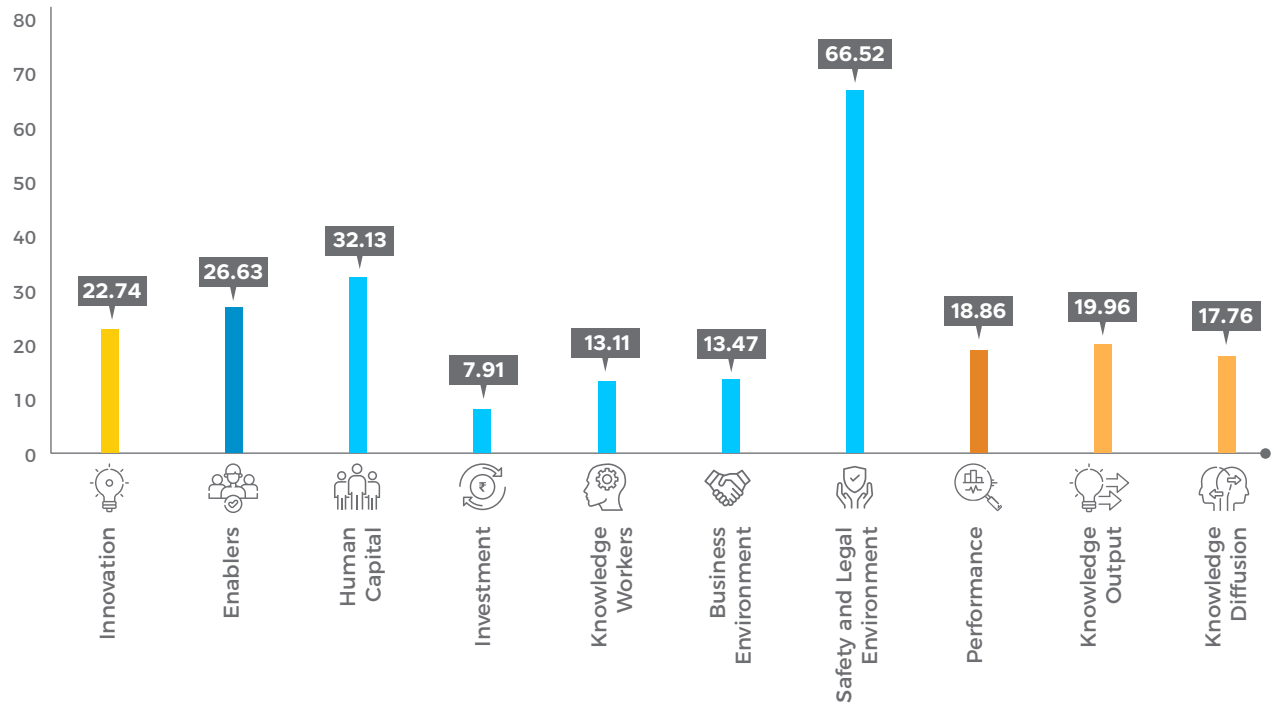
Category

UT / City State

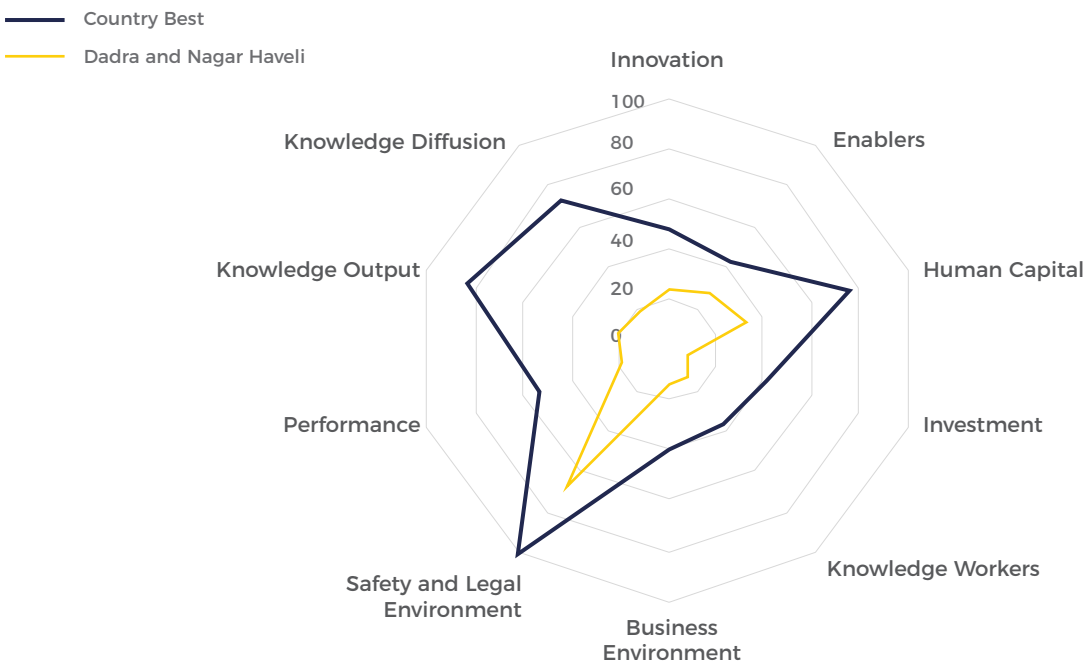
Efficiency Ratio

0.70

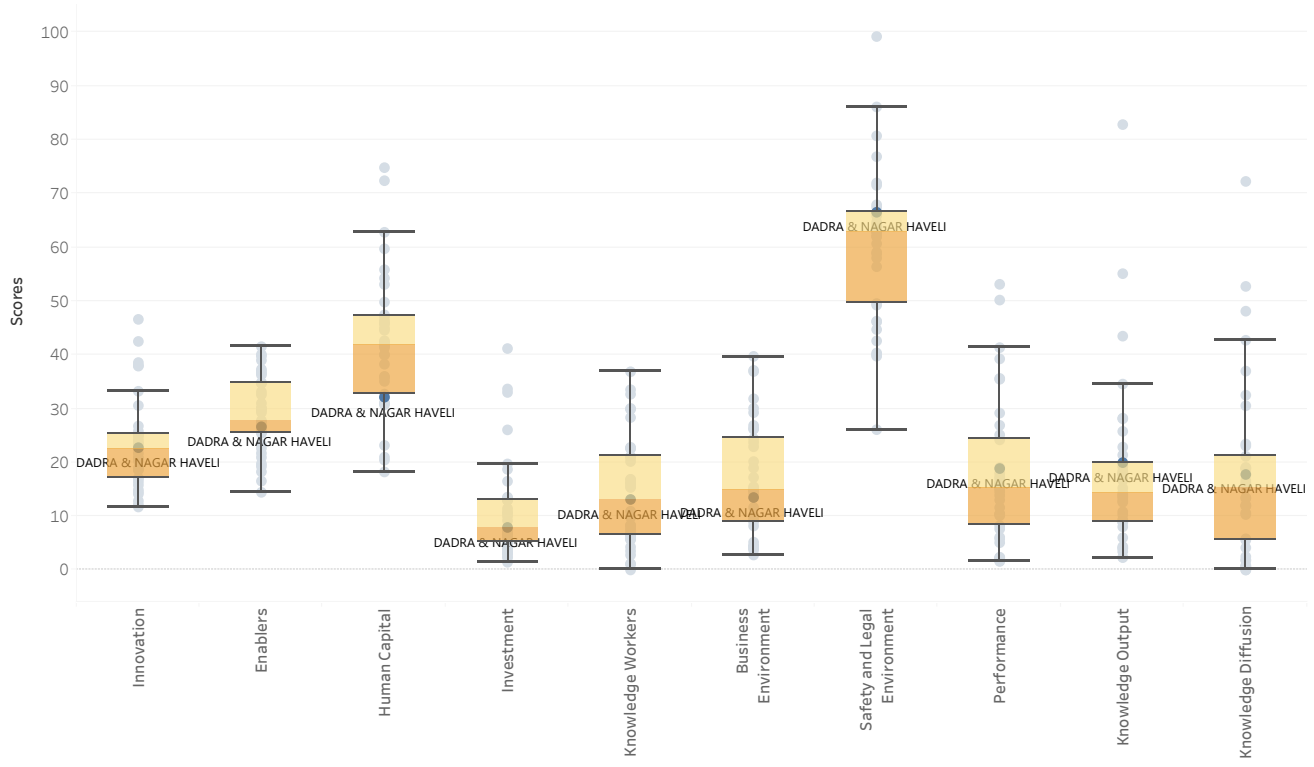
Scores



Country Comparison



Relative Performance



Innovation

22.74

Enablers 26.63

Human Capital 32.13

Enrolment in Ph.D.	0
Enrolment in engineering and technology	9.12
Colleges connected through NMEICT	0
Higher education institutions with NAAC grade A and above	0
Pupil teacher ratio- Higher education	65.31
Schools with ICT labs	83.46
National Achievement Survey (NAS) Scores (Class X)	74.48

Investment 7.91

Expenditure on higher and technical education	39.24
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	0
FDI inflow	7.93
Venture capital deals	0

Knowledge Workers 13.11

Knowledge-intensive employment	8.46
NGOs involved in knowledge intensive areas	0
Private R&D units	51.18
State funded R&D units	0

Business Environment 13.47

Ease of doing business ranking	21.43
Online services transactions	34.24
Internet subscribers	14.37
Incubator centres	0
Common facility centres	0
Cluster Strength	15.45

Safety and Legal Environment 66.52

Information Technology/Intellectual Property related acts	100
Cyber crime police stations	0
Pendency of court cases	90.07

Performance 18.86

Knowledge Diffusion 17.76

ICT exports	0
High and medium high-tech manufacturing entities	100
Geographical Indications (GI) registered	2.27
Citations	0

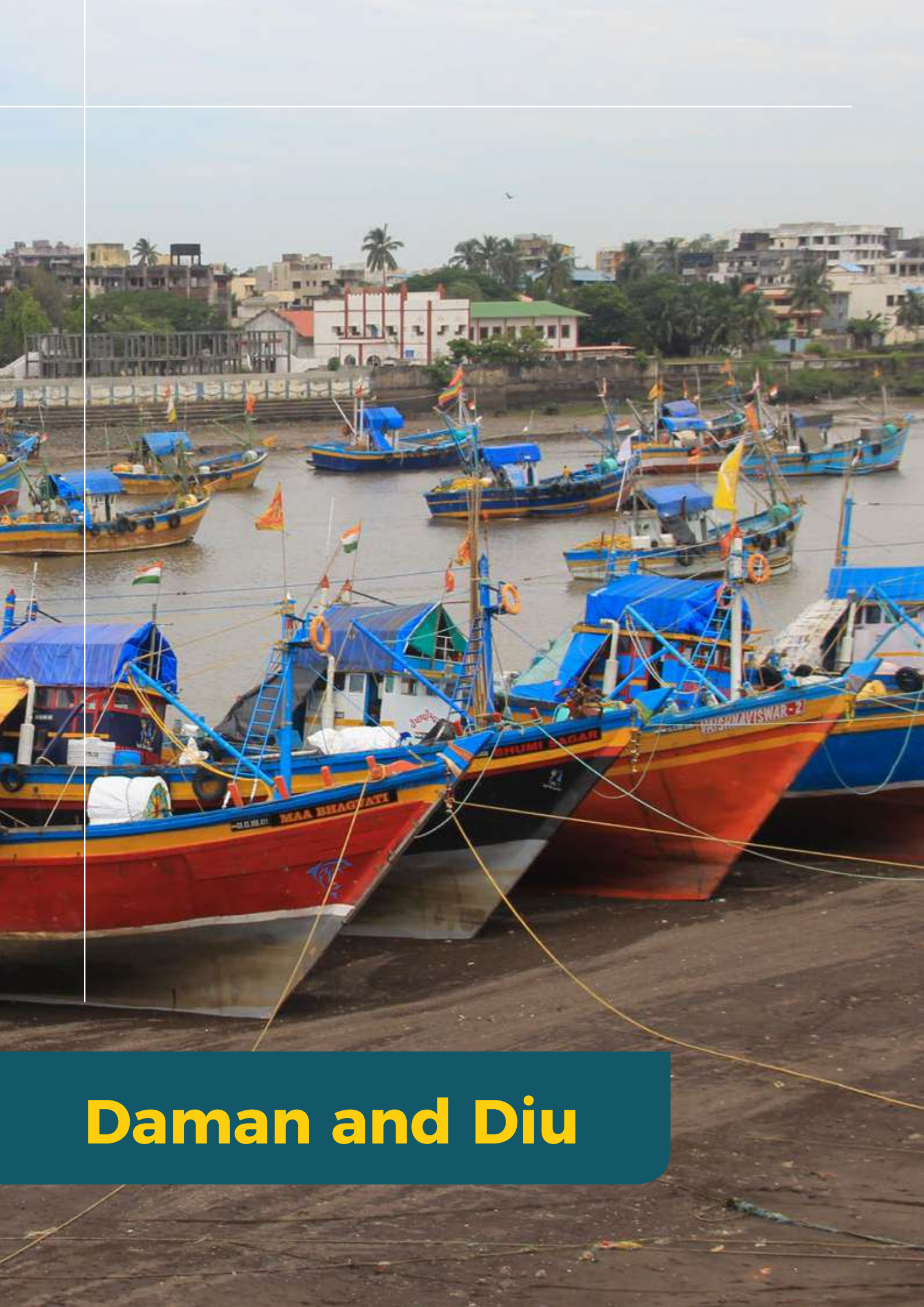
Knowledge Output 19.96

Grassroot innovations	19.9
Patent applications filed	7.39
Trademark applications filed	4.91
Presence of startups	65.21
Industrial Design applications filed	5.78
New businesses registered	29.01
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Daman and Diu

Rank

03

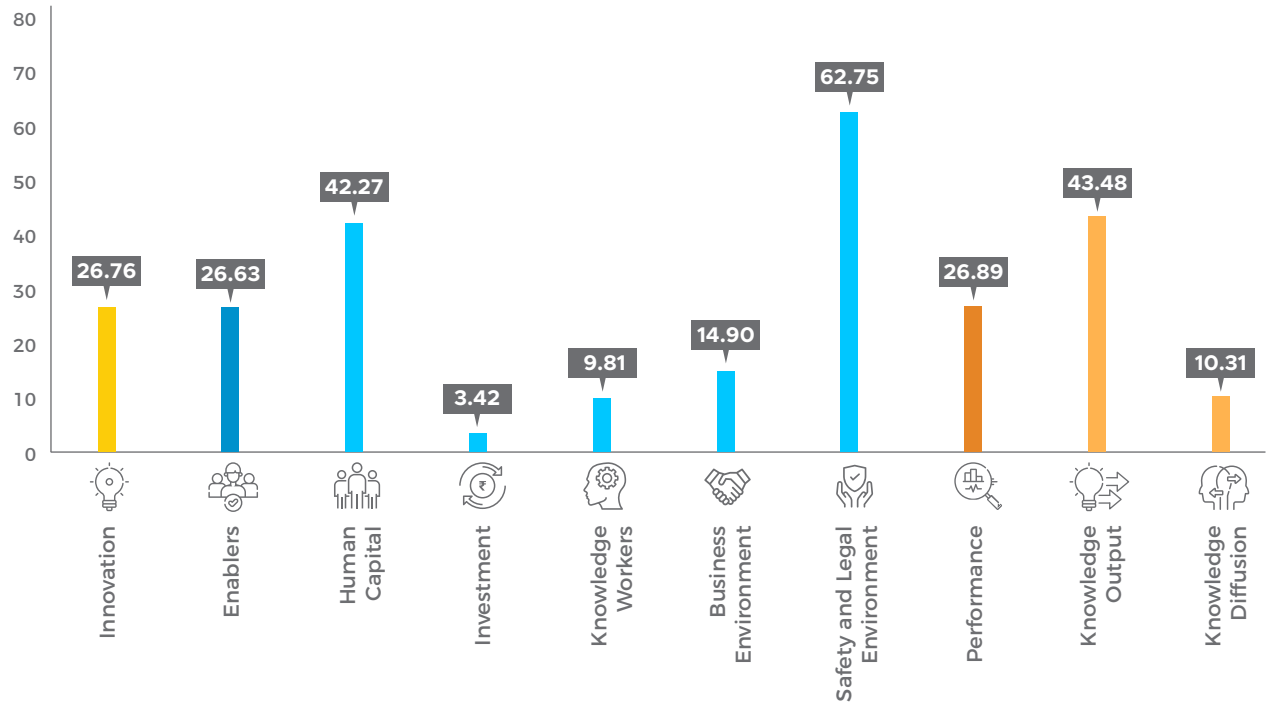
Category

UT/ City State

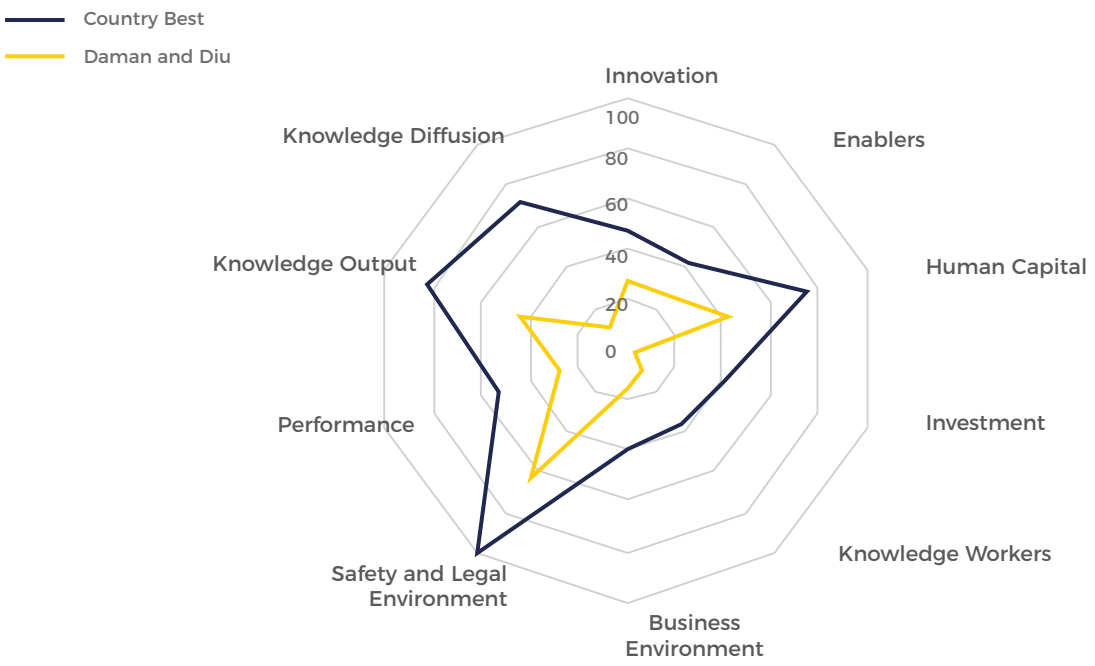
Efficiency Ratio

1.00

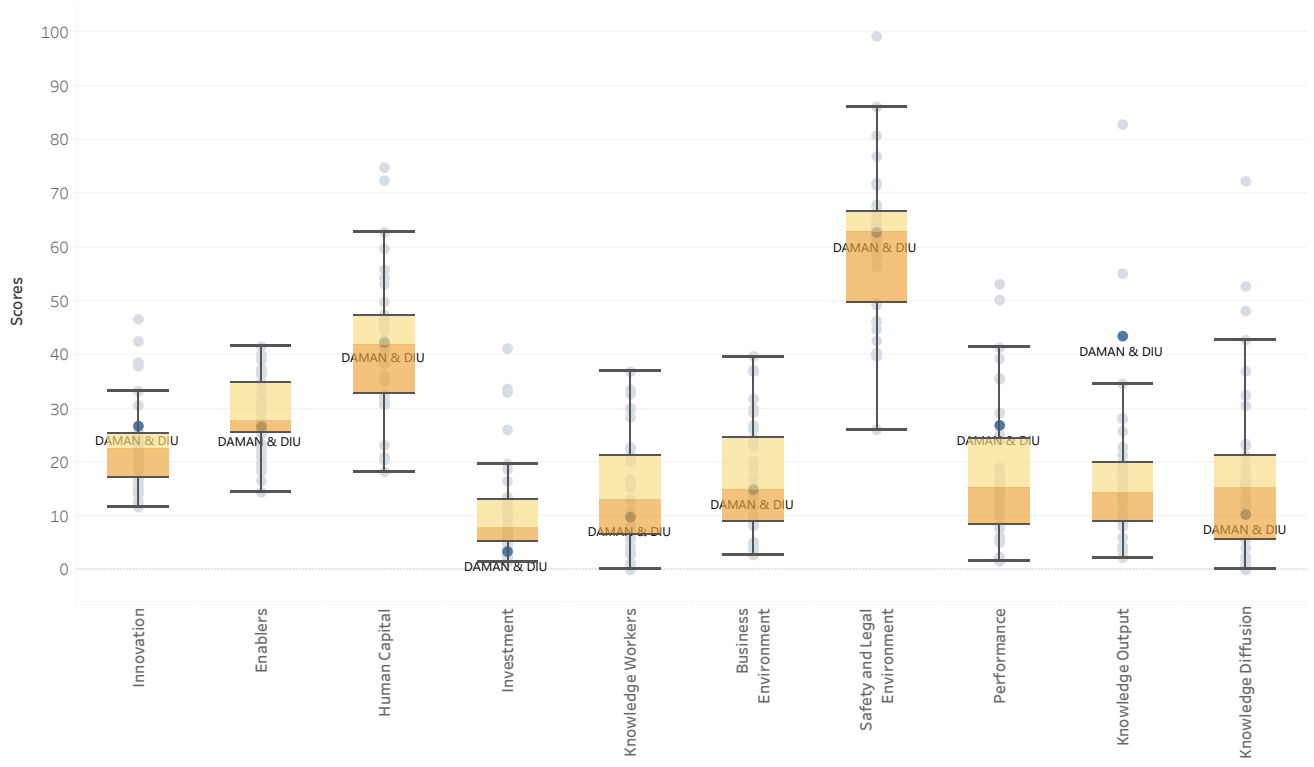
Scores



Country Comparison



Relative Performance



Innovation

26.76

Enablers 26.63

Human Capital 42.27

Enrolment in Ph.D.	0
Enrolment in engineering and technology	21.18
Colleges connected through NMEICT	77.92
Higher education institutions with NAAC grade A and above	0
Pupil teacher ratio- Higher education	95.92
Schools with ICT labs	21.14
National Achievement Survey (NAS) Scores (Class X)	79.54

Investment 3.42

Expenditure on higher and technical education	5.79
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	0
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 9.81

Knowledge-intensive employment	16.98
NGOs involved in knowledge intensive areas	3.6
Private R&D units	18.08
State funded R&D units	0

Business Environment 14.9

Ease of doing business ranking	39.29
Online services transactions	33.87
Internet subscribers	14.37
Incubator centres	0
Common facility centres	0
Cluster Strength	14.63

Safety and Legal Environment 62.75

Information Technology/Intellectual Property related acts	100
Cyber crime police stations	0
Pendency of court cases	78.86

Performance 26.89

Knowledge Diffusion 10.31

ICT exports	0
High and medium high-tech manufacturing entities	56.52
Geographical Indications (GI) registered	2.27
Citations	0

Knowledge Output 43.48

Grassroot innovations	13.43
Patent applications filed	10.44
Trademark applications filed	16.59
Presence of startups	94.63
Industrial Design applications filed	100
New businesses registered	34.37
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Delhi

Rank

01

Category

UT/ City State

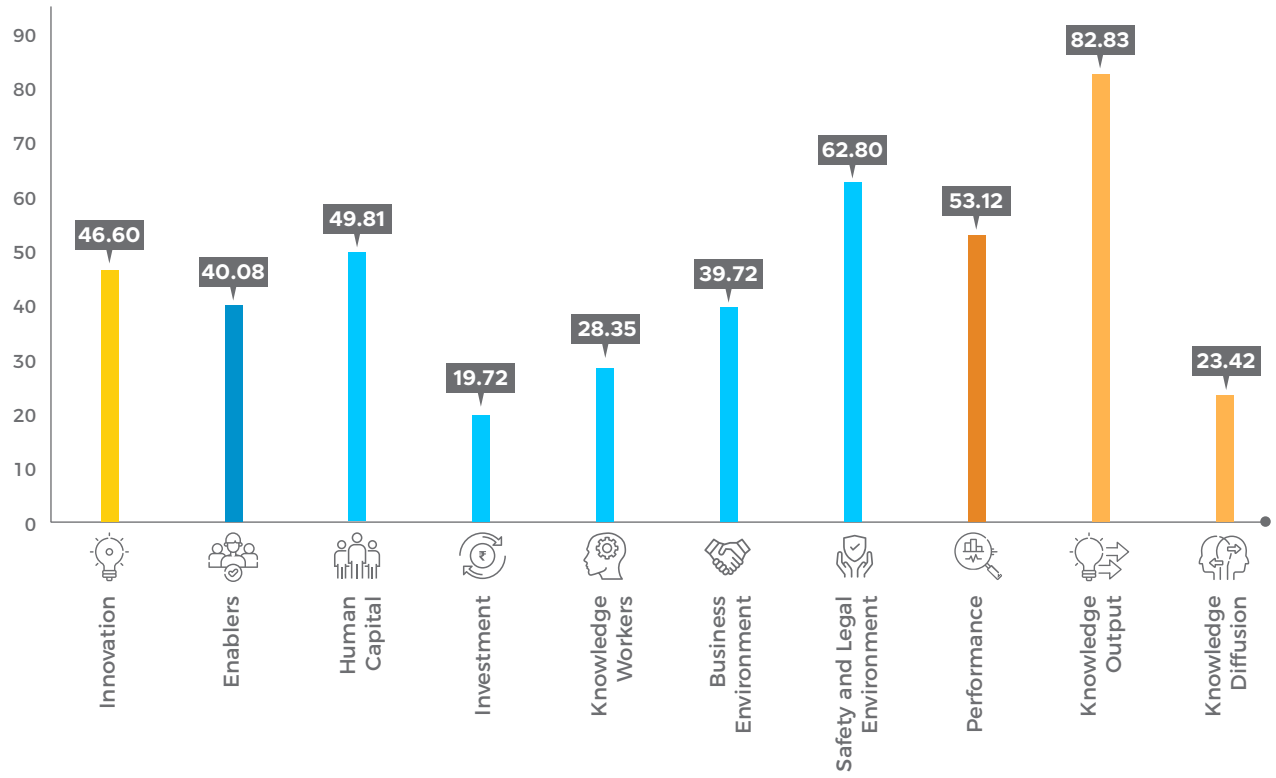
Efficiency Ratio

1.32

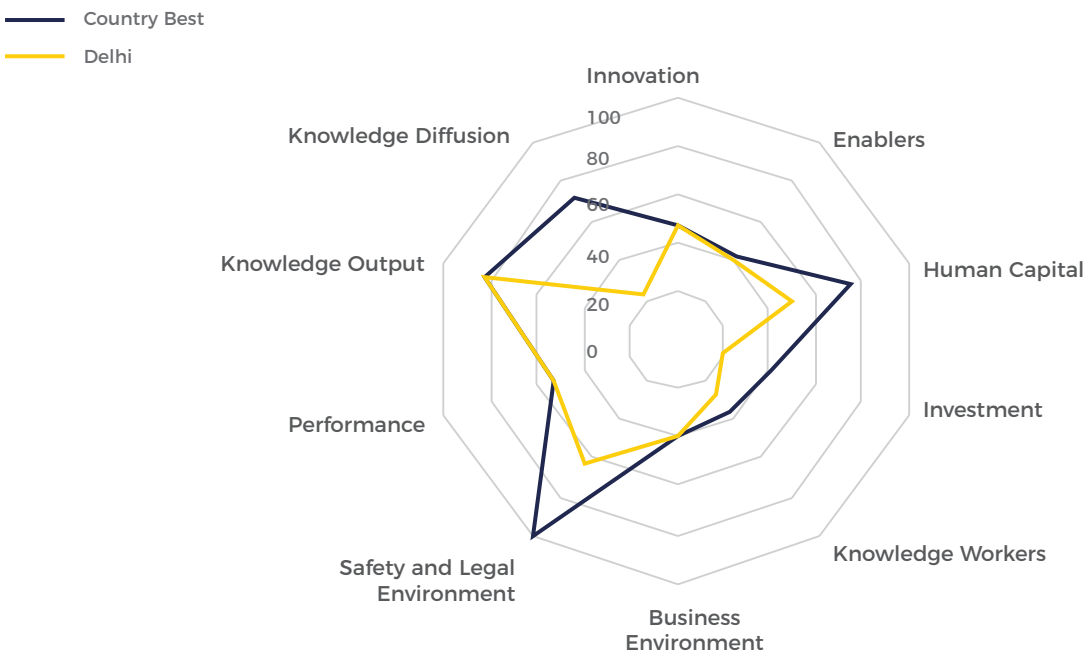
GSDP Per Capita

₹ 2,69,505

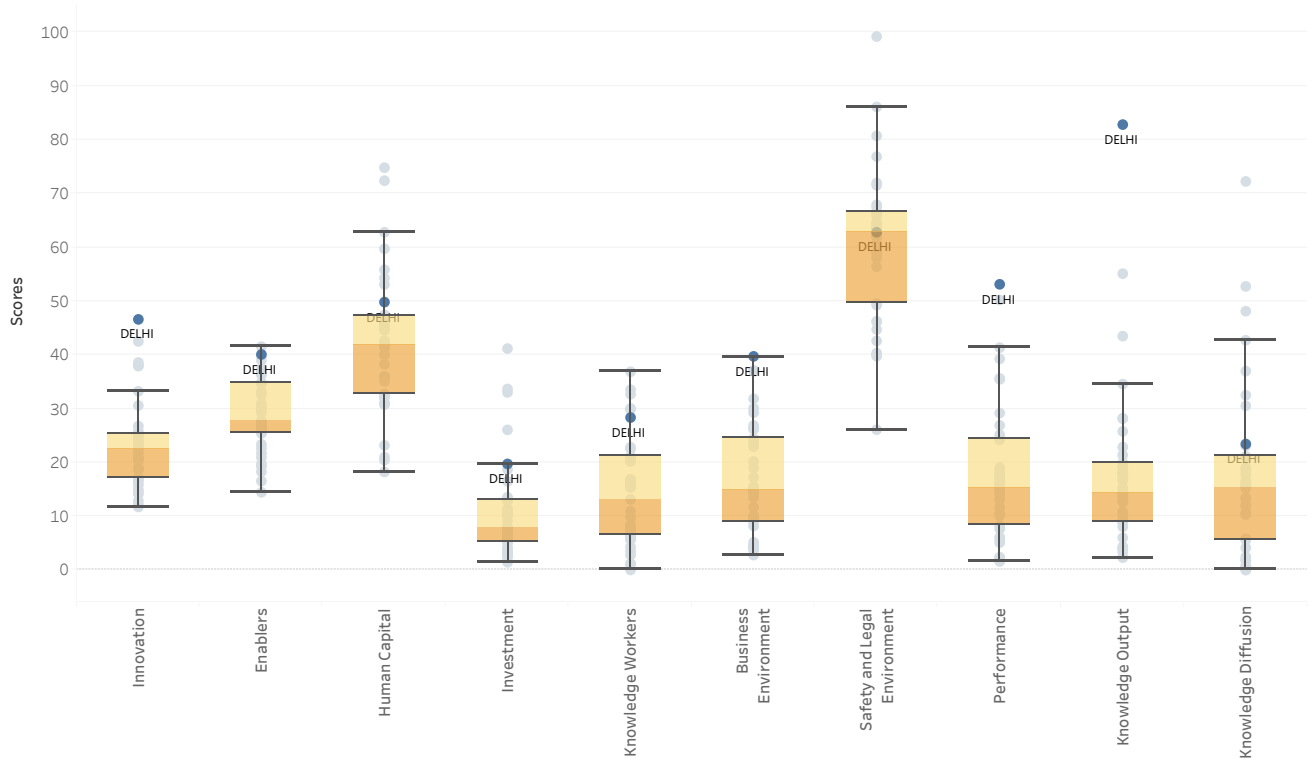
Scores



Country Comparison



Relative Performance



Innovation

46.6

Enablers 40.08

Human Capital 49.81

Enrolment in Ph.D.	68.72
Enrolment in engineering and technology	10.41
Colleges connected through NMEICT	42.34
Higher education institutions with NAAC grade A and above	62.01
Pupil teacher ratio- Higher education	18.37
Schools with ICT labs	50
National Achievement Survey (NAS) Scores (Class X)	100

Investment 19.72

Expenditure on higher and technical education	12.85
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	1.17
FDI inflow	70.43
Venture capital deals	18.39

Knowledge Workers 28.35

Knowledge-intensive employment	13.23
NGOs involved in knowledge intensive areas	24.89
Private R&D units	87.23
State funded R&D units	0

Business Environment 39.72

Ease of doing business ranking	60.71
Online services transactions	13.81
Internet subscribers	100
Incubator centres	14.11
Common facility centres	0
Cluster Strength	47.15

Safety and Legal Environment 62.8

Information Technology/Intellectual Property related acts	85.71
Cyber crime police stations	0
Pendency of court cases	94.43

Performance 53.12

Knowledge Diffusion 23.42

ICT exports	2.08
High and medium high-tech manufacturing entities	40.09
Geographical Indications (GI) registered	2.27
Citations	61.51

Knowledge Output 82.83

Grassroot innovations	5.56
Patent applications filed	100
Trademark applications filed	100
Presence of startups	100
Industrial Design applications filed	22.75
New businesses registered	100
Publications	59.98

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Goa

Rank

05

Category

UT/ City State

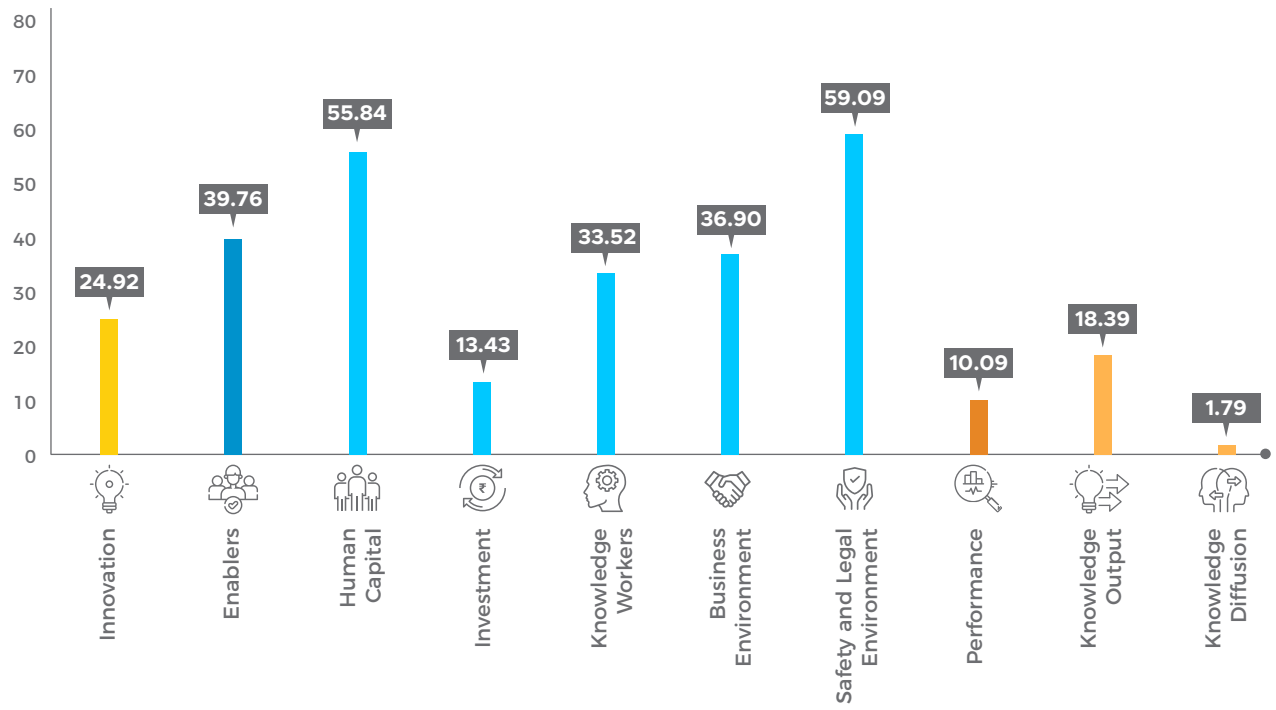
Efficiency Ratio

0.25

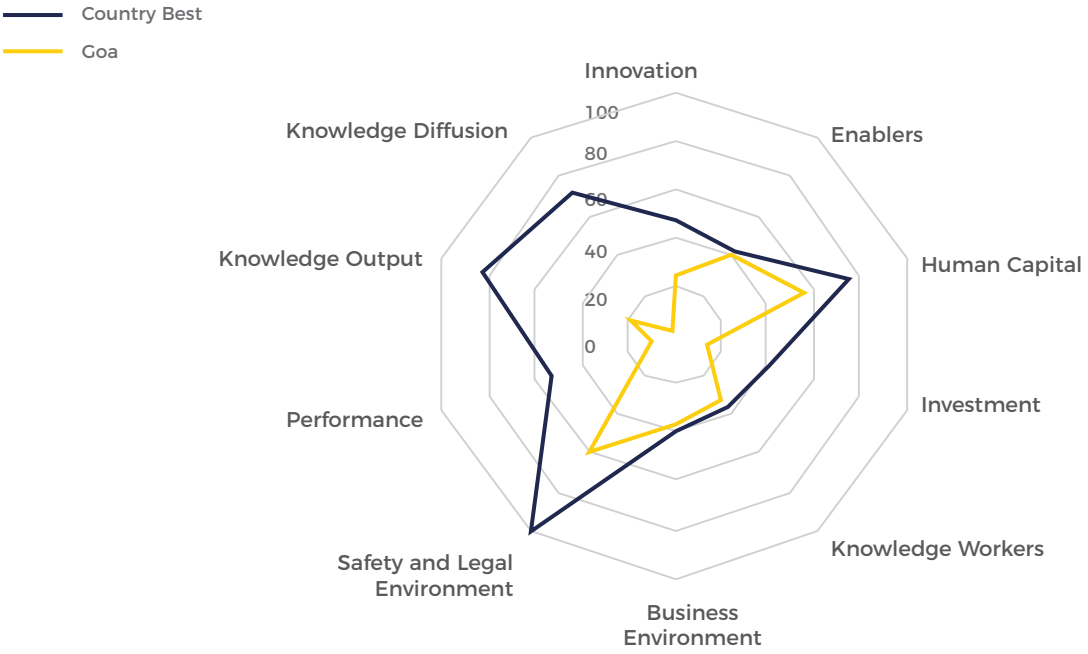
GSDP Per Capita

₹ 3,68,685

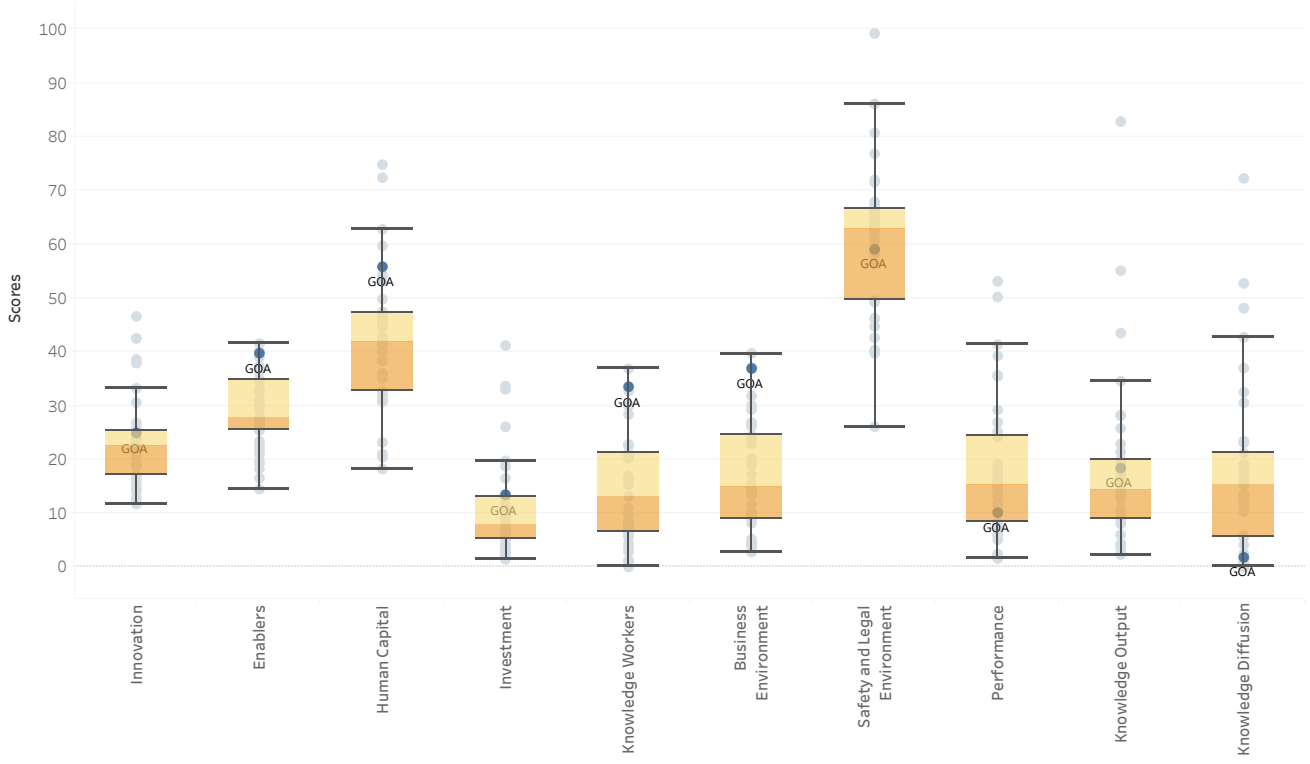
Scores



Country Comparison



Relative Performance



Innovation

24.92

Enablers 39.76

Human Capital 55.84

Enrolment in Ph.D.	24.88
Enrolment in engineering and technology	35.82
Colleges connected through NMEICT	22.86
Higher education institutions with NAAC grade A and above	48.21
Pupil teacher ratio- Higher education	91.84
Schools with ICT labs	71.39
National Achievement Survey (NAS) Scores (Class X)	94.95

Investment 13.43

Expenditure on higher and technical education	38.36
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	25.14
FDI inflow	8.66
Venture capital deals	0

Knowledge Workers 33.52

Knowledge-intensive employment	51.05
NGOs involved in knowledge intensive areas	1.8
Private R&D units	69.35
State funded R&D units	13.84

Business Environment 36.9

Ease of doing business ranking	17.86
Online services transactions	8.81
Internet subscribers	25.73
Incubator centres	20.29
Common facility centres	100
Cluster Strength	36.59

Safety and Legal Environment 59.09

Information Technology/Intellectual Property related acts	82.42
Cyber crime police stations	41.86
Pendency of court cases	49.36

Performance 10.09

Knowledge Diffusion 1.79

ICT exports	0.98
High and medium high-tech manufacturing entities	5.06
Geographical Indications (GI) registered	2.27
Citations	0

Knowledge Output 18.39

Grassroot innovations	4.81
Patent applications filed	38.31
Trademark applications filed	14.43
Presence of startups	22.1
Industrial Design applications filed	0.85
New businesses registered	26.76
Publications	0

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Strength and Weakness is relative to 10 states with similar GDP
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- 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

Gujarat

Rank

08

Category

Major State

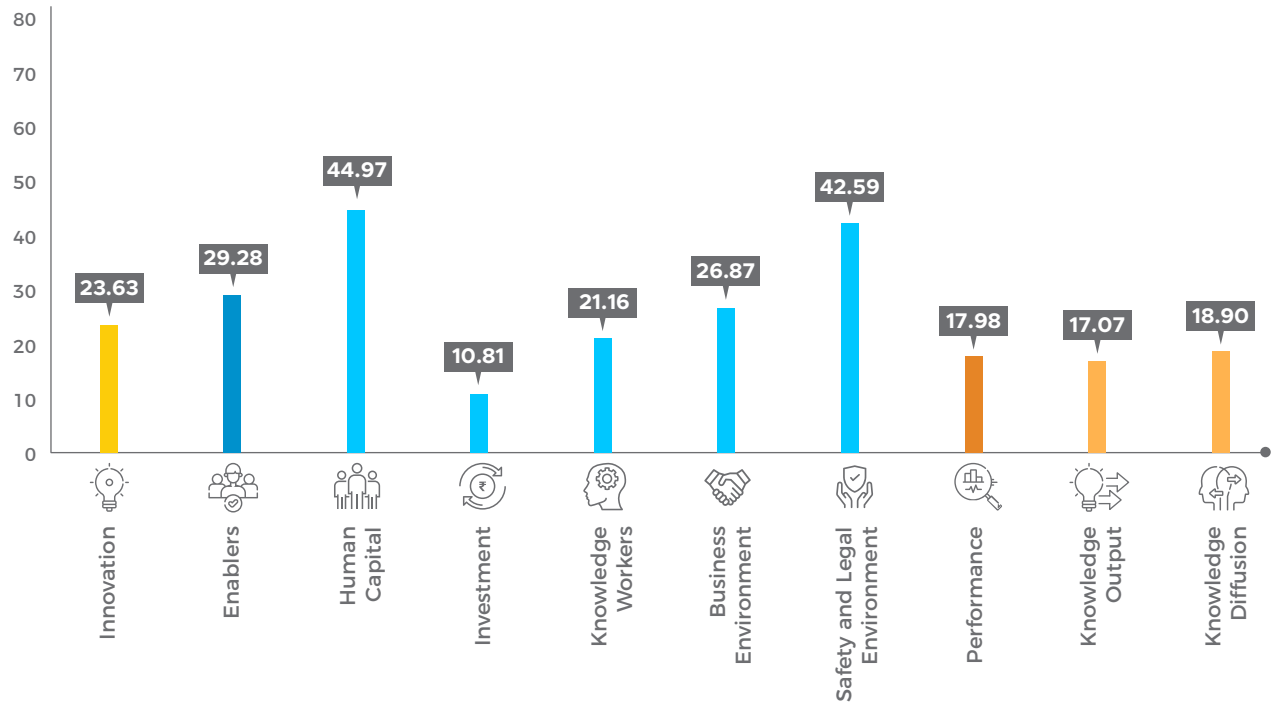
Efficiency Ratio

0.61

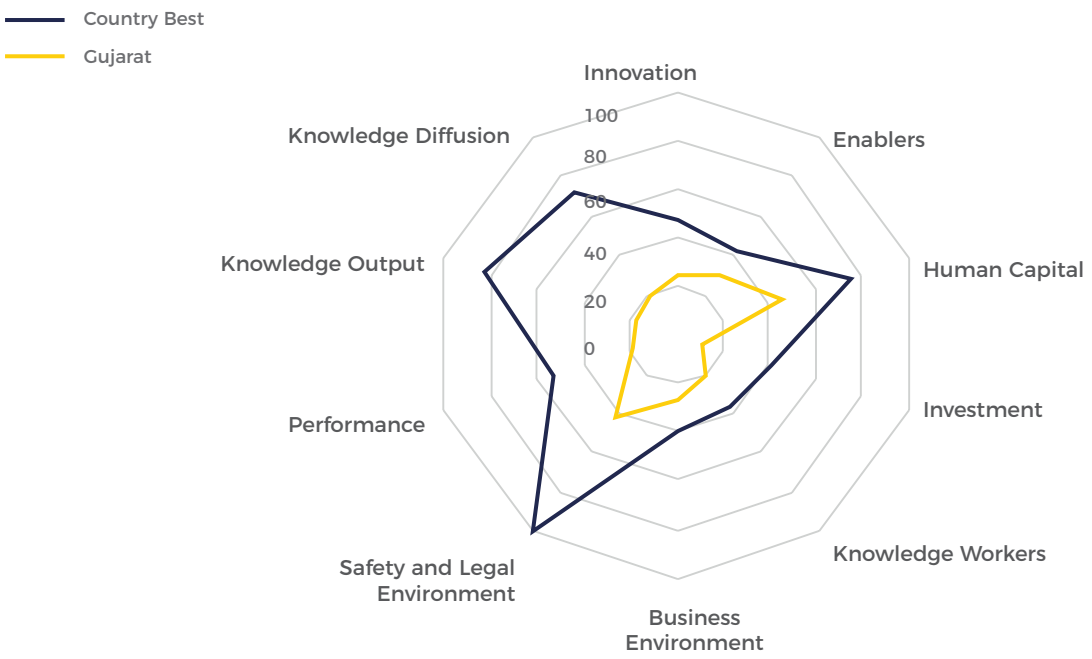
GSDP Per Capita

₹ 1,53,495

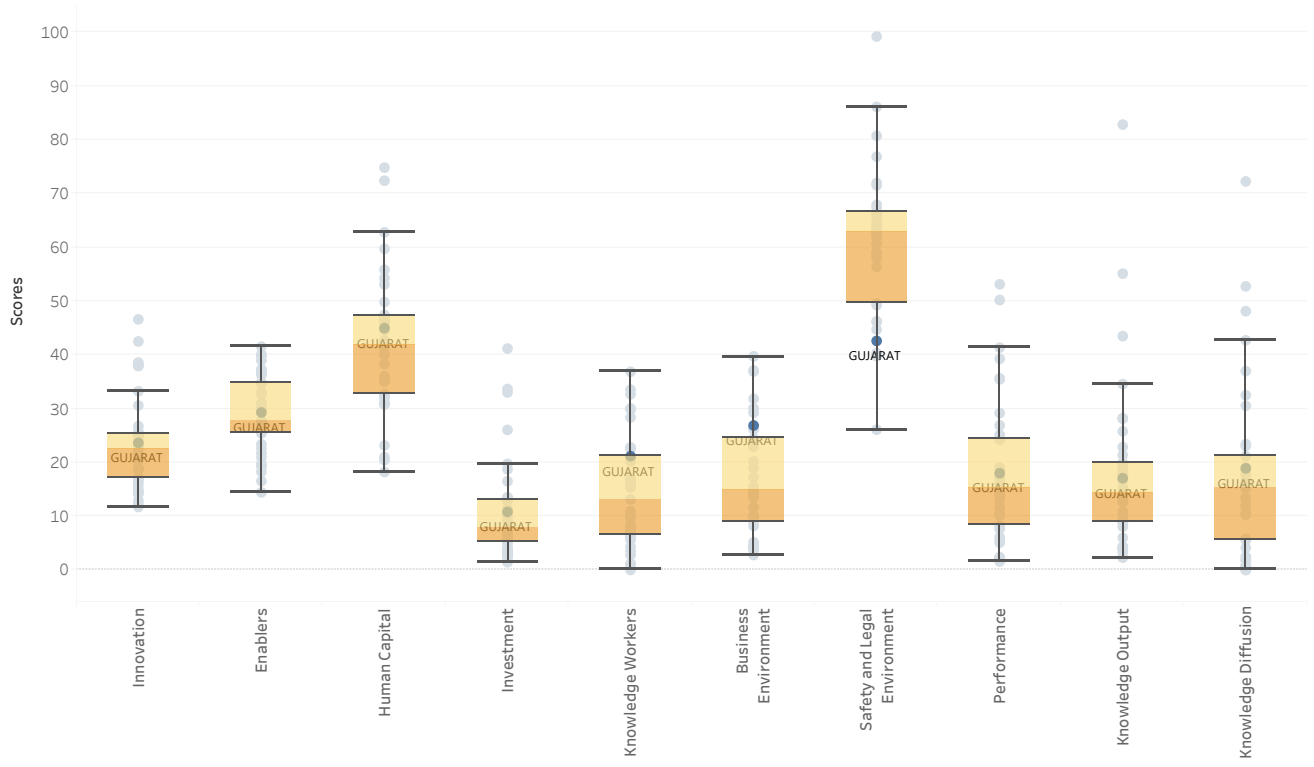
Scores



Country Comparison



Relative Performance



Innovation

23.63

Enablers 29.28

Human Capital 44.97

Enrolment in Ph.D.	12
Enrolment in engineering and technology	25.53
Colleges connected through NMEICT	68.83
Higher education institutions with NAAC grade A and above	2.34
Pupil teacher ratio- Higher education	71.43
Schools with ICT labs	58.21
National Achievement Survey (NAS) Scores (Class X)	81.53

Investment 10.81

Expenditure on higher and technical education	3.43
Expenditure on research and development (State govt.)	9.53
Expenditure on science, technology and environment	15.35
FDI inflow	21.13
Venture capital deals	3.25

Knowledge Workers 21.16

Knowledge-intensive employment	18.77
NGOs involved in knowledge intensive areas	4.33
Private R&D units	25.98
State funded R&D units	38.42

Business Environment 26.87

Ease of doing business ranking	67.86
Online services transactions	34.06
Internet subscribers	19.97
Incubator centres	2.24
Common facility centres	4.22
Cluster Strength	59.35

Safety and Legal Environment 42.59

Information Technology/Intellectual Property related acts	92.31
Cyber crime police stations	0
Pendency of court cases	27.14

Performance 17.98

Knowledge Diffusion 18.9

ICT exports	1.67
High and medium high-tech manufacturing entities	5.06
Geographical Indications (GI) registered	36.36
Citations	30.61

Knowledge Output 17.07

Grassroot innovations	28.89
Patent applications filed	18.24
Trademark applications filed	14.97
Presence of startups	17.01
Industrial Design applications filed	4.89
New businesses registered	21.75
Publications	27.84

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- 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

DLF
The sinful
Silk Oreo Red Velvet
OREO
cvent
BOSS EVERY CHALLENGE

Haryana

Rank

06

Category

Major State

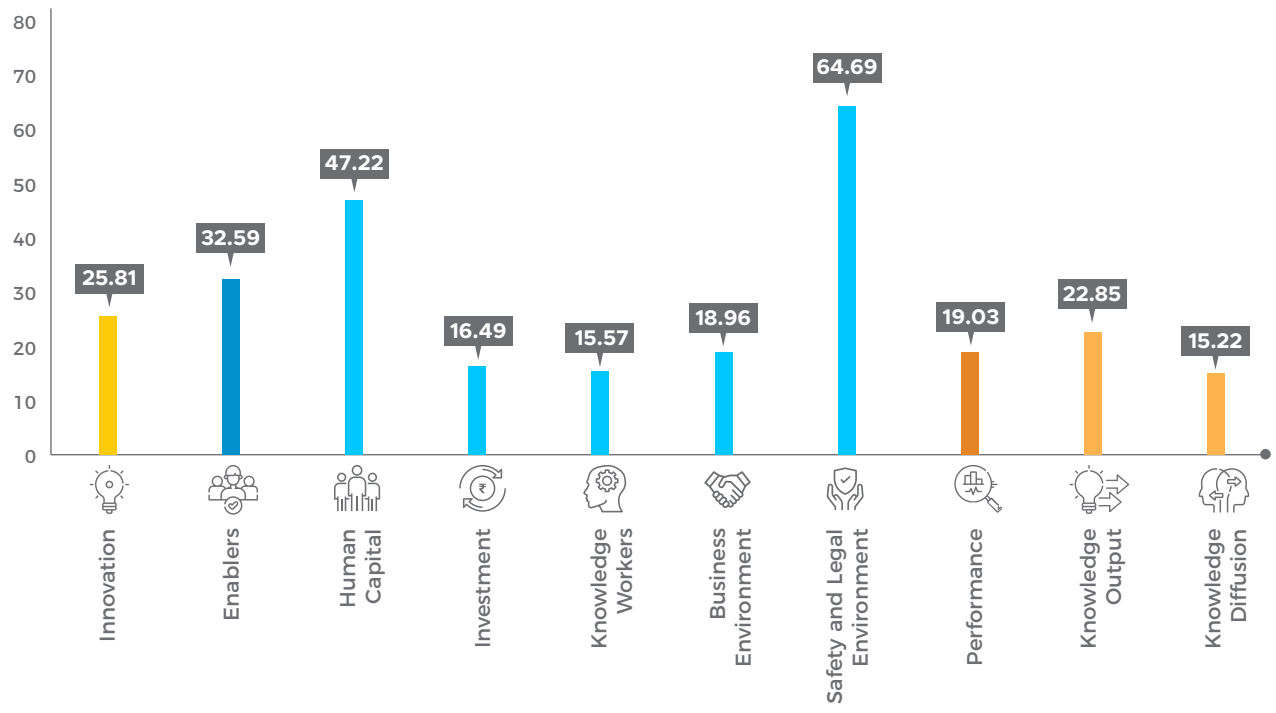
Efficiency Ratio

0.58

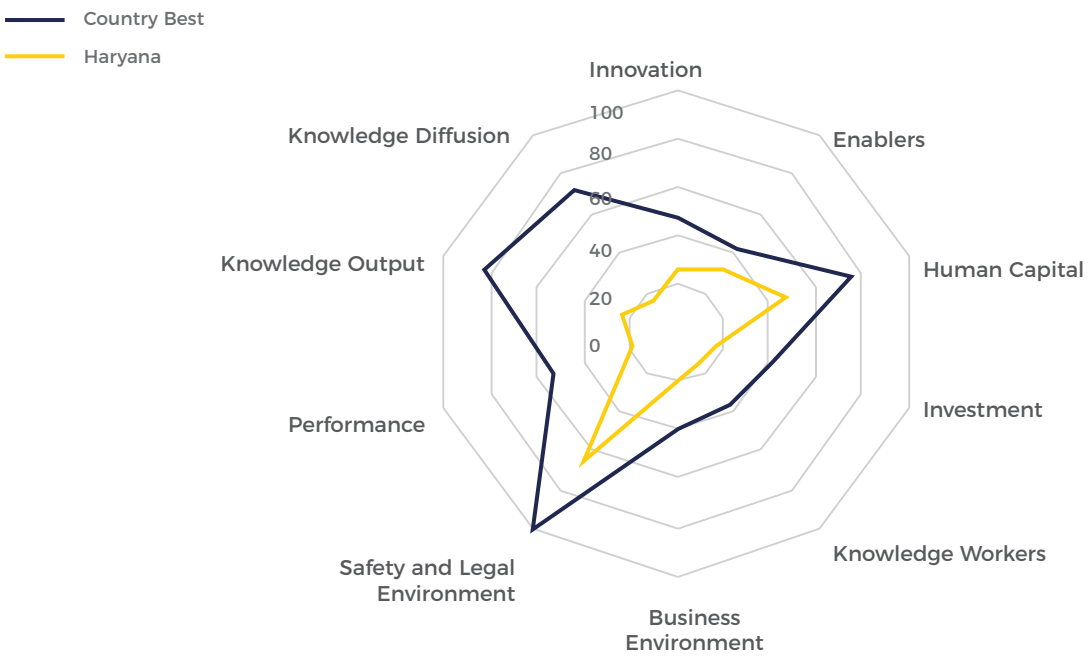
GSDP Per Capita

₹ 1,69,409

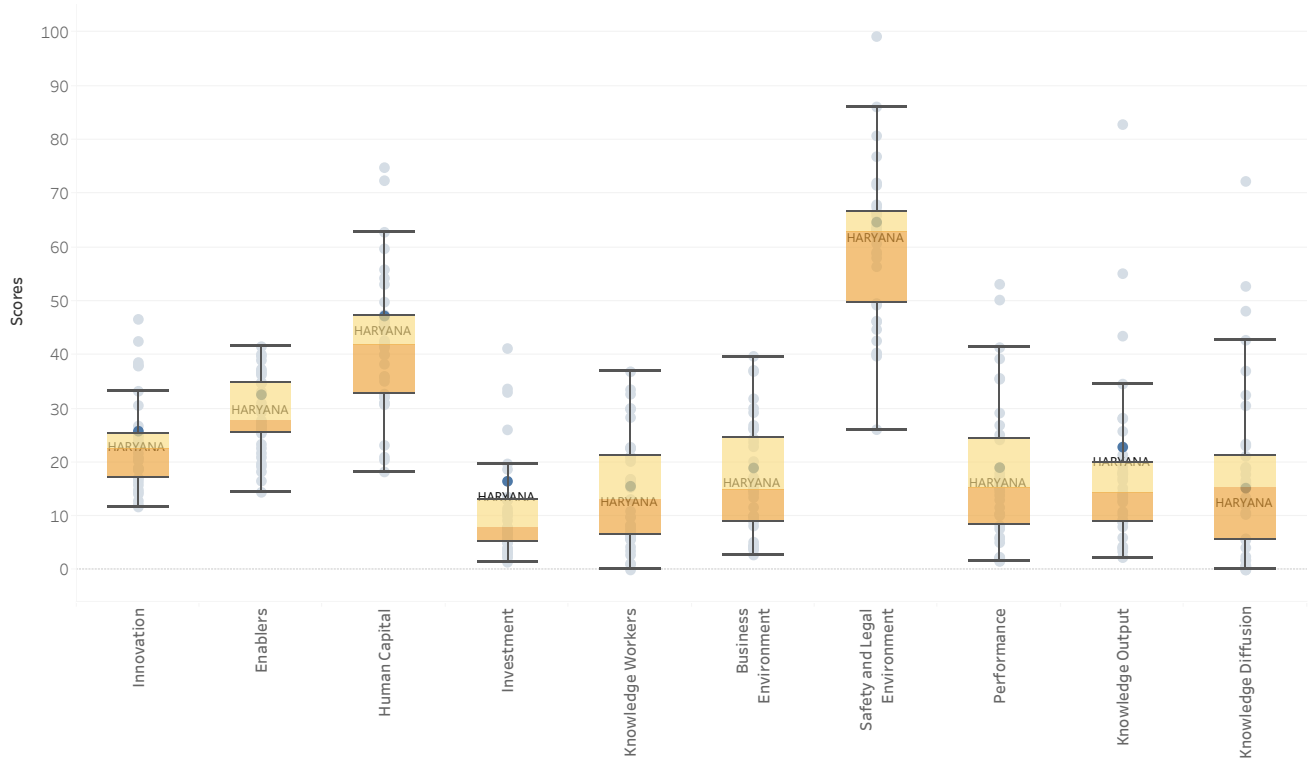
Scores



Country Comparison



Relative Performance



Innovation

25.81

Enablers 32.59

Human Capital 47.22

Enrolment in Ph.D.	18.6
Enrolment in engineering and technology	35.17
Colleges connected through NMEICT	69.87
Higher education institutions with NAAC grade A and above	5.07
Pupil teacher ratio- Higher education	71.43
Schools with ICT labs	52.49
National Achievement Survey (NAS) Scores (Class X)	81.53

Investment 16.49

Expenditure on higher and technical education	14.79
Expenditure on research and development (State govt.)	8.8
Expenditure on science, technology and environment	1.89
FDI inflow	15.15
Venture capital deals	43.62

Knowledge Workers 15.57

Knowledge-intensive employment	11.66
NGOs involved in knowledge intensive areas	3.28
Private R&D units	37.99
State funded R&D units	14.34

Business Environment 18.96

Ease of doing business ranking	46.43
Online services transactions	14.77
Internet subscribers	16.63
Incubator centres	2.84
Common facility centres	14.43
Cluster Strength	34.15

Safety and Legal Environment 64.69

Information Technology/Intellectual Property related acts	82.42
Cyber crime police stations	4.82
Pendency of court cases	99.29

Performance 19.03

Knowledge Diffusion 15.22

ICT exports	30.84
High and medium high-tech manufacturing entities	26.34
Geographical Indications (GI) registered	4.55
Citations	0

Knowledge Output 22.85

Grassroot innovations	24.81
Patent applications filed	26.05
Trademark applications filed	19.78
Presence of startups	32.31
Industrial Design applications filed	4.02
New businesses registered	40.97
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- Overperforming
- Performing within expected range
- Underperforming

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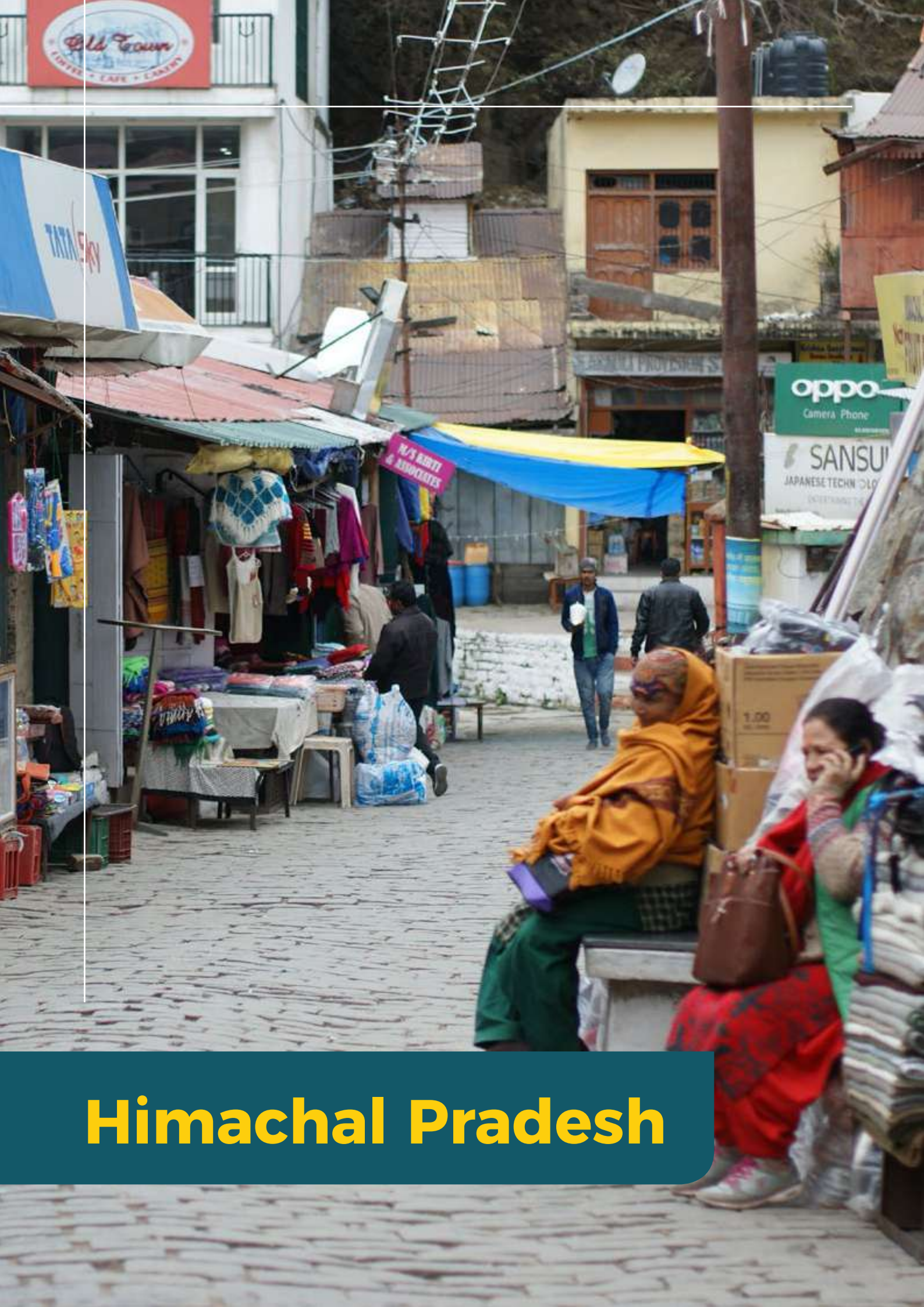


Himachal Pradesh

Rank

01

Category

North East and Hill State

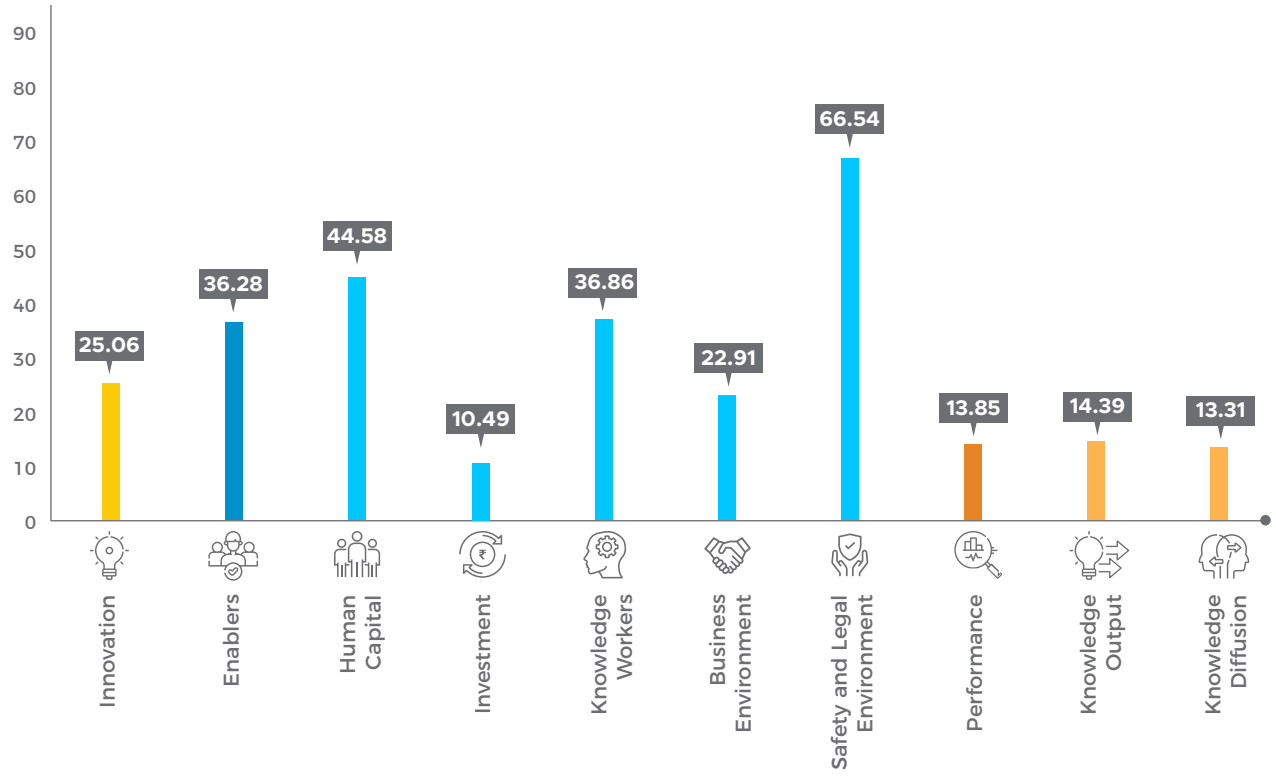
Efficiency Ratio

0.38

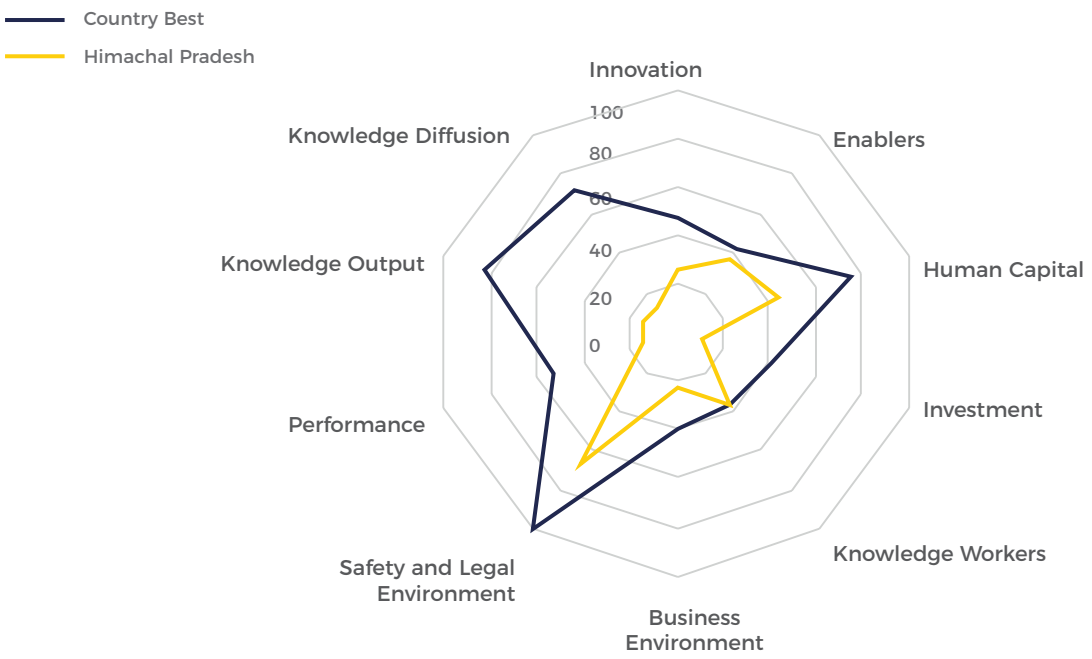
GSDP Per Capita

₹ 1,39,469

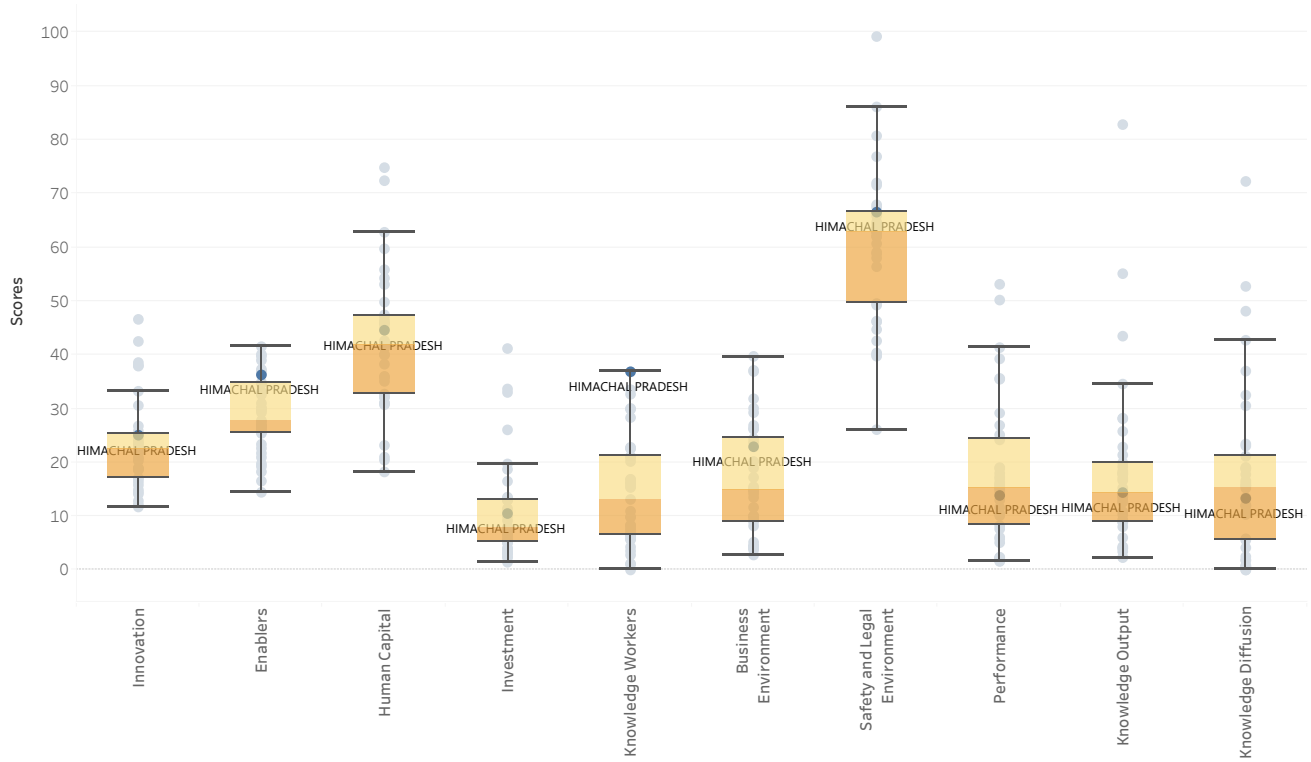
Scores



Country Comparison



Relative Performance



Innovation

25.06

Enablers 36.28

Human Capital 44.58

Enrolment in Ph.D.	34.2
Enrolment in engineering and technology	18.56
Colleges connected through NMEICT	52.73
Higher education institutions with NAAC grade A and above	2.29
Pupil teacher ratio- Higher education	69.39
Schools with ICT labs	62.69
National Achievement Survey (NAS) Scores (Class X)	81.15

Investment 10.49

Expenditure on higher and technical education	38.65
Expenditure on research and development (State govt.)	17.61
Expenditure on science, technology and environment	0.29
FDI inflow	1.18
Venture capital deals	0

Knowledge Workers 36.86

Knowledge-intensive employment	37.29
NGOs involved in knowledge intensive areas	4.08
Private R&D units	5.13
State funded R&D units	100

Business Environment 22.91

Ease of doing business ranking	78.57
Online services transactions	20.61
Internet subscribers	29.75
Incubator centres	1.23
Common facility centres	0
Cluster Strength	34.96

Safety and Legal Environment 66.54

Information Technology/Intellectual Property related acts	87.91
Cyber crime police stations	8.89
Pendency of court cases	95.21

Performance 13.85

Knowledge Diffusion 13.31

ICT exports	0.05
High and medium high-tech manufacturing entities	1.61
Geographical Indications (GI) registered	20.45
Citations	29.88

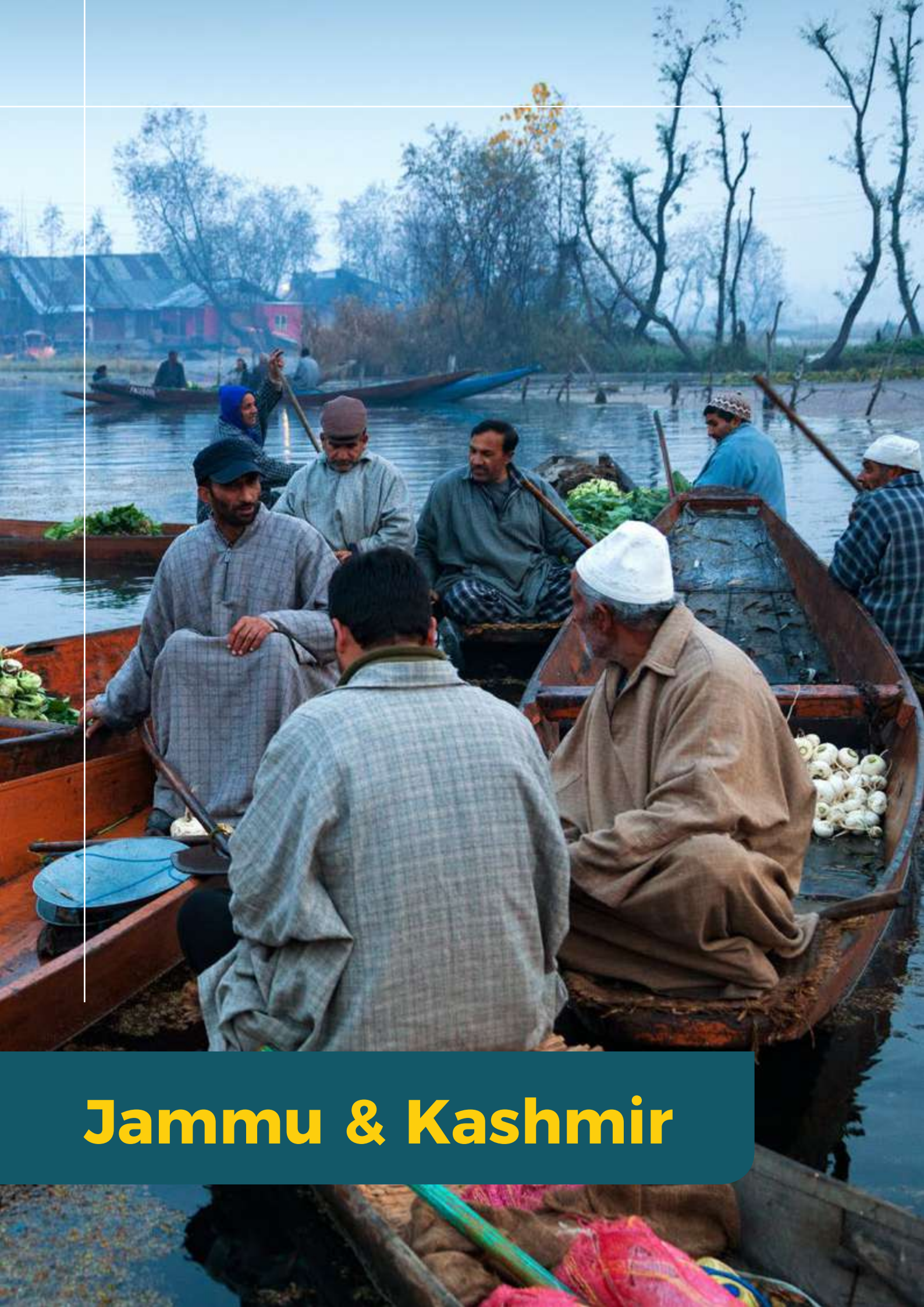
Knowledge Output 14.39

Grassroot innovations	15.93
Patent applications filed	35.7
Trademark applications filed	4.9
Presence of startups	7.98
Industrial Design applications filed	2.39
New businesses registered	12.07
Publications	33.92

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Jammu & Kashmir

Rank

08

Category

UT/ City State

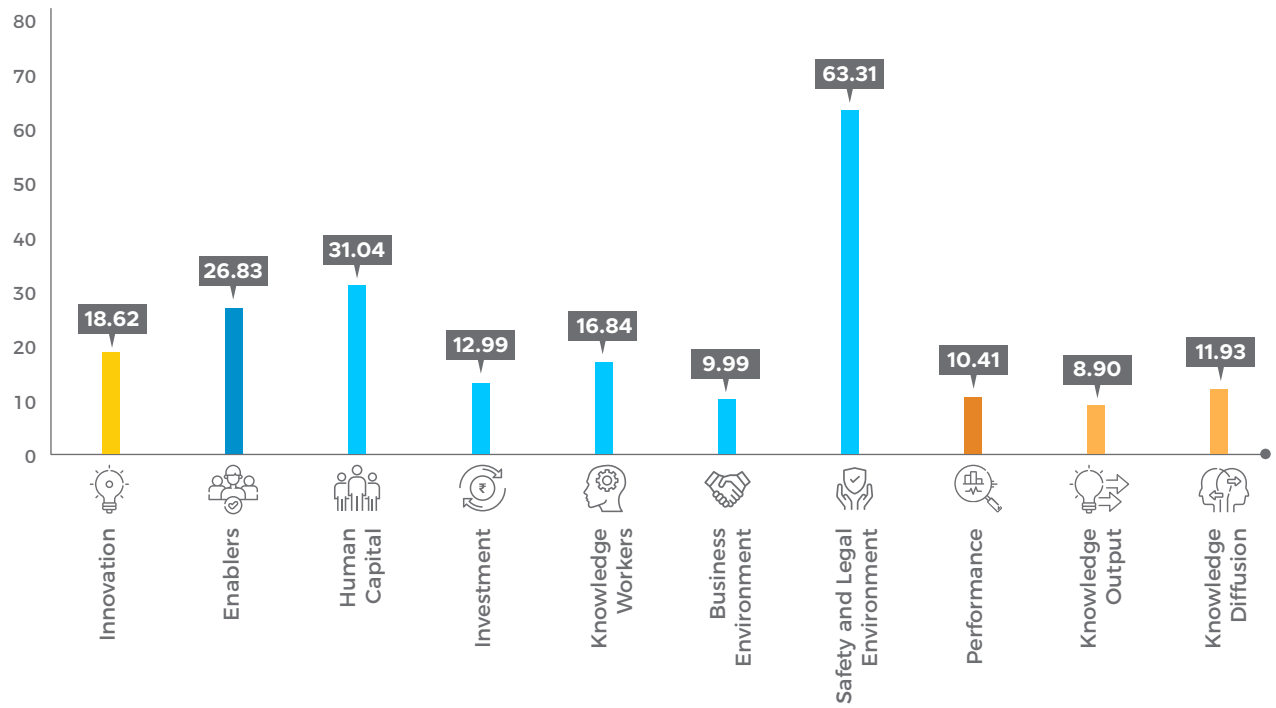
Efficiency Ratio

0.38

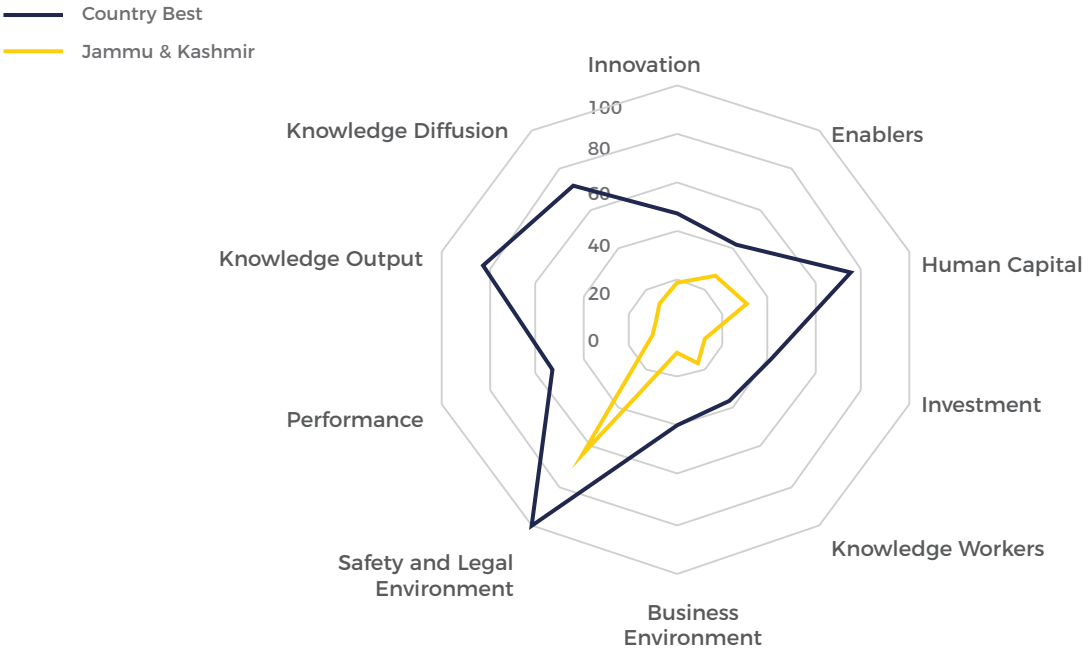
GSDP Per Capita

₹ 65,178

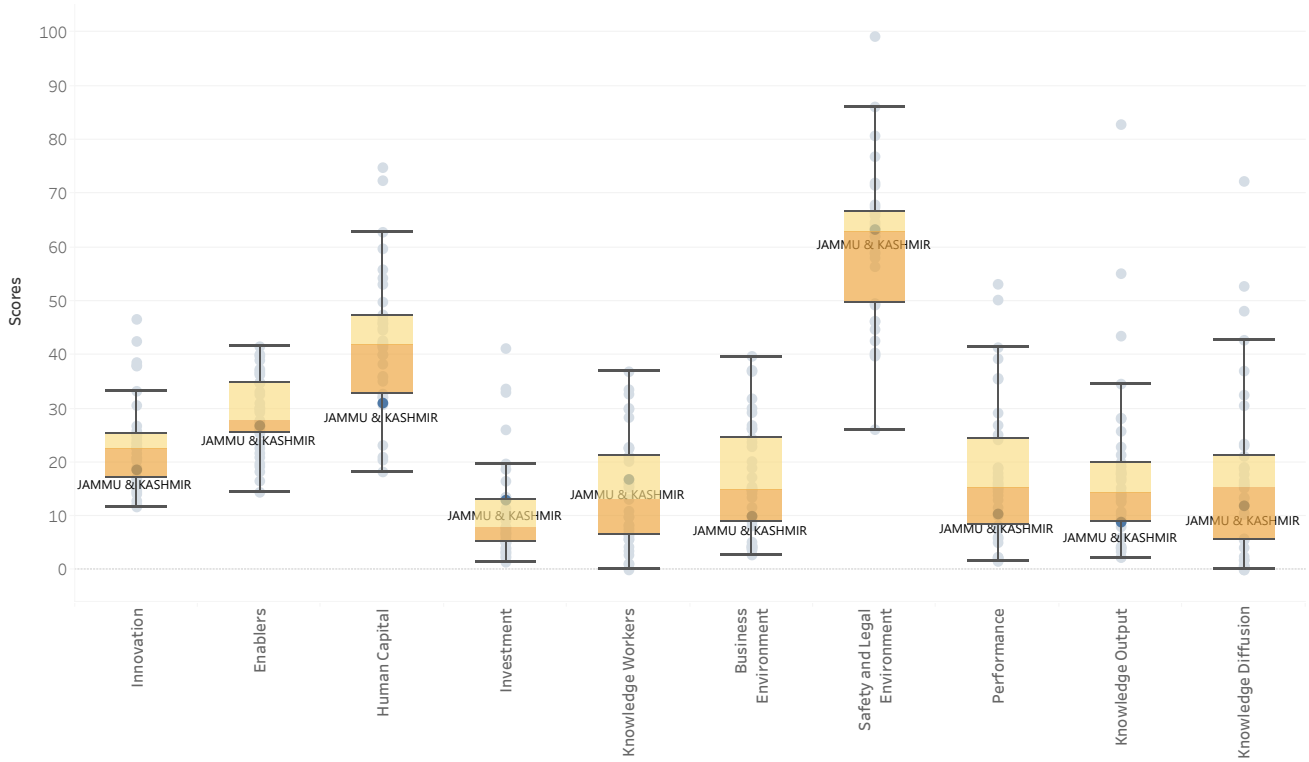
Scores



Country Comparison



Relative Performance



Innovation

18.62

Enablers 26.83

Human Capital 31.04

Enrolment in Ph.D.	26.22
Enrolment in engineering and technology	9.5
Colleges connected through NMEICT	38.7
Higher education institutions with NAAC grade A and above	0
Pupil teacher ratio- Higher education	53.06
Schools with ICT labs	22.89
National Achievement Survey (NAS) Scores (Class X)	70.64

Investment 12.99

Expenditure on higher and technical education	19.44
Expenditure on research and development (State govt.)	32.12
Expenditure on science, technology and environment	0.9
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 16.84

Knowledge-intensive employment	12.26
NGOs involved in knowledge intensive areas	9.71
Private R&D units	0.35
State funded R&D units	45.08

Business Environment 9.99

Ease of doing business ranking	28.57
Online services transactions	0.73
Internet subscribers	15.13
Incubator centres	1.01
Common facility centres	9.87
Cluster Strength	12.2

Safety and Legal Environment 63.31

Information Technology/Intellectual Property related acts	94.51
Cyber crime police stations	9.74
Pendency of court cases	77.71

Performance 10.41

Knowledge Diffusion 11.93

ICT exports	0.03
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	20.45
Citations	25.48

Knowledge Output 8.9

Grassroot innovations	27.04
Patent applications filed	4.05
Trademark applications filed	2.9
Presence of startups	14.85
Industrial Design applications filed	0.06
New businesses registered	13.72
Publications	21.19

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

धनबाद
DHANBAD
सिन्दरी,भोजुडीह,बोकारो,चन्द्र
CHANGE HERE FOR SINDRI,BHO
कक्ष-2
POH DONE AT KPA -
PATNA

Jharkhand

Rank

15

Category

Major State

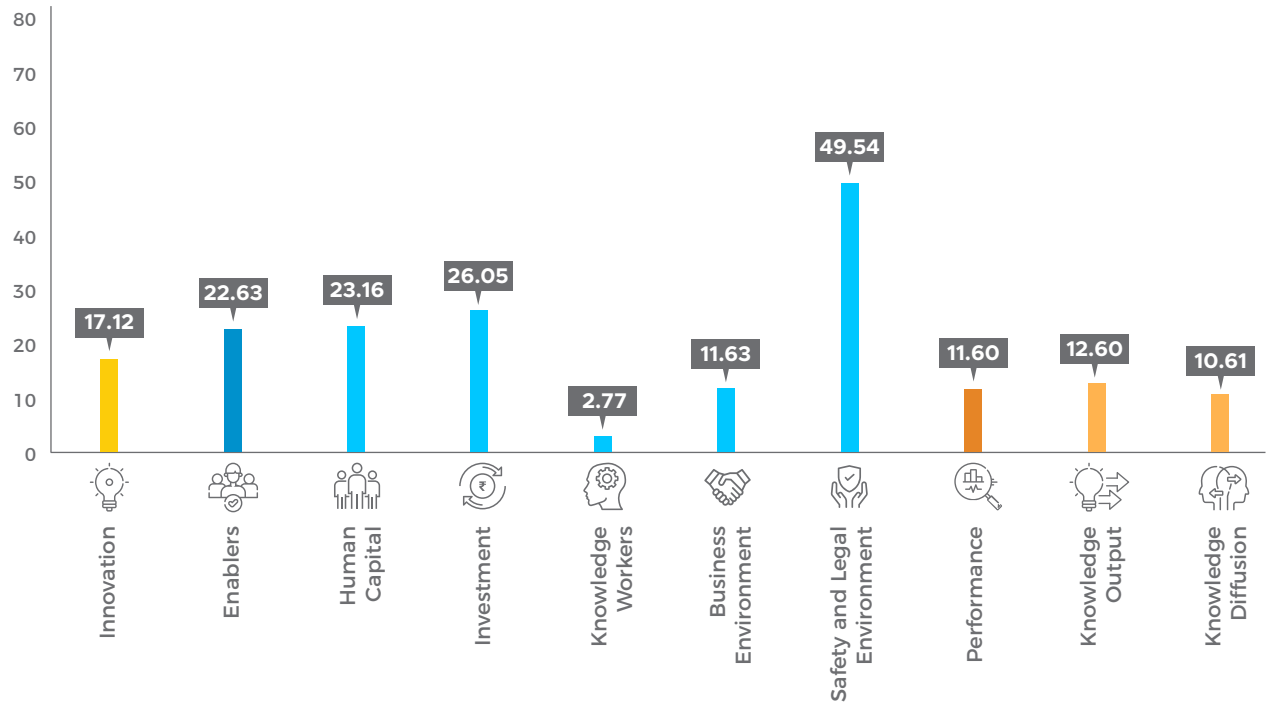
Efficiency Ratio

0.51

GSDP Per Capita

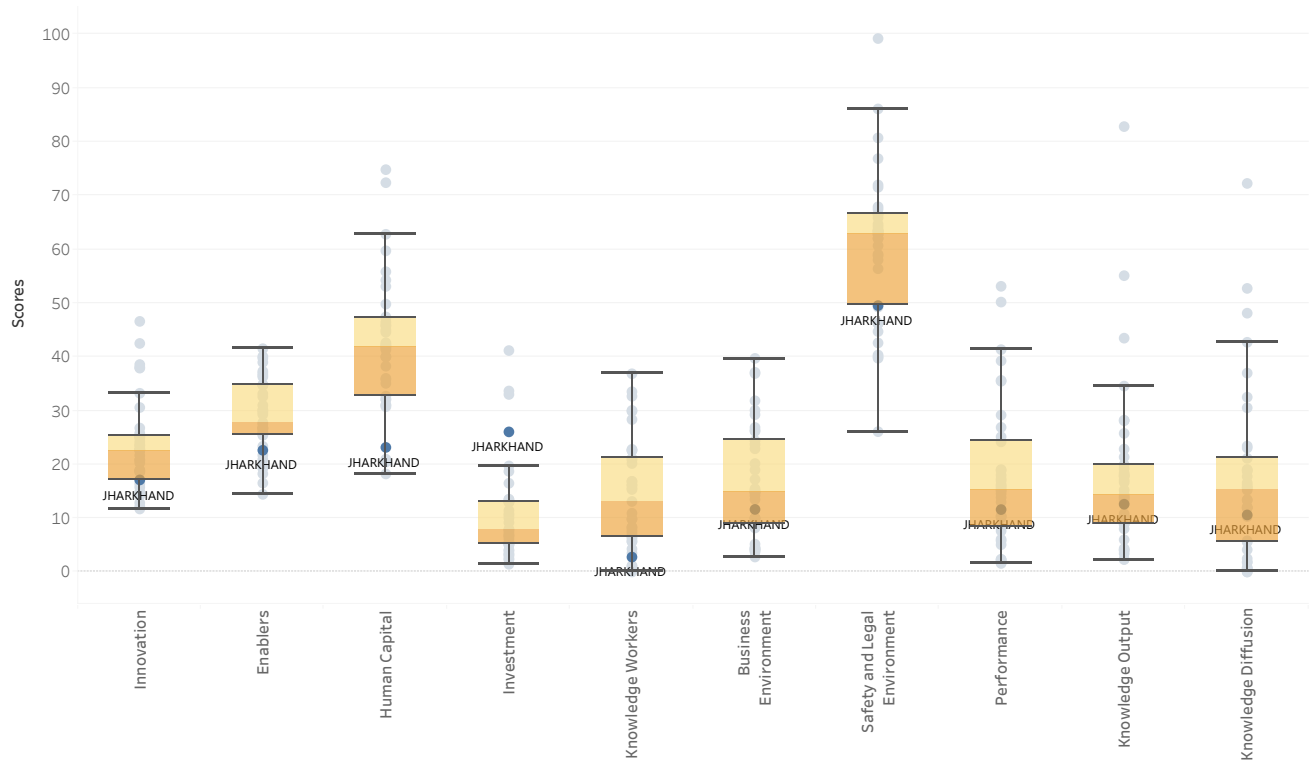
₹ 54,982

Scores



Country Comparison

Relative Performance



Innovation

17.12

Enablers 22.63

Human Capital 23.16

Enrolment in Ph.D.	10.79
Enrolment in engineering and technology	8.35
Colleges connected through NMEICT	37.92
Higher education institutions with NAAC grade A and above	1.63
Pupil teacher ratio- Higher education	2.04
Schools with ICT labs	20.9
National Achievement Survey (NAS) Scores (Class X)	81.19

Investment 26.05

Expenditure on higher and technical education	9.95
Expenditure on research and development (State govt.)	5.73
Expenditure on science, technology and environment	17.02
FDI inflow	100
Venture capital deals	0

Knowledge Workers 2.77

Knowledge-intensive employment	3.86
NGOs involved in knowledge intensive areas	3.13
Private R&D units	1.07
State funded R&D units	2.45

Business Environment 11.63

Ease of doing business ranking	85.71
Online services transactions	1.31
Internet subscribers	0
Incubator centres	0.64
Common facility centres	0
Cluster Strength	22.76

Safety and Legal Environment 49.54

Information Technology/Intellectual Property related acts	79.12
Cyber crime police stations	12.96
Pendency of court cases	50.43

Performance 11.6

Knowledge Diffusion 10.61

ICT exports	0.02
High and medium high-tech manufacturing entities	1.41
Geographical Indications (GI) registered	0
Citations	41.67

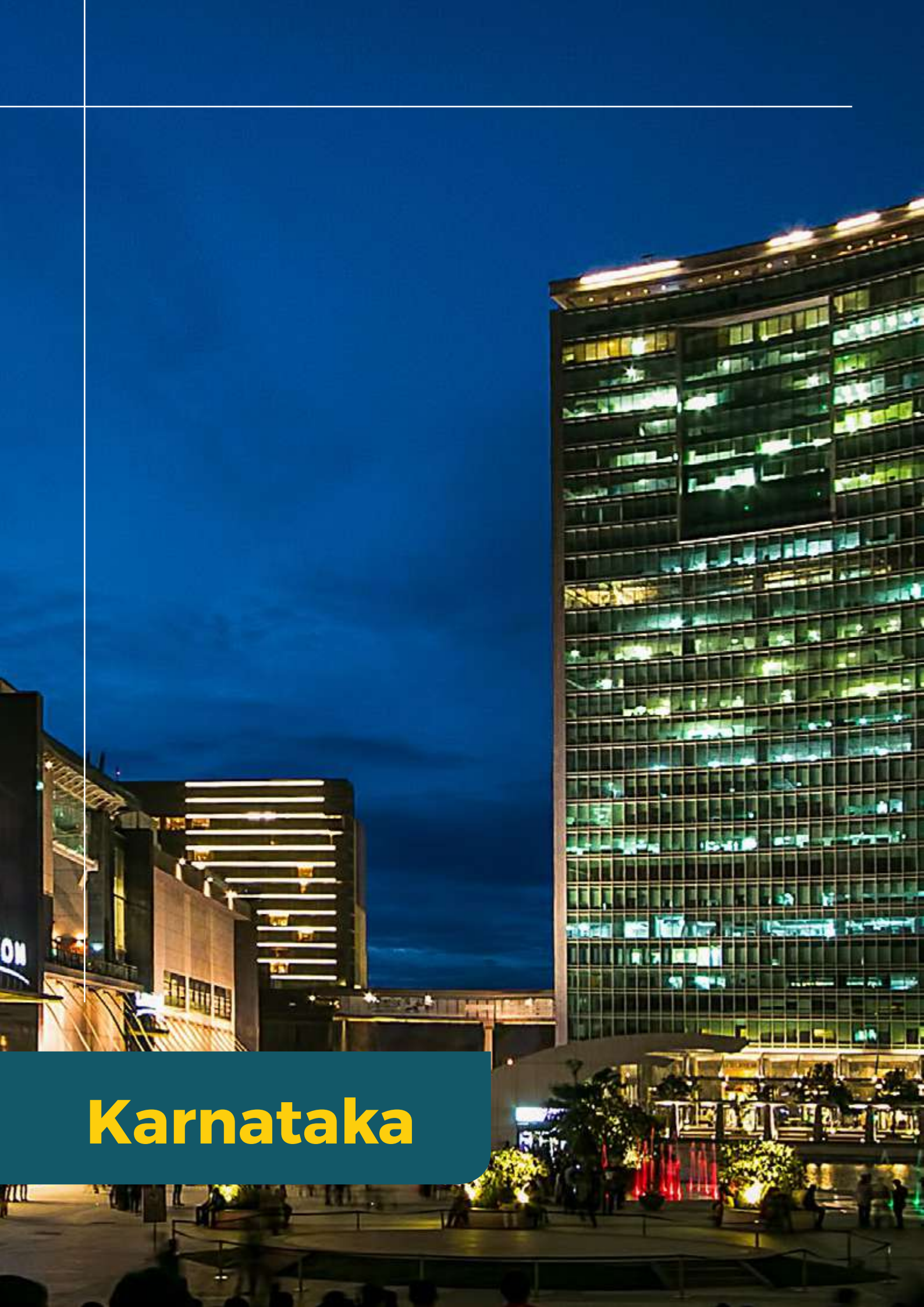
Knowledge Output 12.6

Grassroot innovations	12.59
Patent applications filed	6.2
Trademark applications filed	1.19
Presence of startups	14.82
Industrial Design applications filed	0.13
New businesses registered	20.72
Publications	45.71

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Karnataka

Rank

01

Category

Major State

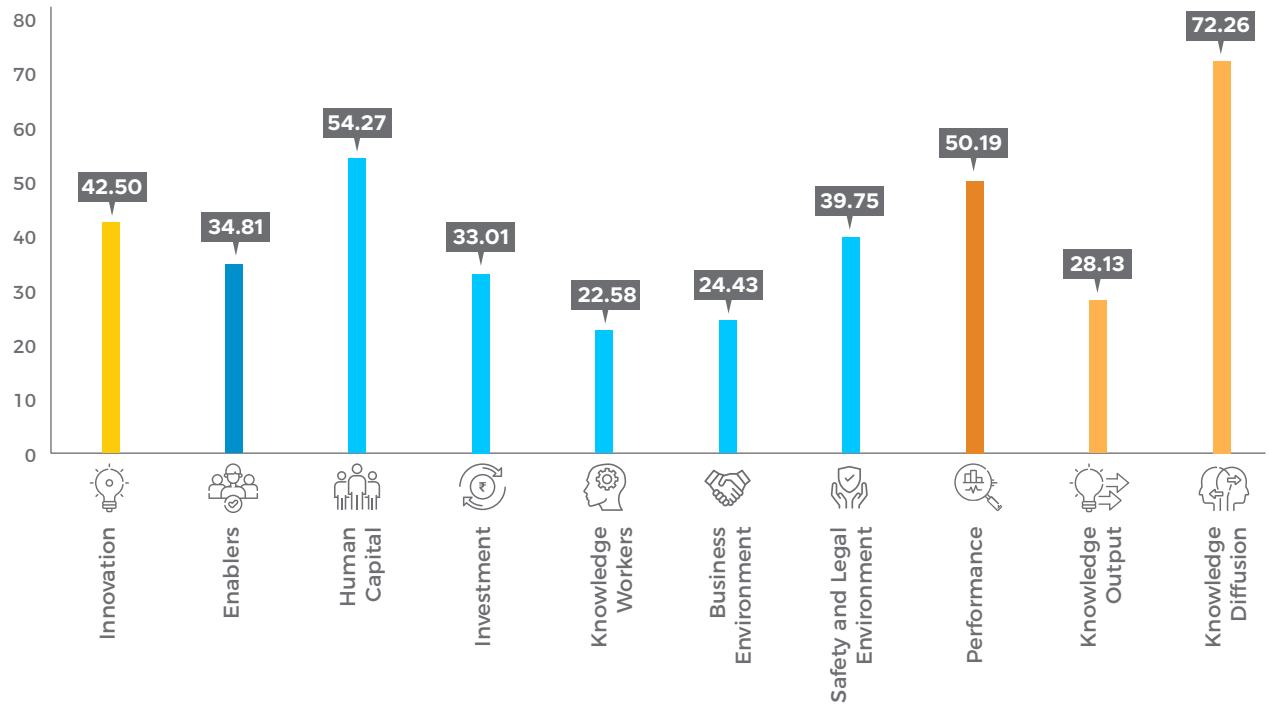
Efficiency Ratio

1.44

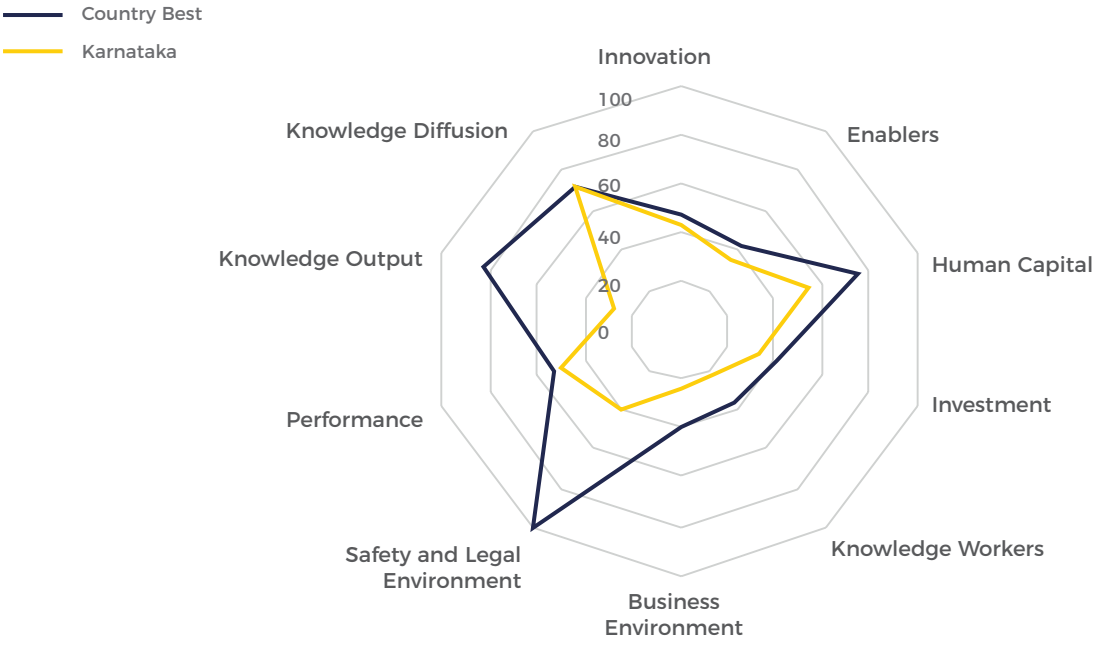
GSDP Per Capita

₹ 1,53,276

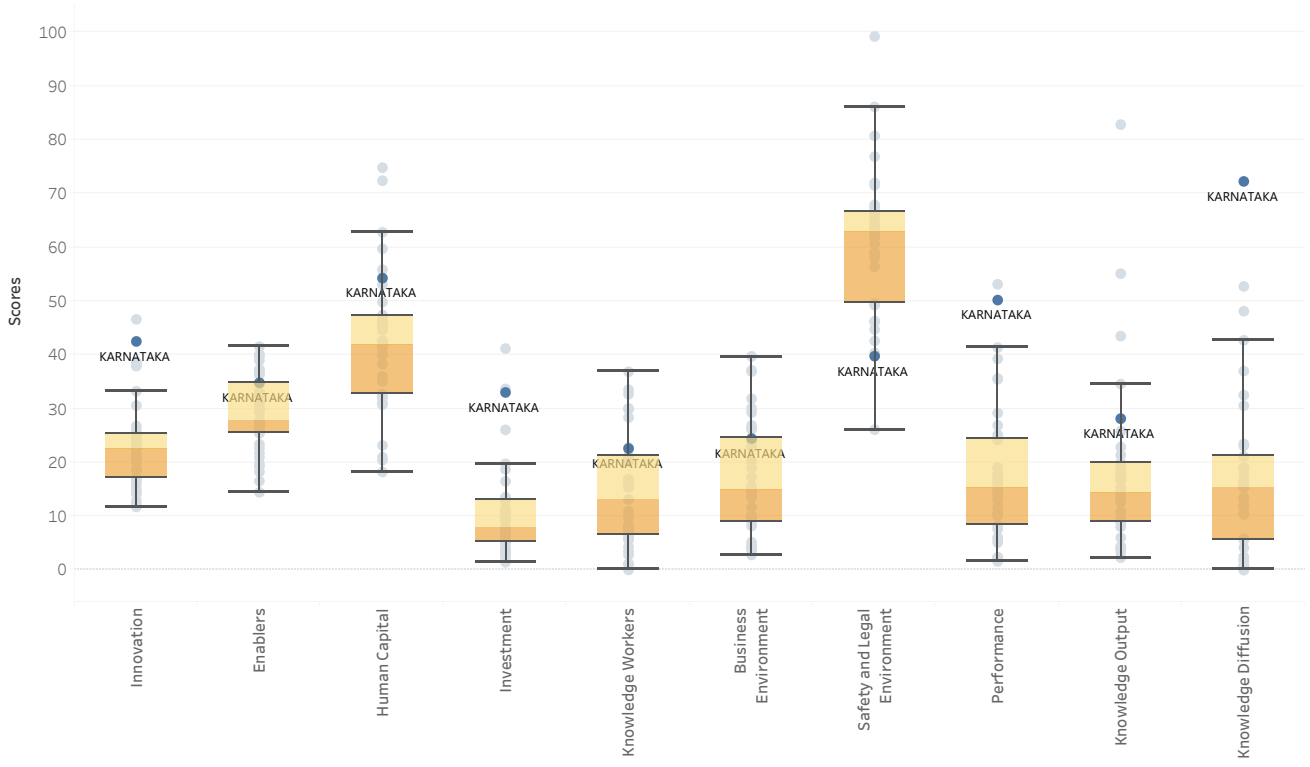
Scores



Country Comparison



Relative Performance



Innovation

42.5

Enablers 34.81

Human Capital 54.27

Enrolment in Ph.D.	26.69
Enrolment in engineering and technology	40.52
Colleges connected through NMEICT	81.82
Higher education institutions with NAAC grade A and above	10.33
Pupil teacher ratio- Higher education	93.88
Schools with ICT labs	28.86
National Achievement Survey (NAS) Scores (Class X)	97.56

Investment 33.01

Expenditure on higher and technical education	4.82
Expenditure on research and development (State govt.)	4.81
Expenditure on science, technology and environment	12.57
FDI inflow	42.7
Venture capital deals	100

Knowledge Workers 22.58

Knowledge-intensive employment	15.29
NGOs involved in knowledge intensive areas	4.95
Private R&D units	30.95
State funded R&D units	43.95

Business Environment 24.43

Ease of doing business ranking	42.86
Online services transactions	6.08
Internet subscribers	22.46
Incubator centres	4.29
Common facility centres	18.26
Cluster Strength	66.67

Safety and Legal Environment 39.75

Information Technology/Intellectual Property related acts	0
Cyber crime police stations	42.97
Pendency of court cases	79.79

Performance 50.19

Knowledge Diffusion 72.26

ICT exports	100
High and medium high-tech manufacturing entities	9.12
Geographical Indications (GI) registered	100
Citations	51.03

Knowledge Output 28.13

Grassroot innovations	1.11
Patent applications filed	45.42
Trademark applications filed	9.09
Presence of startups	37.78
Industrial Design applications filed	1.78
New businesses registered	36.46
Publications	51.06

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

Kerala

Rank

05

Category

Major State

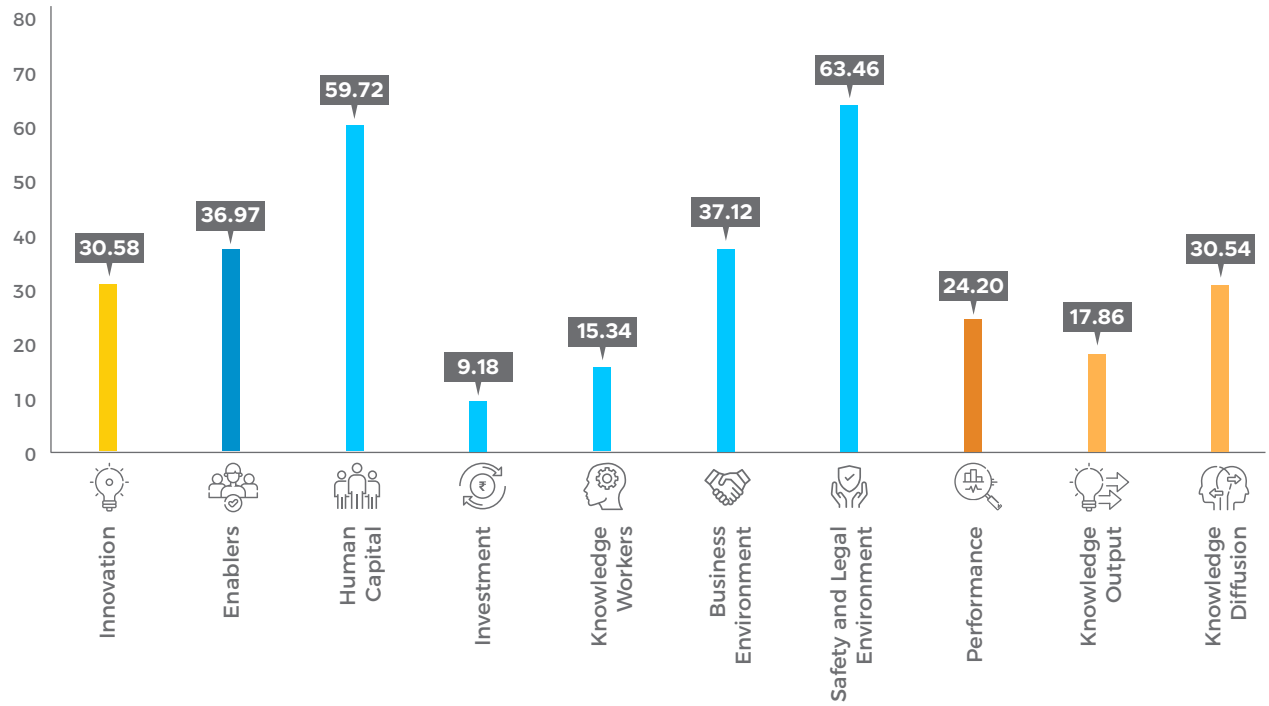
Efficiency Ratio

0.65

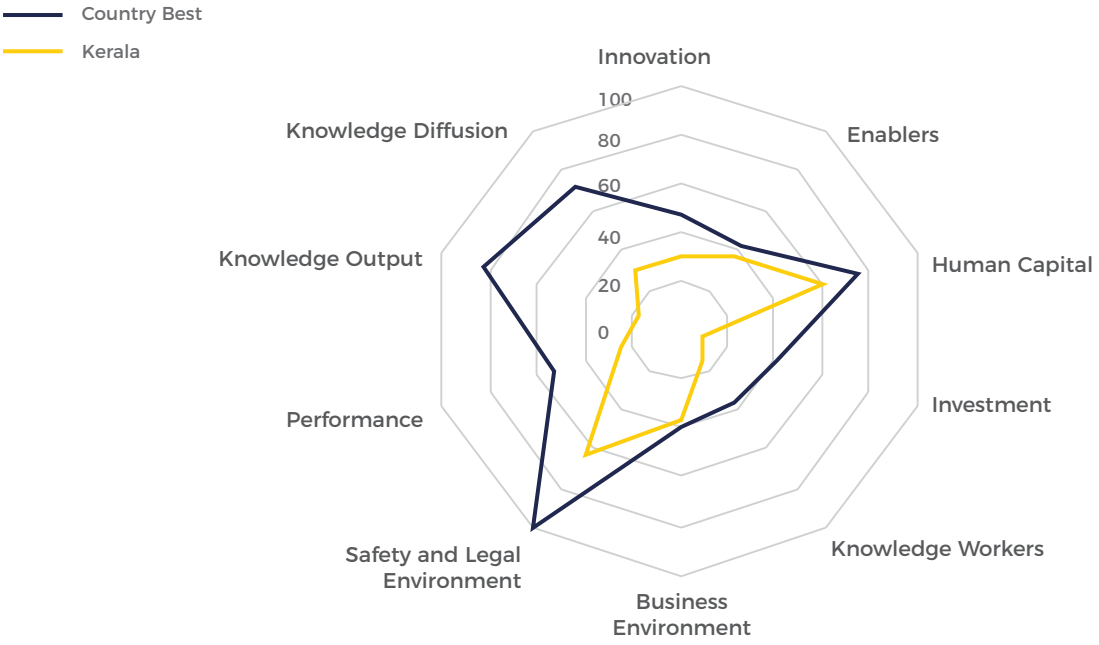
GSDP Per Capita

₹ 1,48,078

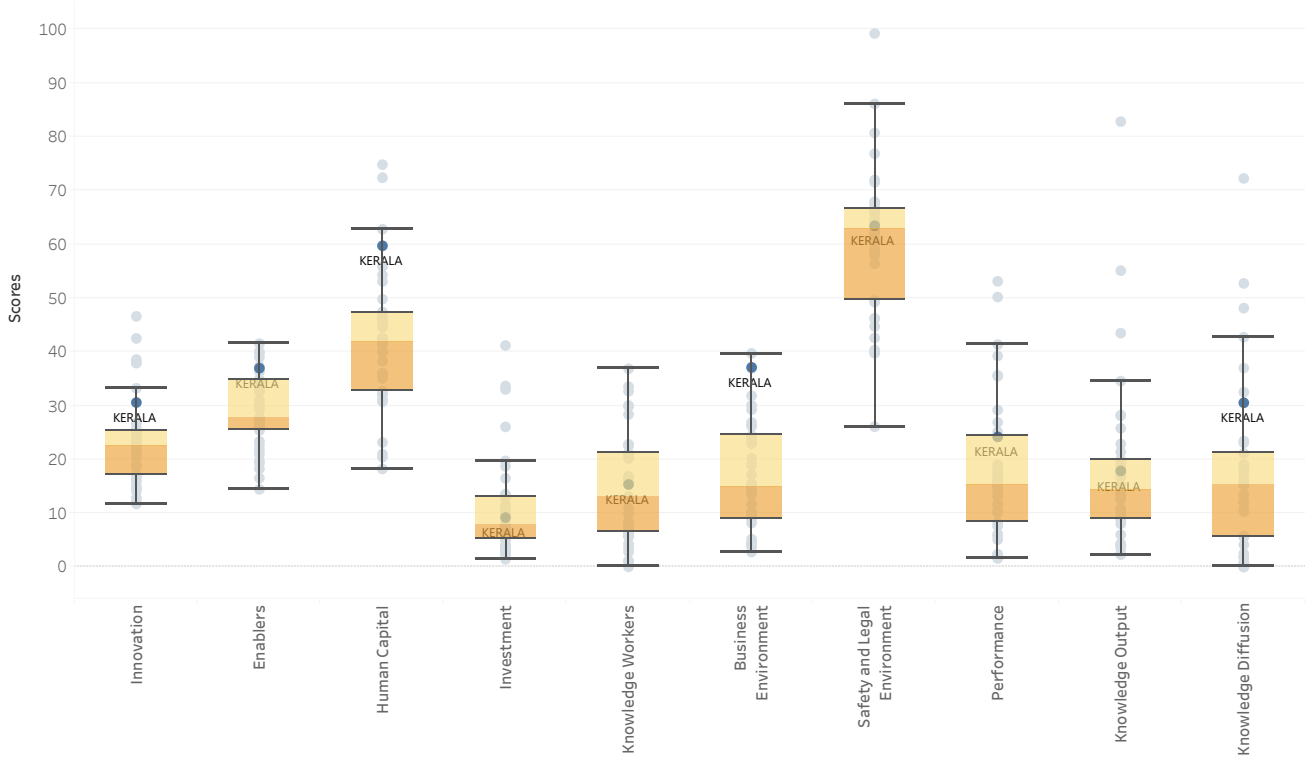
Scores



Country Comparison



Relative Performance



Innovation

30.58

Enablers 36.97

Human Capital 59.72

Enrolment in Ph.D.	24.53
Enrolment in engineering and technology	40.18
Colleges connected through NMEICT	85.97
Higher education institutions with NAAC grade A and above	18.13
Pupil teacher ratio- Higher education	87.76
Schools with ICT labs	77.24
National Achievement Survey (NAS) Scores (Class X)	89.91

Investment 9.18

Expenditure on higher and technical education	7.39
Expenditure on research and development (State govt.)	3.59
Expenditure on science, technology and environment	13.06
FDI inflow	2.06
Venture capital deals	19.47

Knowledge Workers 15.34

Knowledge-intensive employment	7.98
NGOs involved in knowledge intensive areas	1.81
Private R&D units	9.61
State funded R&D units	44.72

Business Environment 37.12

Ease of doing business ranking	3.57
Online services transactions	100
Internet subscribers	25.91
Incubator centres	3.54
Common facility centres	32.37
Cluster Strength	44.72

Safety and Legal Environment 63.46

Information Technology/Intellectual Property related acts	86.81
Cyber crime police stations	1.83
Pendency of court cases	93.57

Performance 24.2

Knowledge Diffusion 30.54

ICT exports	4.35
High and medium high-tech manufacturing entities	0.11
Geographical Indications (GI) registered	68.18
Citations	42.44

Knowledge Output 17.86

Grassroot innovations	11.48
Patent applications filed	10.53
Trademark applications filed	9.11
Presence of startups	19.56
Industrial Design applications filed	0.98
New businesses registered	32.74
Publications	41.39

All the values represent scores on a scale of 0-100
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All the indicators have been treated using relevant denominators eg. population, GDP etc.

- Overperforming
- Performing within expected range
- Underperforming

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Lakshadweep

Rank

09

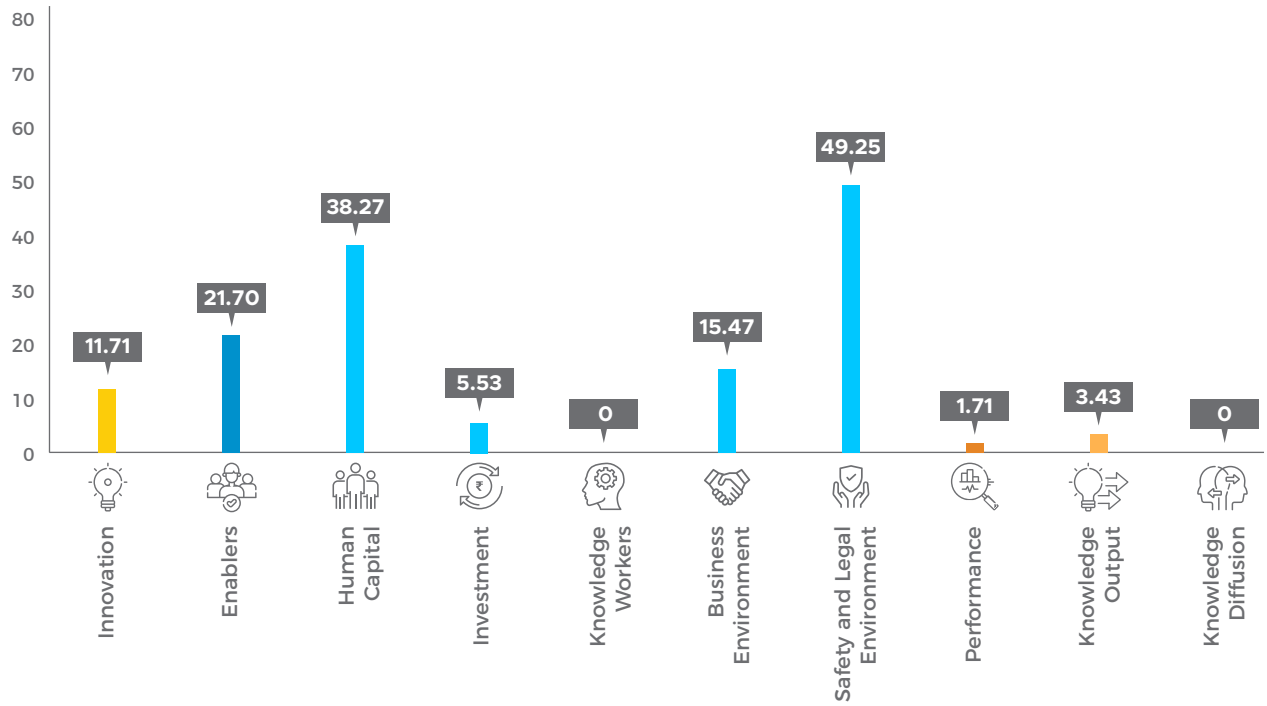
Category

UT/ City State

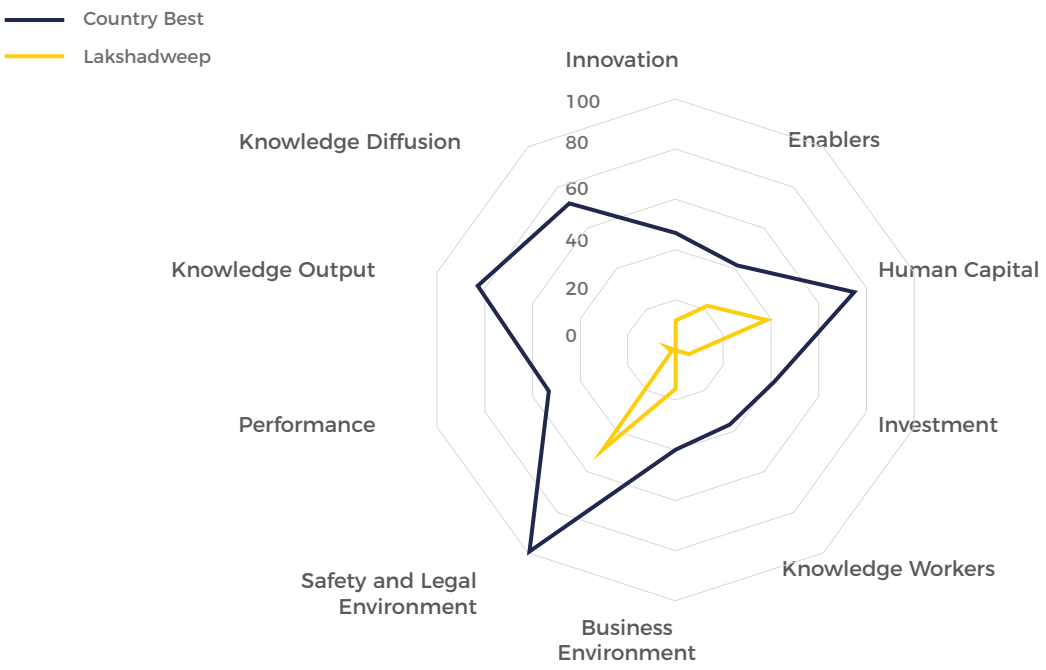
Efficiency Ratio

0.07

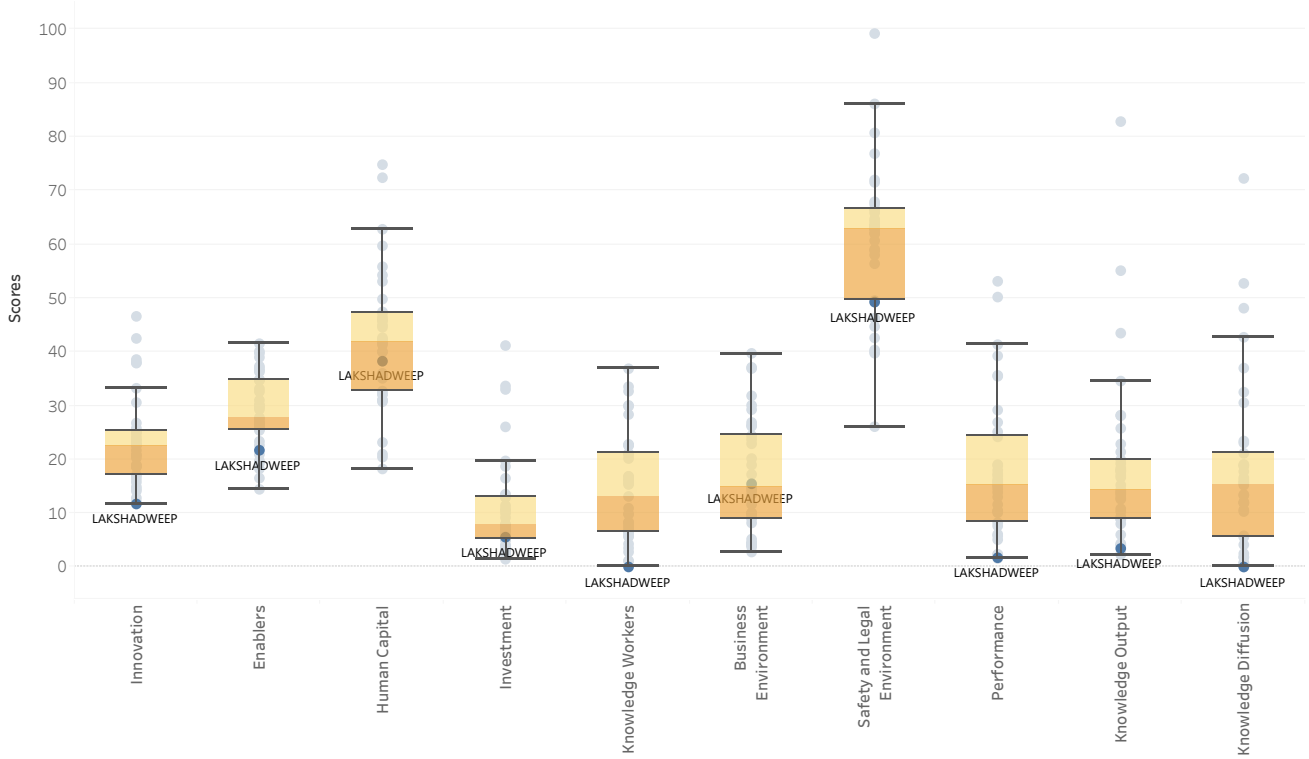
Scores



Country Comparison



Relative Performance



Innovation

11.71

Enablers 21.7

Human Capital 38.27

Enrolment in Ph.D.	0
Enrolment in engineering and technology	0
Colleges connected through NMEICT	0
Higher education institutions with NAAC grade A and above	0
Pupil teacher ratio- Higher education	100
Schools with ICT labs	100
National Achievement Survey (NAS) Scores (Class X)	78.7

Investment 5.53

Expenditure on higher and technical education	18.85
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	0
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 0

Knowledge-intensive employment	0
NGOs involved in knowledge intensive areas	0
Private R&D units	0
State funded R&D units	0

Business Environment 15.47

Ease of doing business ranking	50
Online services transactions	44.61
Internet subscribers	14.37
Incubator centres	0
Common facility centres	0
Cluster Strength	0

Safety and Legal Environment 49.25

Information Technology/Intellectual Property related acts	67.03
Cyber crime police stations	0
Pendency of court cases	74.26

Performance 1.71

Knowledge Diffusion 0

ICT exports	0
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	0
Citations	0

Knowledge Output 3.43

Grassroot innovations	7.04
Patent applications filed	0
Trademark applications filed	0
Presence of startups	1.57
Industrial Design applications filed	0
New businesses registered	14.92
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- Overperforming
- Performing within expected range
- Underperforming

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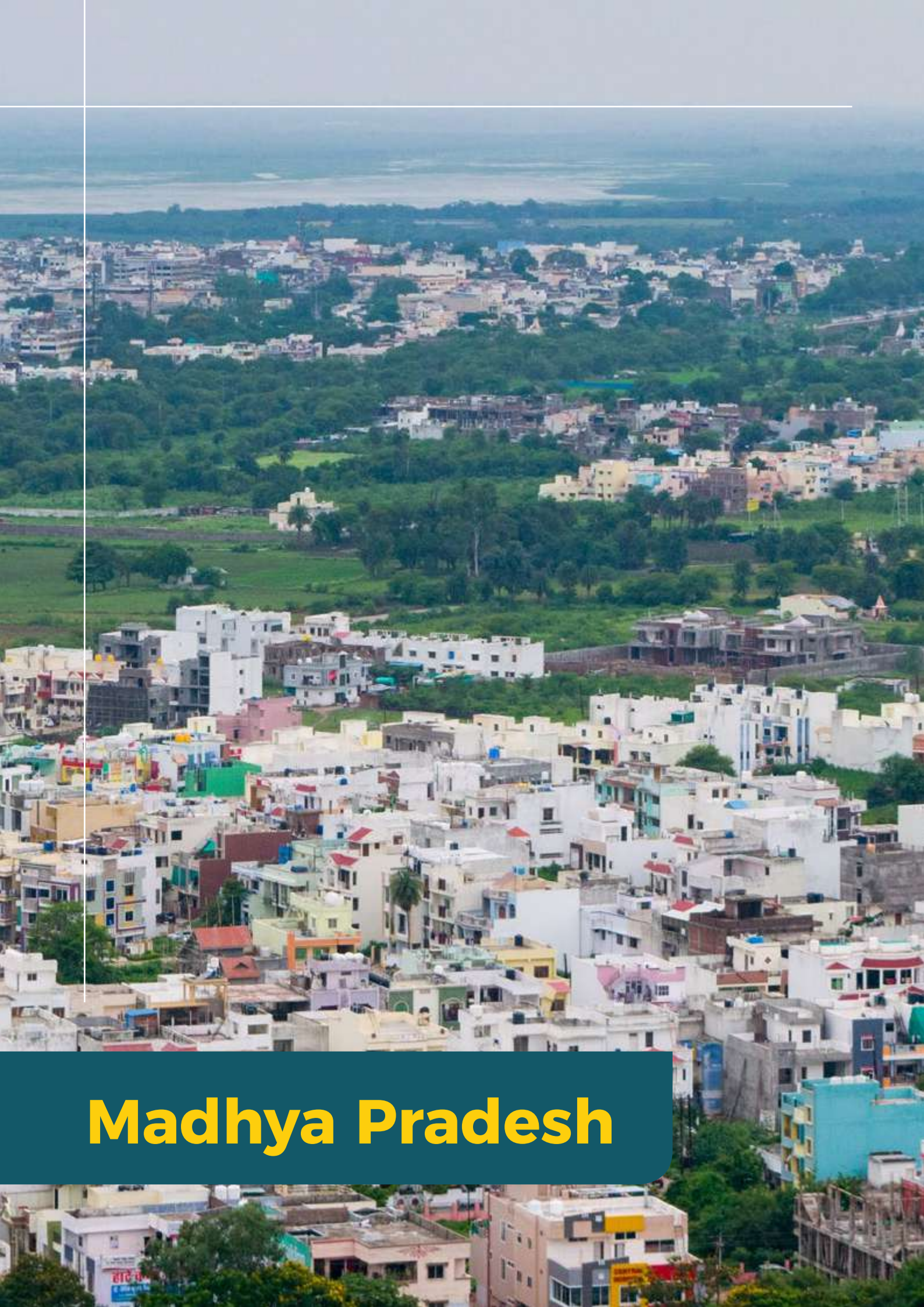


Madhya Pradesh

Rank

13

Category

Major State

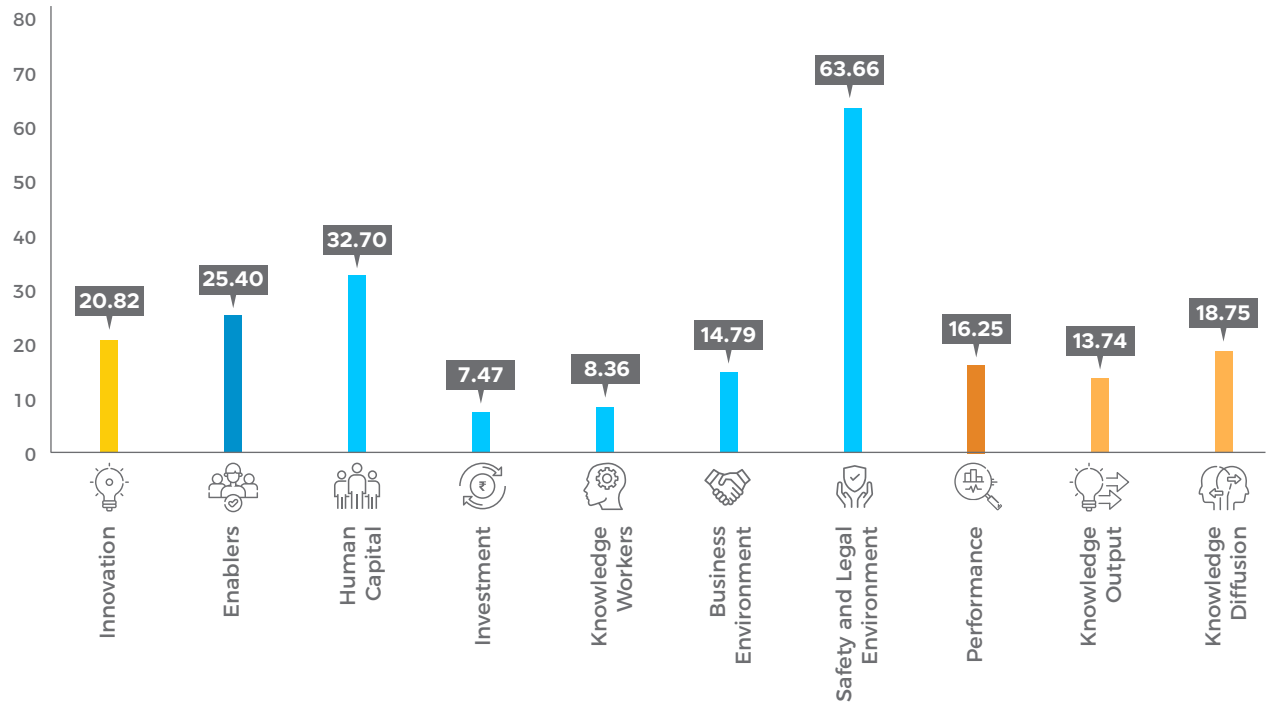
Efficiency Ratio

0.63

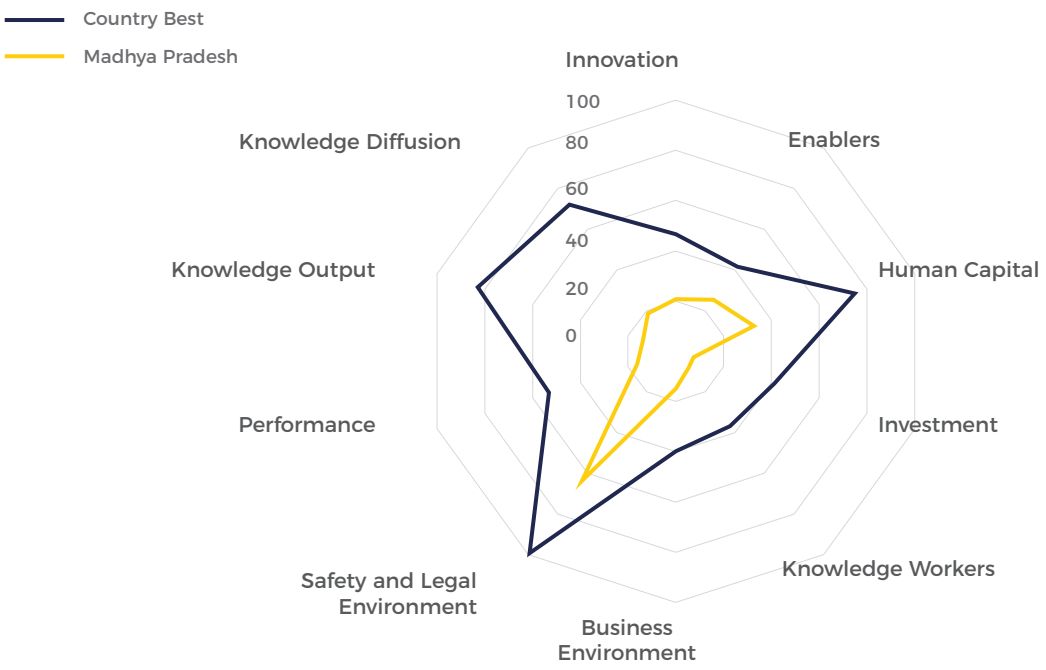
GSDP Per Capita

₹ 56,498

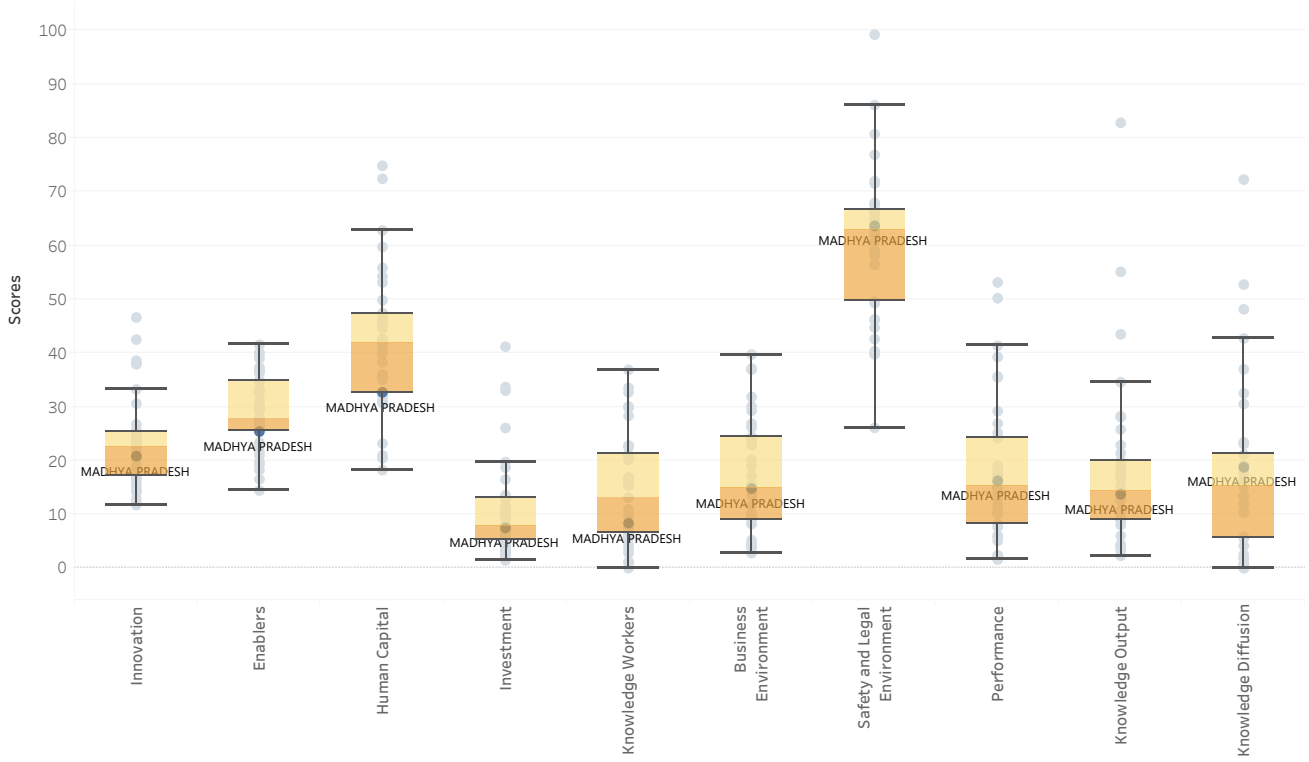
Scores



Country Comparison



Relative Performance



Innovation

20.82

Enablers 25.4

Human Capital 32.7

Enrolment in Ph.D.	6.91
Enrolment in engineering and technology	19.03
Colleges connected through NMEICT	46.49
Higher education institutions with NAAC grade A and above	3.64
Pupil teacher ratio- Higher education	57.14
Schools with ICT labs	15.17
National Achievement Survey (NAS) Scores (Class X)	78.96

Investment 7.47

Expenditure on higher and technical education	9.58
Expenditure on research and development (State govt.)	12.29
Expenditure on science, technology and environment	11.94
FDI inflow	2.86
Venture capital deals	0

Knowledge Workers 8.36

Knowledge-intensive employment	11.71
NGOs involved in knowledge intensive areas	5.79
Private R&D units	3.15
State funded R&D units	11.4

Business Environment 14.79

Ease of doing business ranking	89.29
Online services transactions	5.8
Internet subscribers	7.49
Incubator centres	1.51
Common facility centres	0
Cluster Strength	24.39

Safety and Legal Environment 63.66

Information Technology/Intellectual Property related acts	93.41
Cyber crime police stations	0.84
Pendency of court cases	87.93

Performance 16.24

Knowledge Diffusion 18.75

ICT exports	0.87
High and medium high-tech manufacturing entities	5.09
Geographical Indications (GI) registered	25
Citations	43.37

Knowledge Output 13.74

Grassroot innovations	2.59
Patent applications filed	3.41
Trademark applications filed	3.79
Presence of startups	23.23
Industrial Design applications filed	0.21
New businesses registered	20.57
Publications	43.88

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Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- Overperforming
- Performing within expected range
- Underperforming

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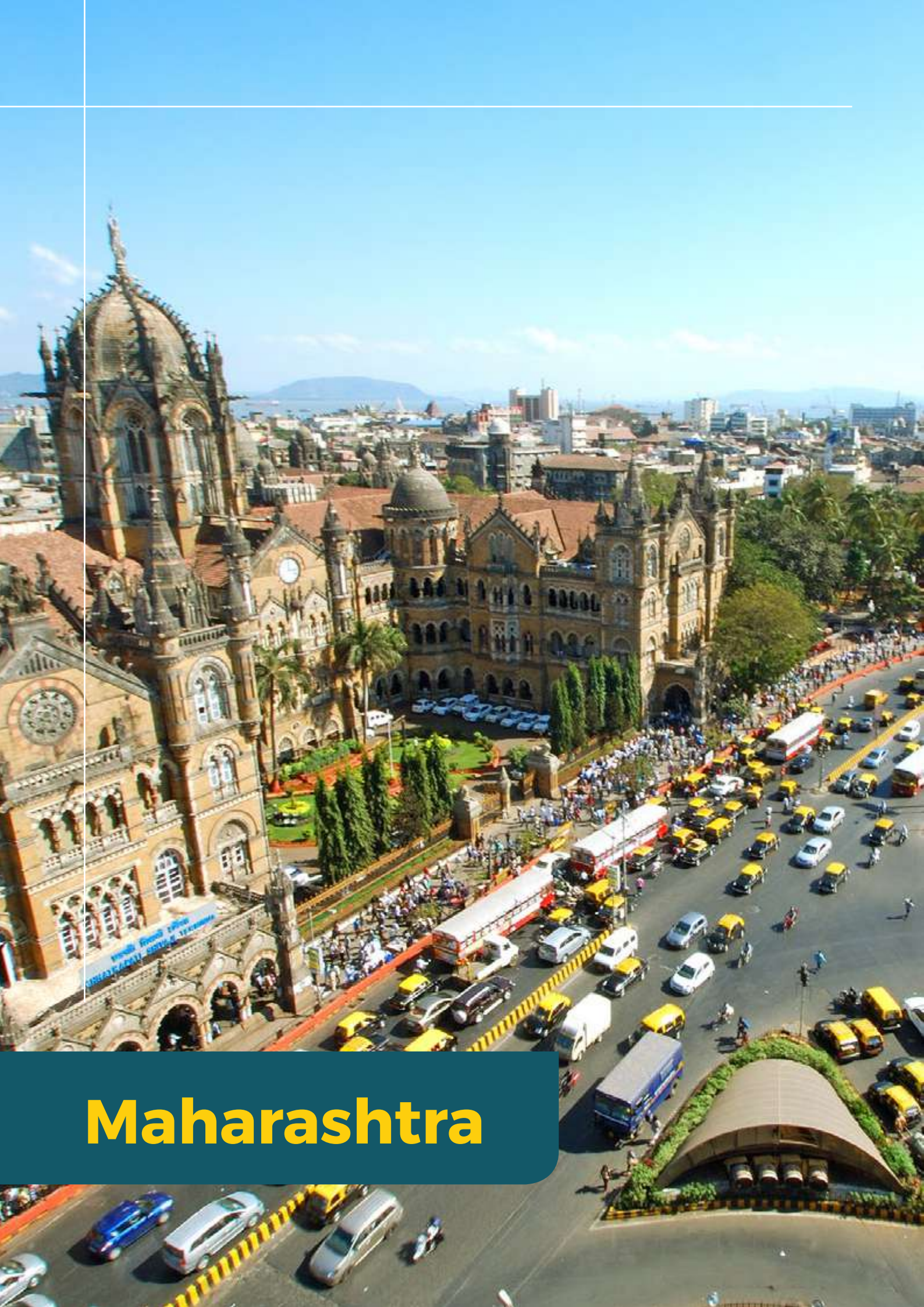


Maharashtra

Rank

02

Category

Major State

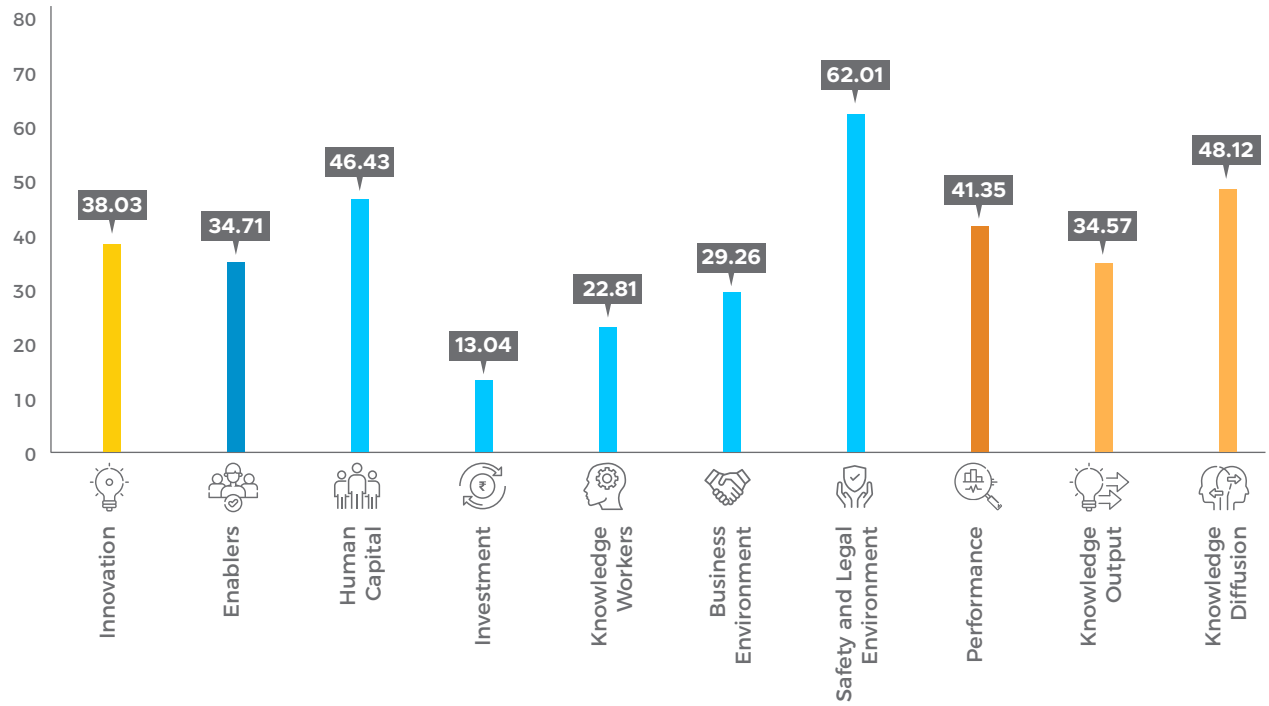
Efficiency Ratio

1.19

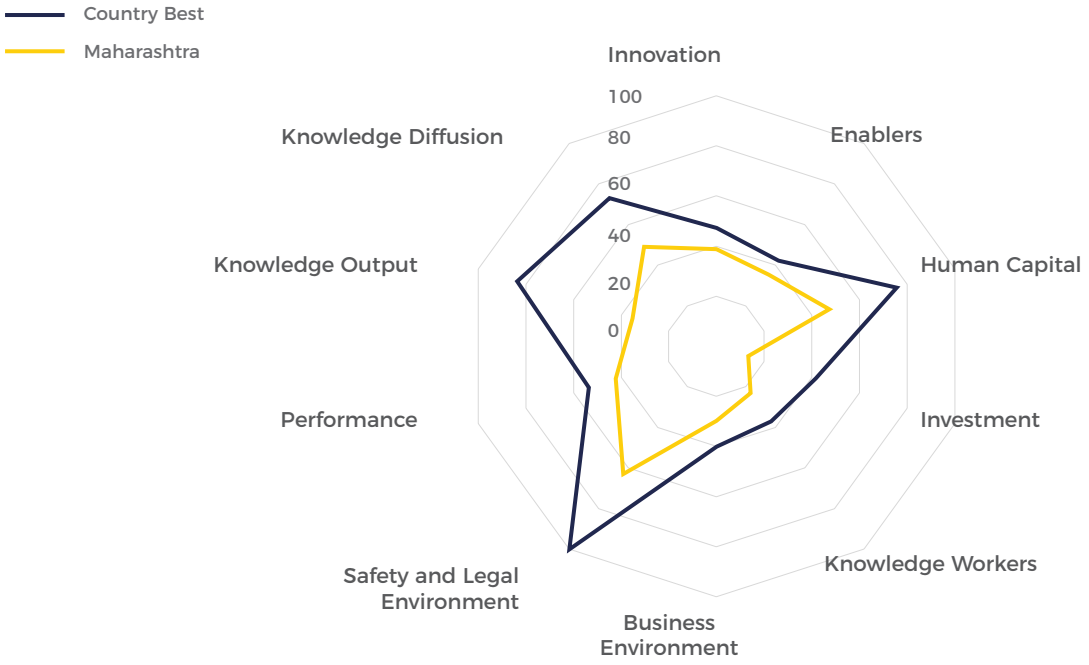
GSDP Per Capita

₹ 1,47,450

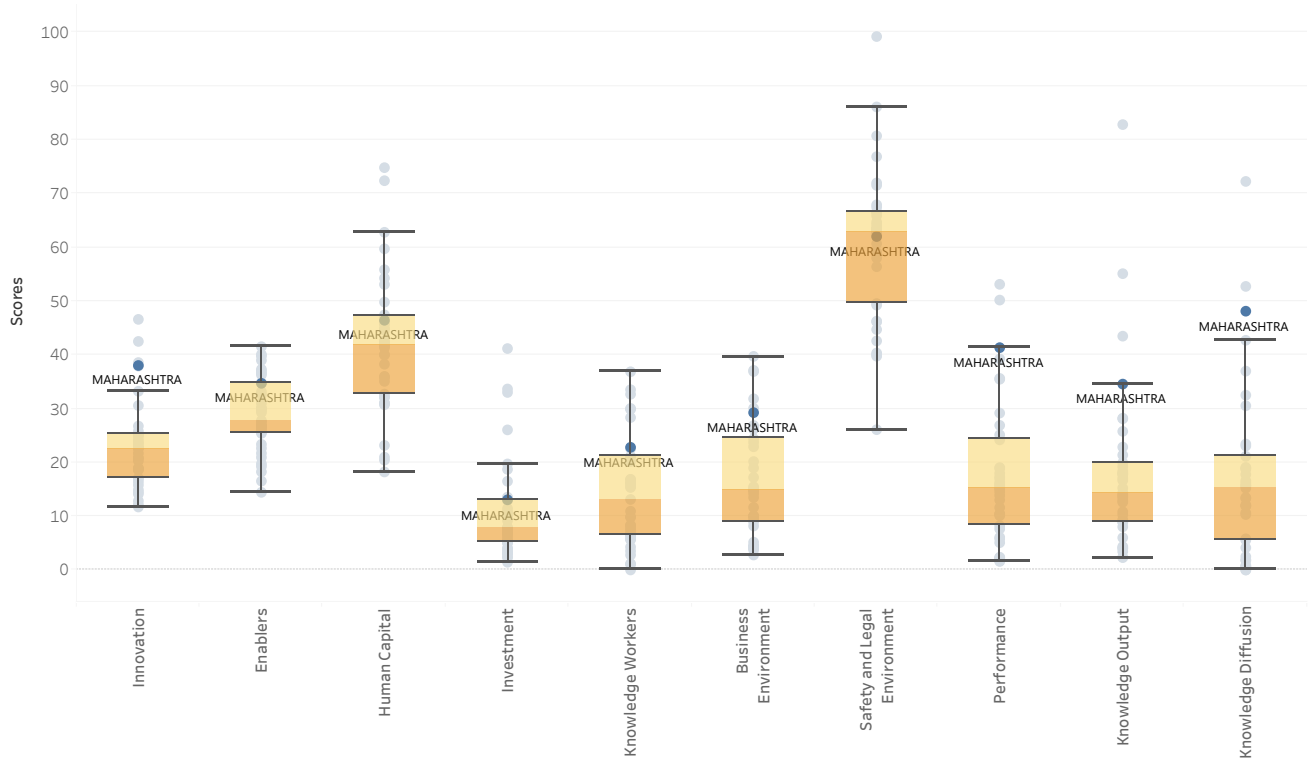
Scores



Country Comparison



Relative Performance



Innovation

38.03

Enablers 34.71

Human Capital 46.43

Enrolment in Ph.D.	9.6
Enrolment in engineering and technology	29.02
Colleges connected through NMEICT	64.42
Higher education institutions with NAAC grade A and above	18.97
Pupil teacher ratio- Higher education	69.39
Schools with ICT labs	47.51
National Achievement Survey (NAS) Scores (Class X)	86.39

Investment 13.04

Expenditure on higher and technical education	0.08
Expenditure on research and development (State govt.)	1.48
Expenditure on science, technology and environment	4.57
FDI inflow	34.85
Venture capital deals	24.51

Knowledge Workers 22.81

Knowledge-intensive employment	21.01
NGOs involved in knowledge intensive areas	10.2
Private R&D units	45.59
State funded R&D units	18.87

Business Environment 29.26

Ease of doing business ranking	57.14
Online services transactions	3.88
Internet subscribers	25.73
Incubator centres	2.14
Common facility centres	19.05
Cluster Strength	88.62

Safety and Legal Environment 62.01

Information Technology/Intellectual Property related acts	93.41
Cyber crime police stations	23.36
Pendency of court cases	62.79

Performance 41.35

Knowledge Diffusion 48.12

ICT exports	27.01
High and medium high-tech manufacturing entities	12.32
Geographical Indications (GI) registered	75
Citations	69.32

Knowledge Output 34.57

Grassroot innovations	0
Patent applications filed	48.11
Trademark applications filed	18.03
Presence of startups	32.97
Industrial Design applications filed	4.85
New businesses registered	50.11
Publications	68.17

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Manipur

Rank

03

Category

North East and Hill State

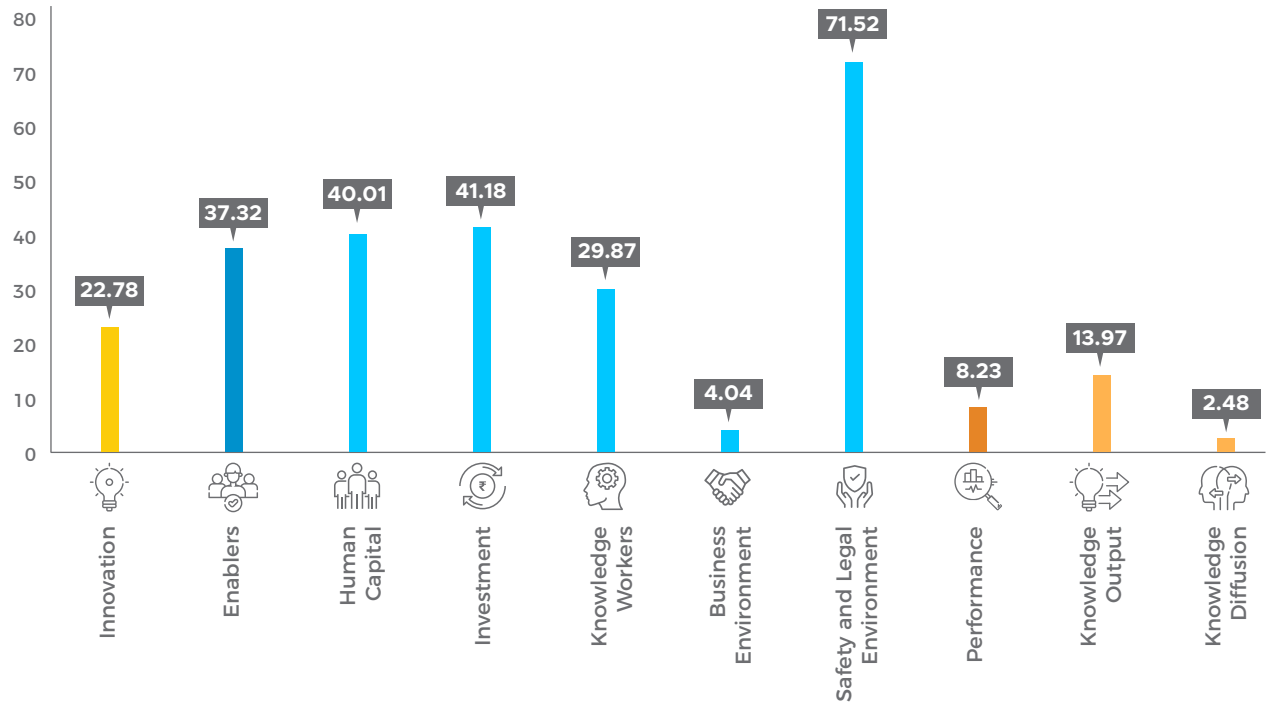
Efficiency Ratio

0.22

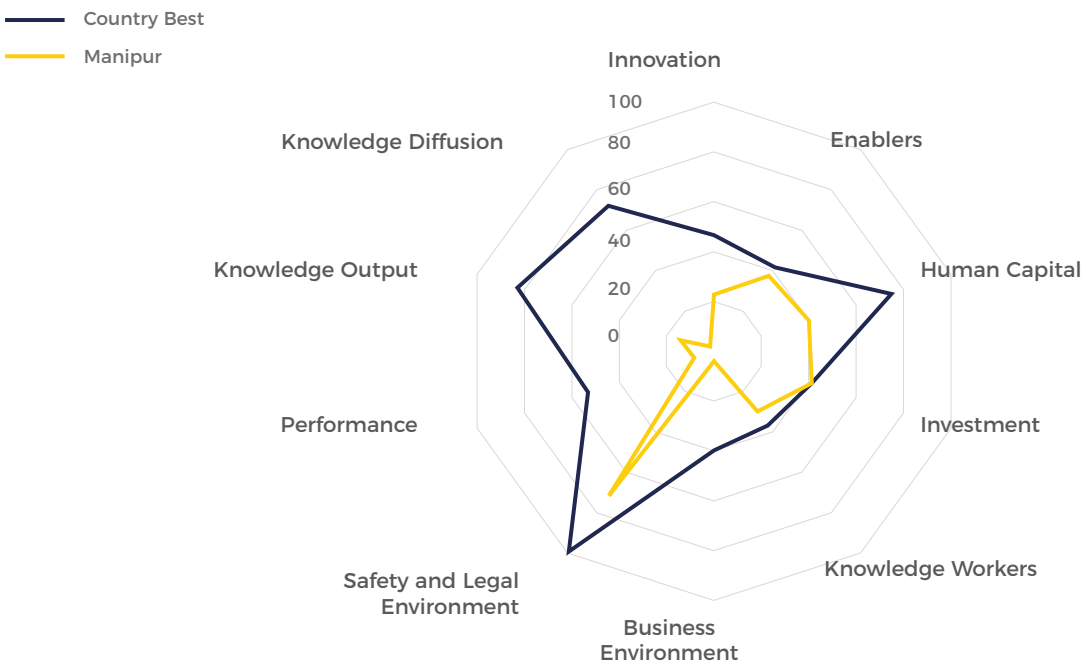
GSDP Per Capita

₹ 51,180

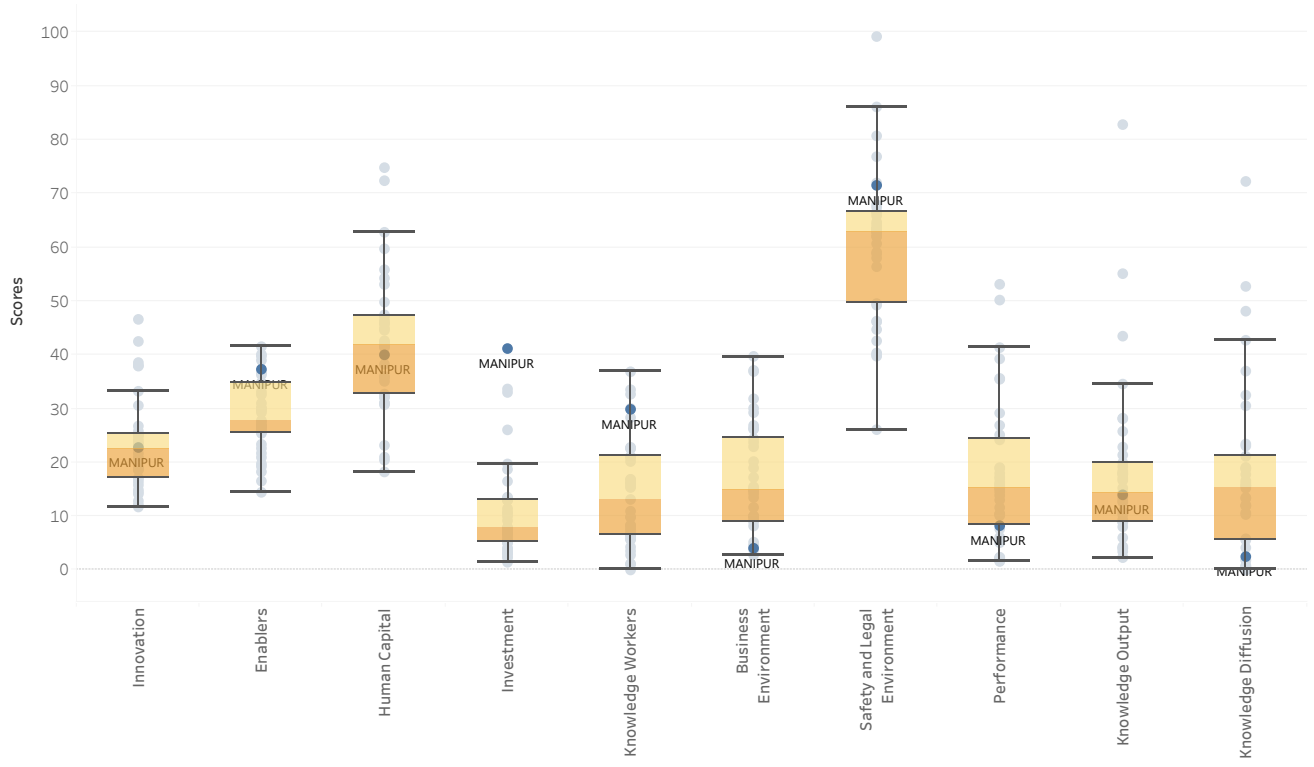
Scores



Country Comparison



Relative Performance



Innovation

22.78

Enablers 37.32

Human Capital 40.01

Enrolment in Ph.D.	46.7
Enrolment in engineering and technology	2.7
Colleges connected through NMEICT	45.71
Higher education institutions with NAAC grade A and above	2.85
Pupil teacher ratio- Higher education	79.59
Schools with ICT labs	24.75
National Achievement Survey (NAS) Scores (Class X)	84.59

Investment 41.18

Expenditure on higher and technical education	1.4
Expenditure on research and development (State govt.)	100
Expenditure on science, technology and environment	73.7
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 29.87

Knowledge-intensive employment	0.19
NGOs involved in knowledge intensive areas	100
Private R&D units	4.62
State funded R&D units	14.14

Business Environment 4.04

Ease of doing business ranking	0
Online services transactions	0
Internet subscribers	12.56
Incubator centres	0
Common facility centres	0
Cluster Strength	8.13

Safety and Legal Environment 71.52

Information Technology/Intellectual Property related acts	100
Cyber crime police stations	21.38
Pendency of court cases	85.79

Performance 8.23

Knowledge Diffusion 2.48

ICT exports	0
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	9.09
Citations	0

Knowledge Output 13.97

Grassroot innovations	77.78
Patent applications filed	3.11
Trademark applications filed	0.79
Presence of startups	25.99
Industrial Design applications filed	0
New businesses registered	39.53
Publications	0

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Strength and Weakness is relative to 10 states with similar GDP
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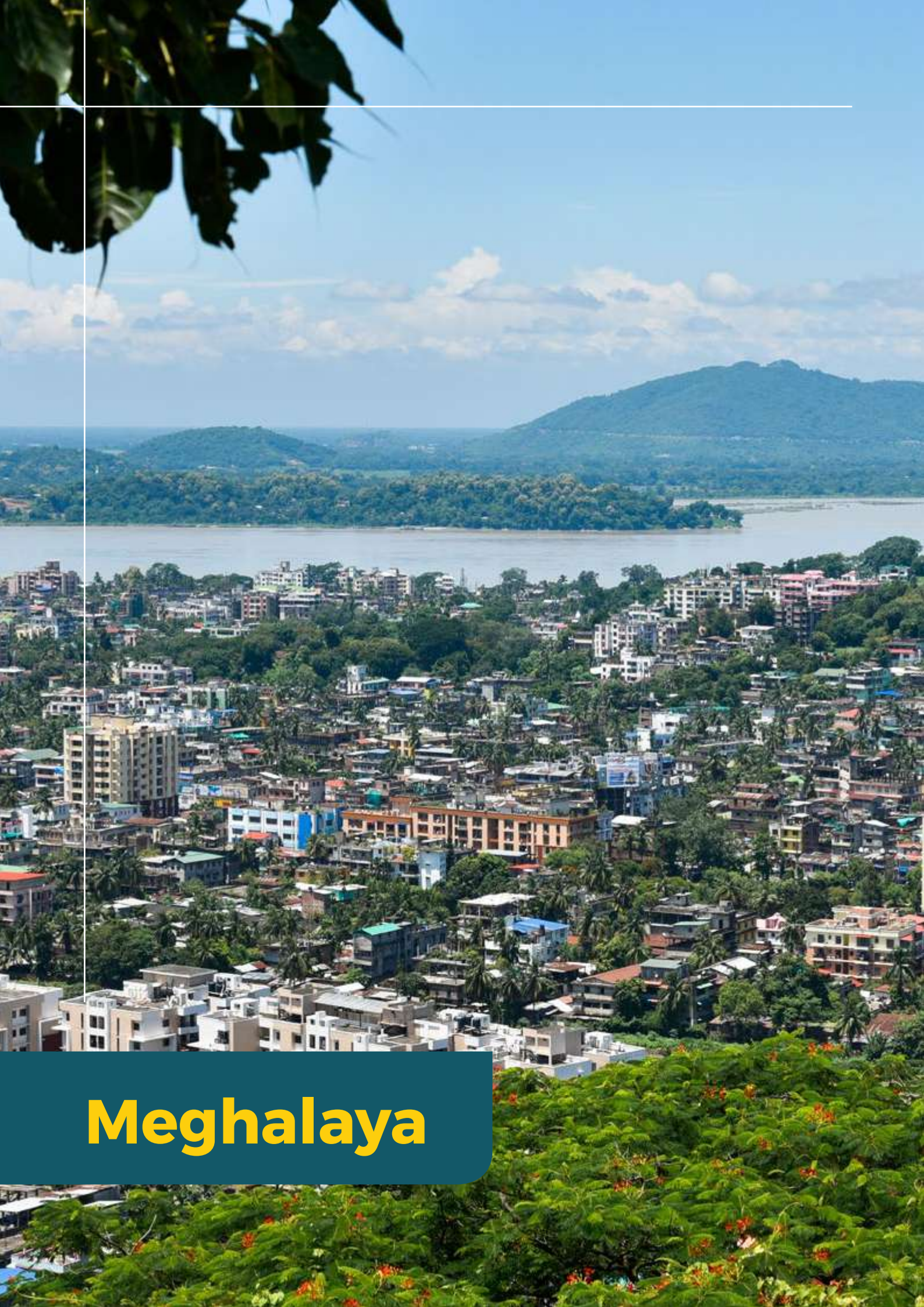
- Overperforming
- Performing within expected range
- Underperforming

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



Meghalaya

Rank

10

Category

North East and Hill State

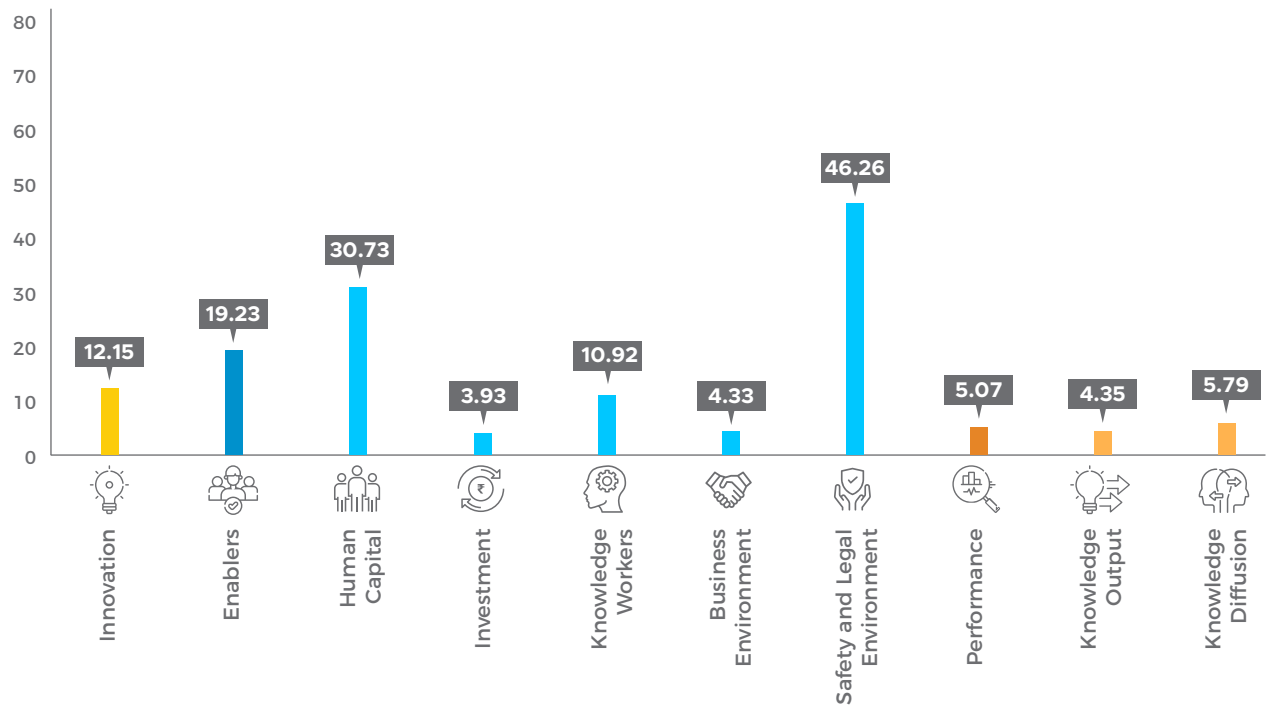
Efficiency Ratio

0.26

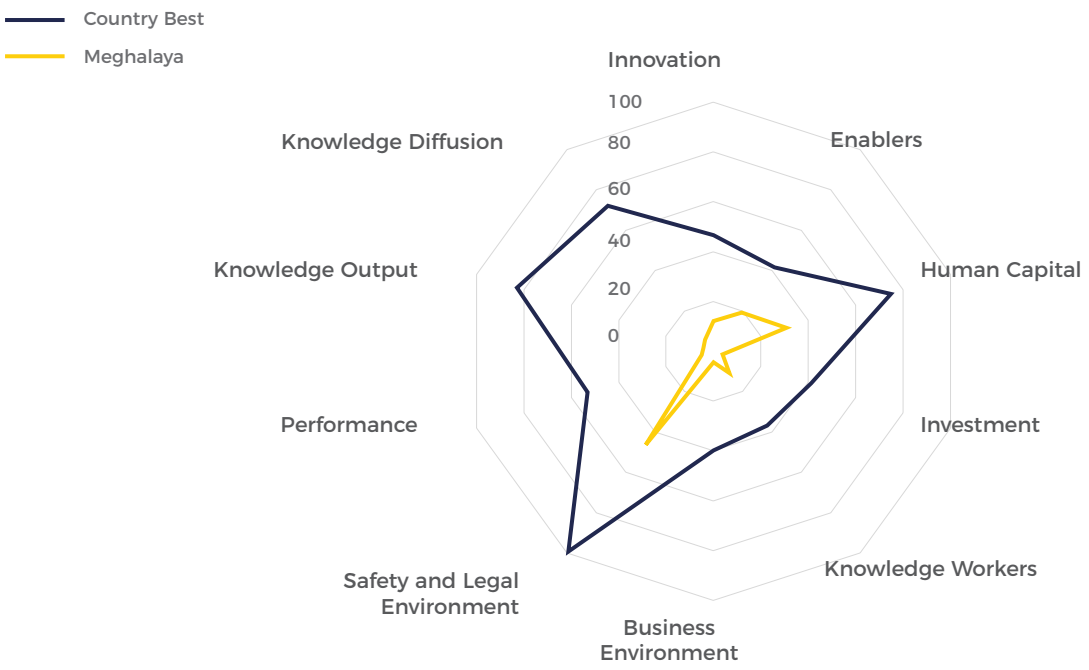
GSDP Per Capita

₹ 66,223

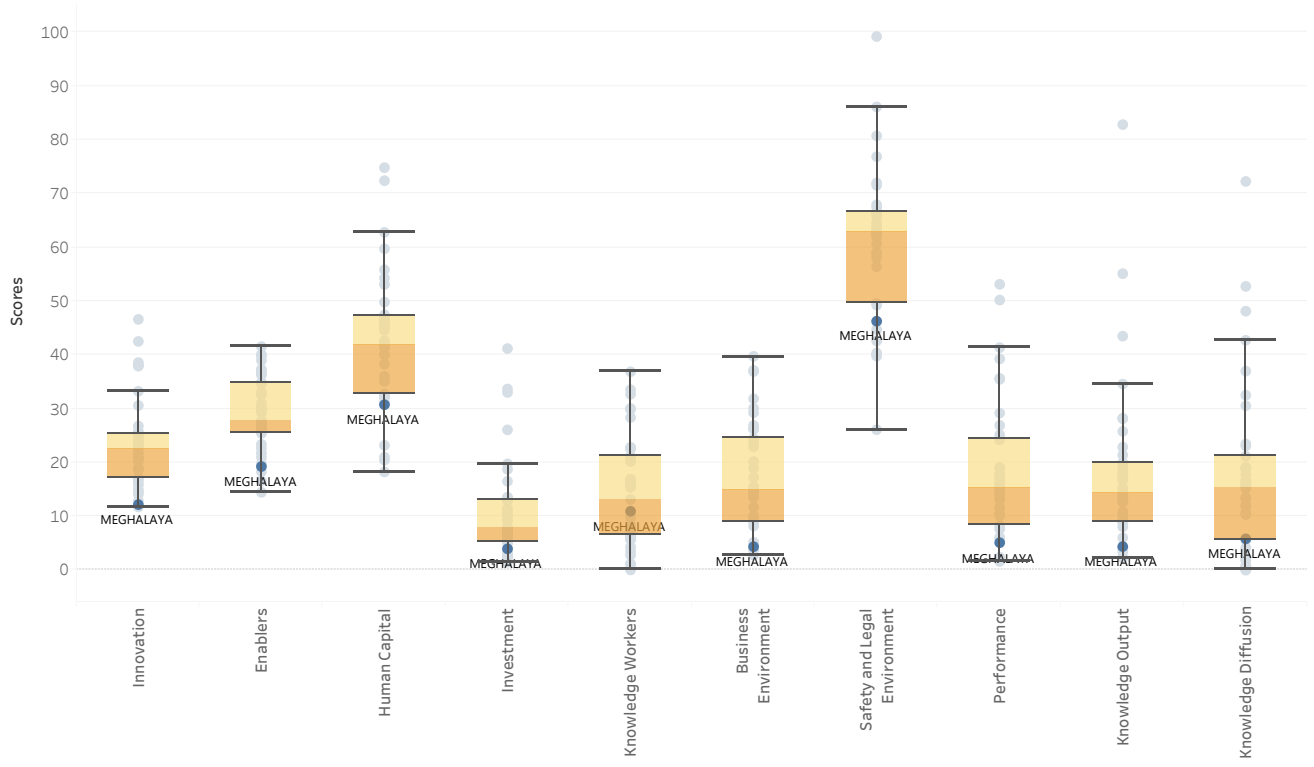
Scores



Country Comparison



Relative Performance



Innovation

12.15

Enablers 19.23

Human Capital 30.73

Enrolment in Ph.D.	47.64
Enrolment in engineering and technology	3.05
Colleges connected through NMEICT	20.26
Higher education institutions with NAAC grade A and above	11.69
Pupil teacher ratio- Higher education	71.43
Schools with ICT labs	1.87
National Achievement Survey (NAS) Scores (Class X)	61.86

Investment 3.93

Expenditure on higher and technical education	1.09
Expenditure on research and development (State govt.)	4.94
Expenditure on science, technology and environment	0.8
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 10.92

Knowledge-intensive employment	0
NGOs involved in knowledge intensive areas	2.95
Private R&D units	2.96
State funded R&D units	40.83

Business Environment 4.33

Ease of doing business ranking	0
Online services transactions	0.22
Internet subscribers	12.56
Incubator centres	0
Common facility centres	0
Cluster Strength	9.76

Safety and Legal Environment 46.26

Information Technology/Intellectual Property related acts	76.92
Cyber crime police stations	20.58
Pendency of court cases	36.21

Performance 5.07

Knowledge Diffusion 5.79

ICT exports	0.25
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	4.55
Citations	18

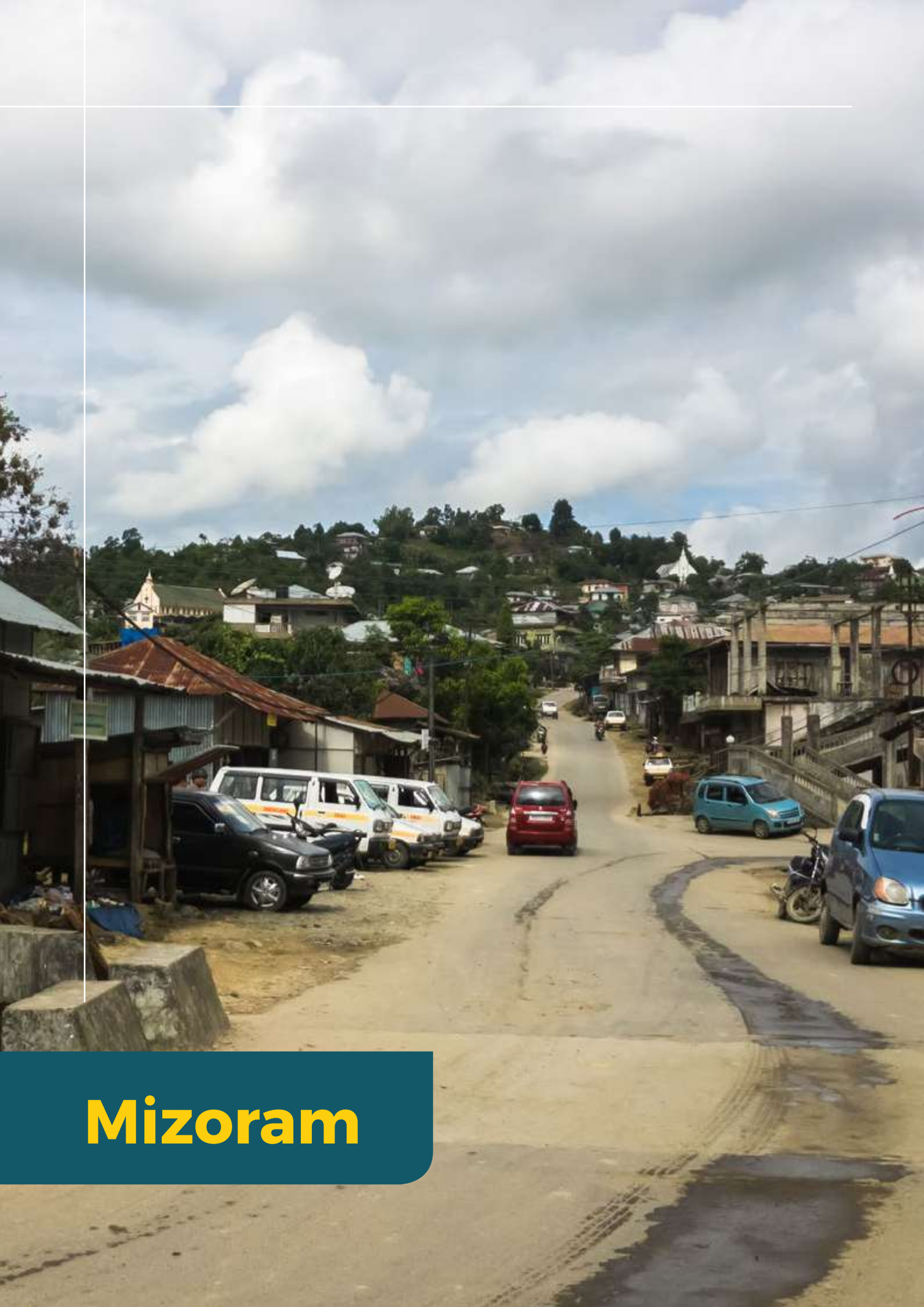
Knowledge Output 4.35

Grassroot innovations	55.56
Patent applications filed	2.57
Trademark applications filed	0.72
Presence of startups	1.64
Industrial Design applications filed	0
New businesses registered	5.51
Publications	17.83

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Mizoram

Rank

05

Category

North East and Hill State

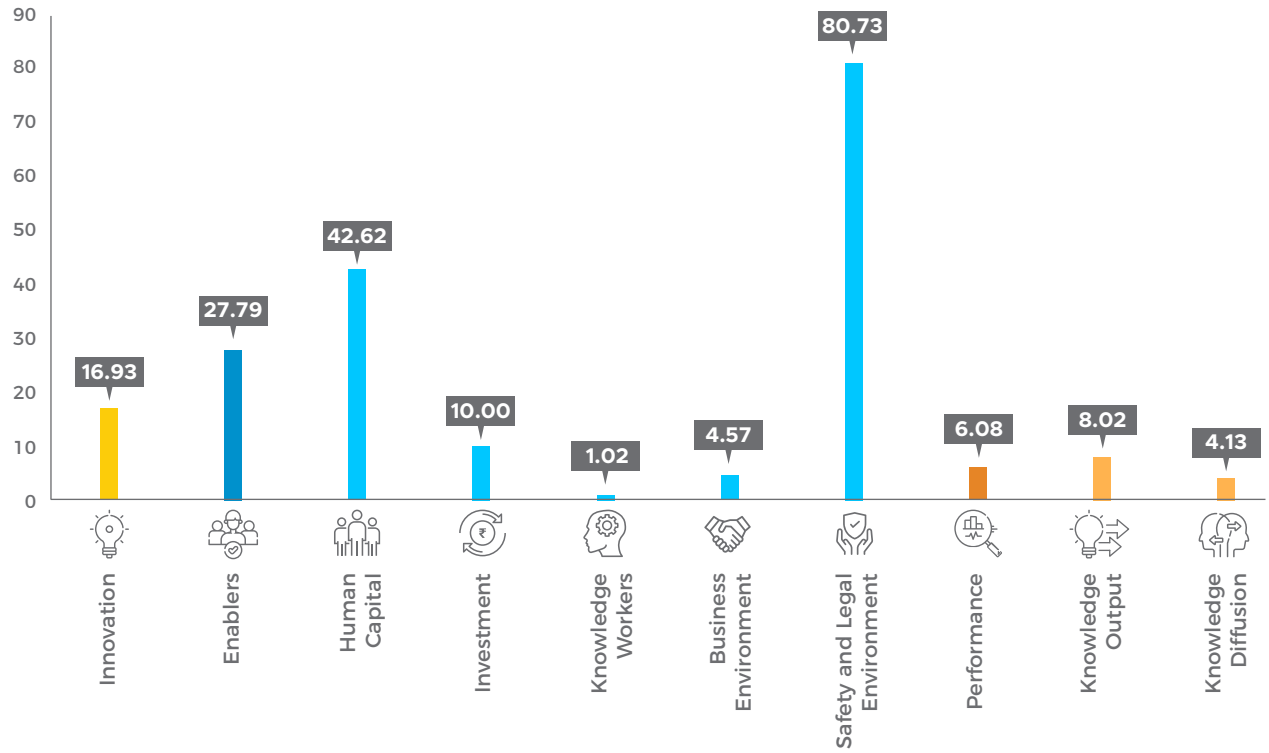
Efficiency Ratio

0.21

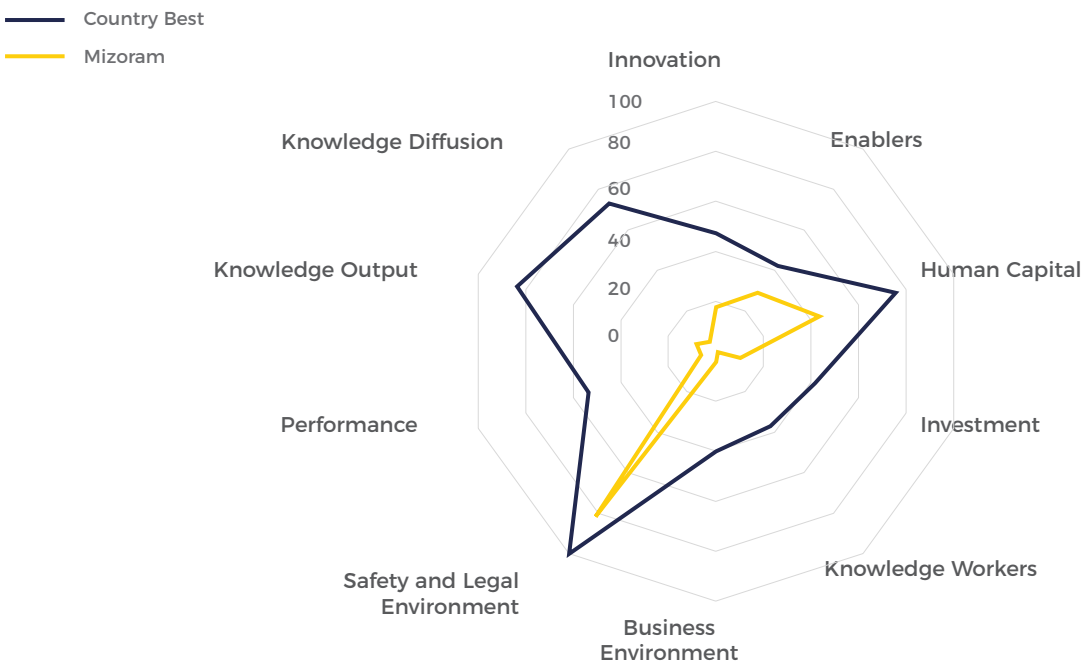
GSDP Per Capita

₹ 1,07,853

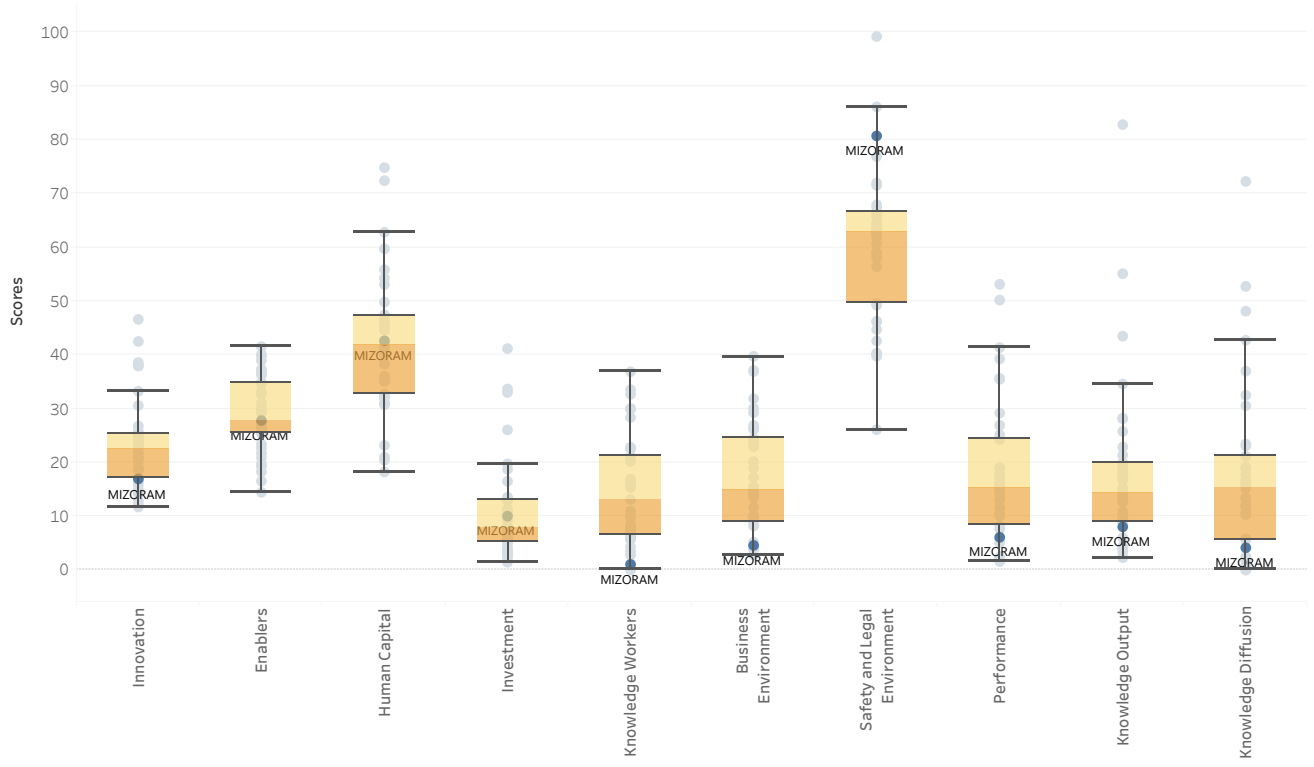
Scores



Country Comparison



Relative Performance



Innovation

16.93

Enablers 27.79

Human Capital 42.62

Enrolment in Ph.D.	87.48
Enrolment in engineering and technology	3.86
Colleges connected through NMEICT	16.36
Higher education institutions with NAAC grade A and above	16.93
Pupil teacher ratio- Higher education	87.76
Schools with ICT labs	0
National Achievement Survey (NAS) Scores (Class X)	91.27

Investment 10.00

Expenditure on higher and technical education	7.57
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	28.69
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 1.02

Knowledge-intensive employment	0
NGOs involved in knowledge intensive areas	3.99
Private R&D units	0
State funded R&D units	0

Business Environment 4.57

Ease of doing business ranking	14.29
Online services transactions	2.88
Internet subscribers	12.56
Incubator centres	0
Common facility centres	0
Cluster Strength	0

Safety and Legal Environment 80.73

Information Technology/Intellectual Property related acts	94.51
Cyber crime police stations	55.65
Pendency of court cases	88.36

Performance 6.08

Knowledge Diffusion 4.13

ICT exports	0
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	2.27
Citations	14.12

Knowledge Output 8.02

Grassroot innovations	66.3
Patent applications filed	28.93
Trademark applications filed	0.4
Presence of startups	1.12
Industrial Design applications filed	0
New businesses registered	5.19
Publications	13.26

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All the indicators have been treated using relevant denominators eg. population, GDP etc.

- Overperforming
- Performing within expected range
- Underperforming

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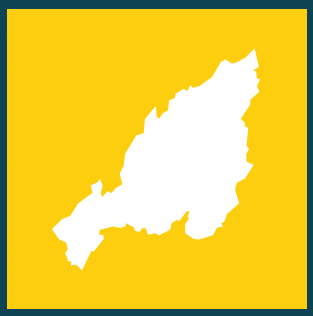
Nagaland



Rank

08

Category

North East and Hill State

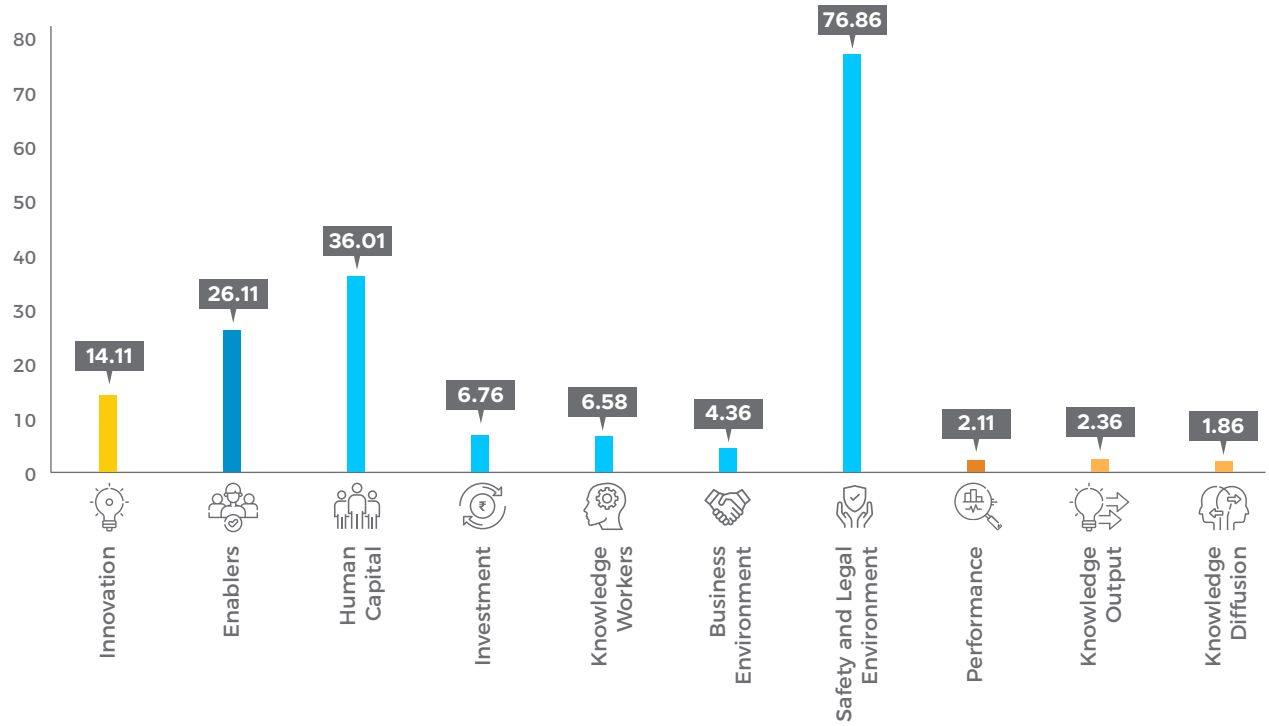
Efficiency Ratio

0.08

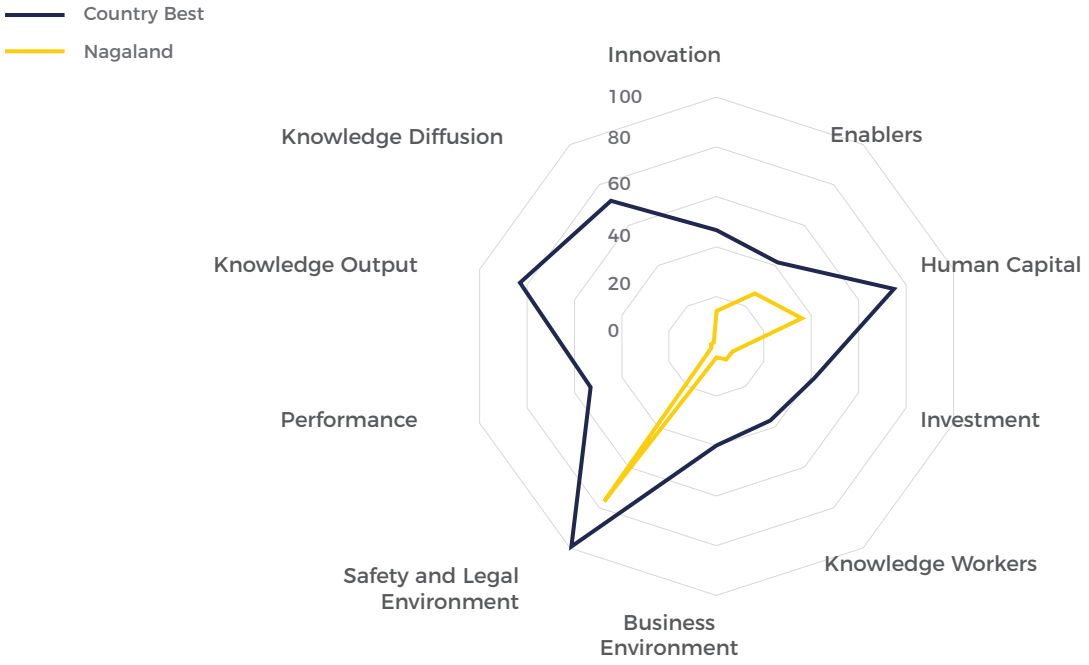
GSDP Per Capita

₹ 73,276

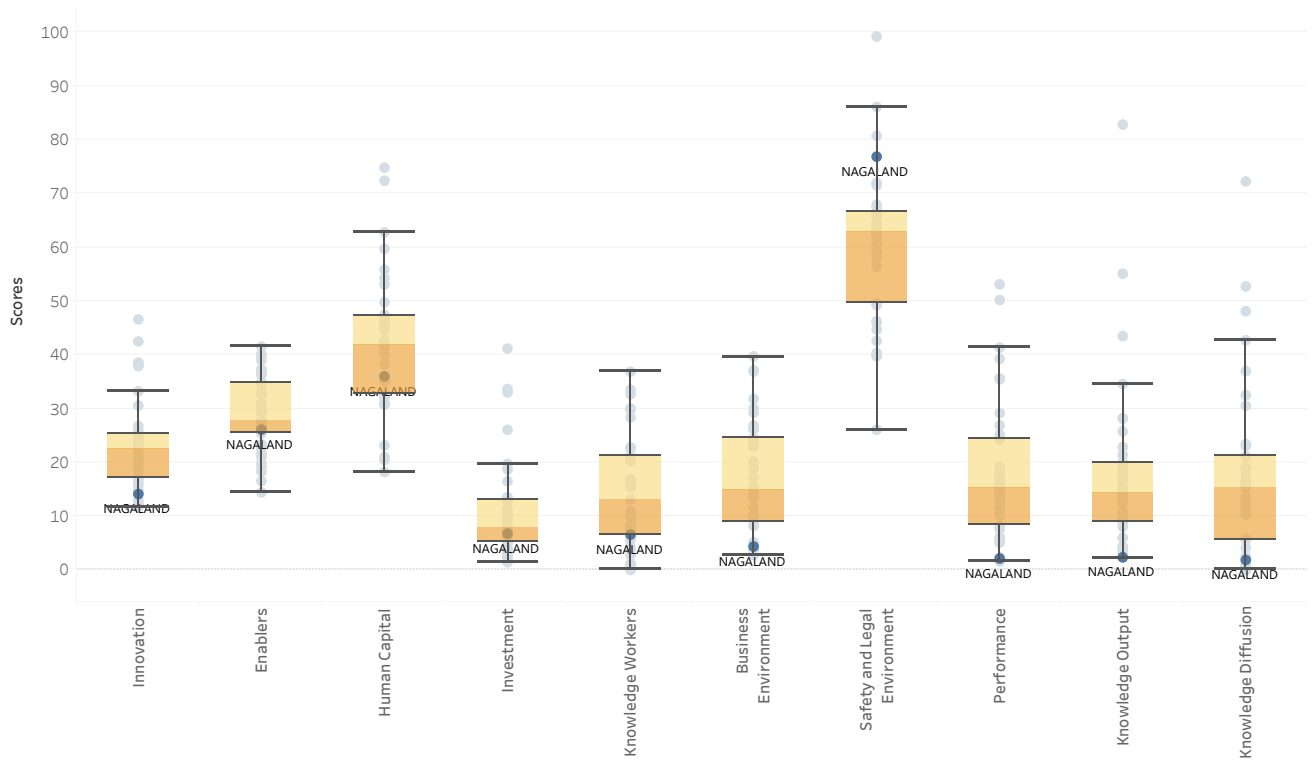
Scores



Country Comparison



Relative Performance



Innovation

14.11

Enablers 26.11

Human Capital 36.01

Enrolment in Ph.D.	30.48
Enrolment in engineering and technology	5.32
Colleges connected through NMEICT	31.43
Higher education institutions with NAAC grade A and above	15.1
Pupil teacher ratio- Higher education	85.71
Schools with ICT labs	13.81
National Achievement Survey (NAS) Scores (Class X)	71.6

Investment 6.76

Expenditure on higher and technical education	3.85
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	16.67
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 6.58

Knowledge-intensive employment	0
NGOs involved in knowledge intensive areas	14.61
Private R&D units	2.22
State funded R&D units	10.2

Business Environment 4.36

Ease of doing business ranking	0
Online services transactions	1.2
Internet subscribers	12.56
Incubator centres	2.14
Common facility centres	0
Cluster Strength	6.5

Safety and Legal Environment 76.86

Information Technology/Intellectual Property related acts	98.9
Cyber crime police stations	30.86
Pendency of court cases	94.36

Performance 2.11

Knowledge Diffusion 1.86

ICT exports	0
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	6.82
Citations	0

Knowledge Output 2.36

Grassroot innovations	45.19
Patent applications filed	3.21
Trademark applications filed	0.46
Presence of startups	7.52
Industrial Design applications filed	0
New businesses registered	0.08
Publications	0

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- Overperforming
- Performing within expected range
- Underperforming

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Odisha

Rank

14

Category

Major State

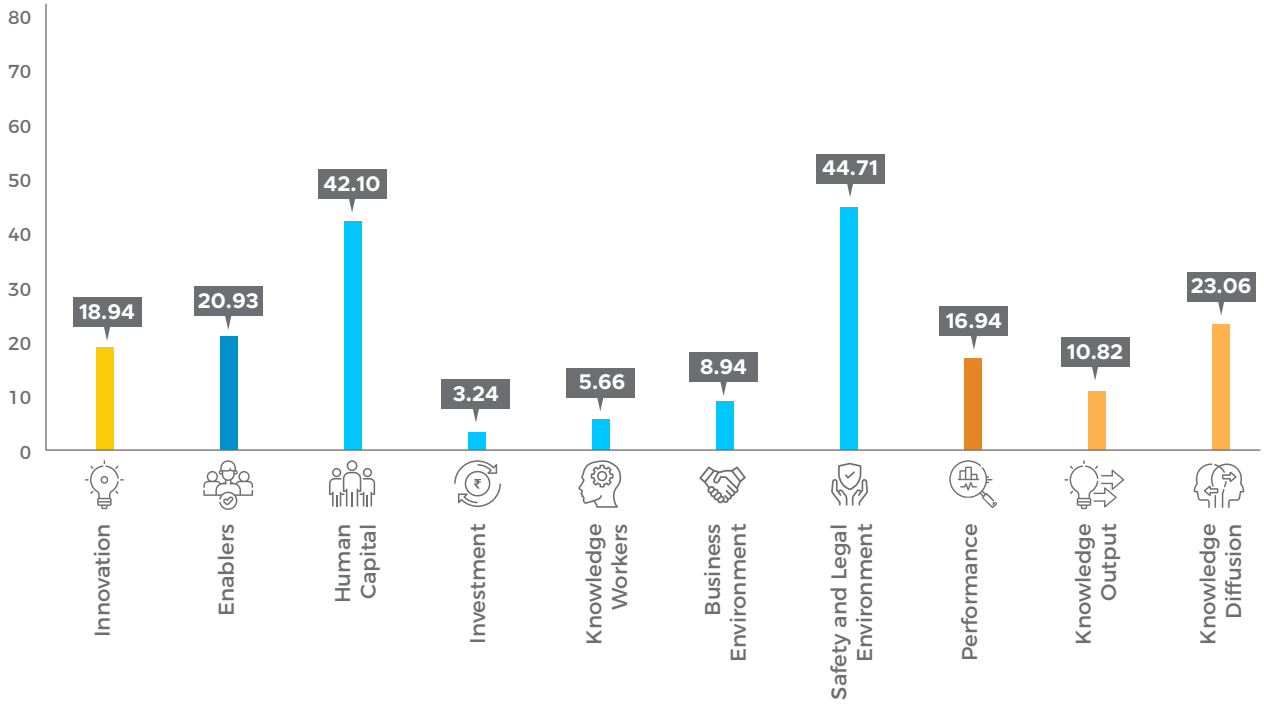
Efficiency Ratio

0.80

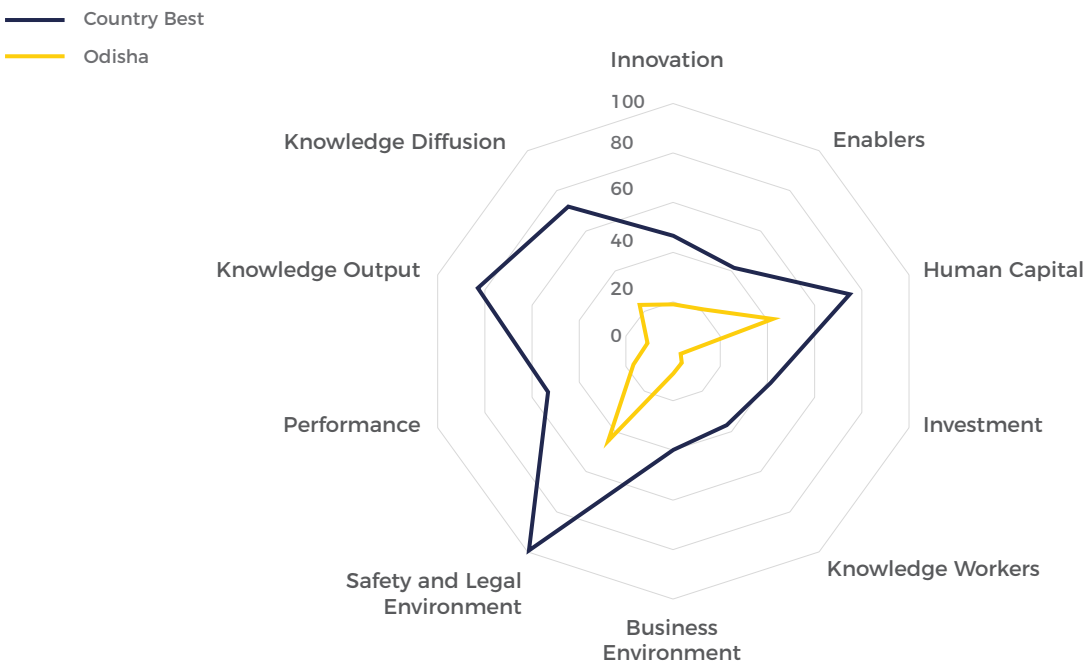
GSDP Per Capita

₹ 76,417

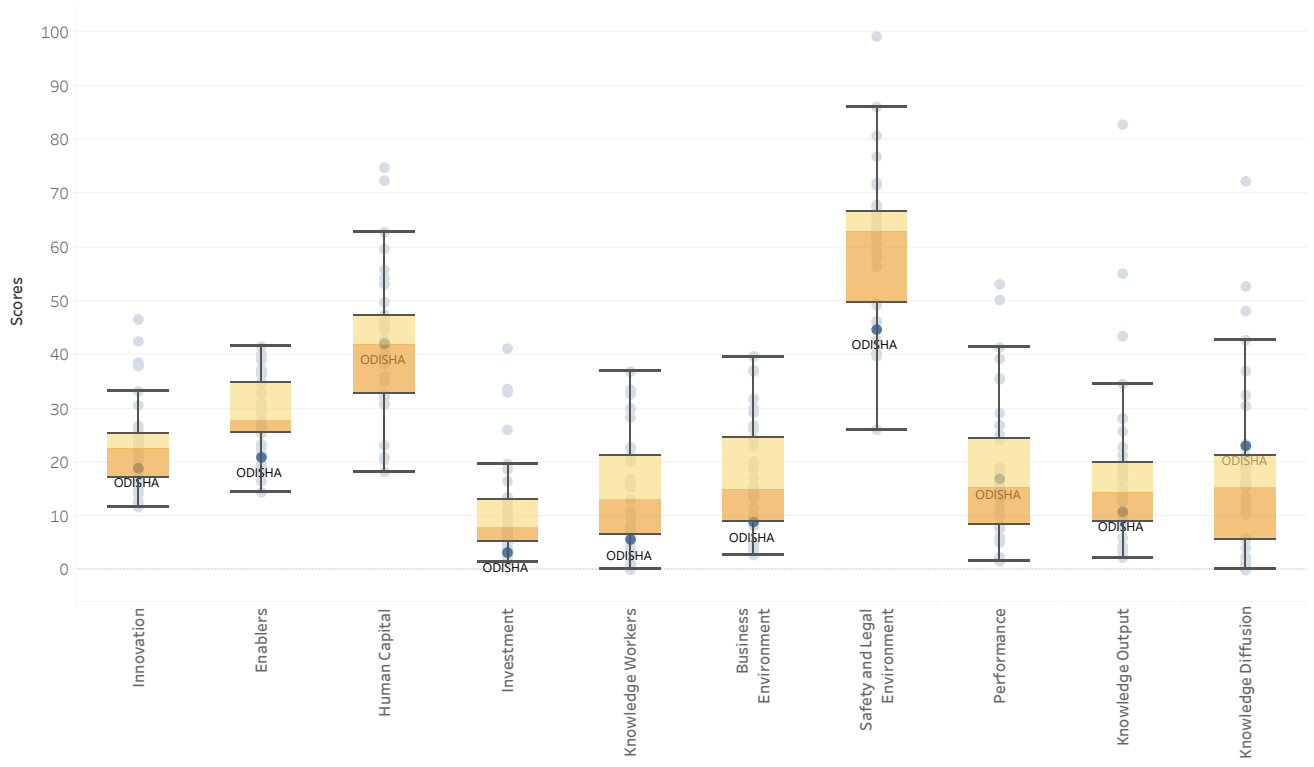
Scores



Country Comparison



Relative Performance



Innovation

18.94

Enablers 20.93

Human Capital 42.1

Enrolment in Ph.D.	10.87
Enrolment in engineering and technology	26.99
Colleges connected through NMEICT	54.81
Higher education institutions with NAAC grade A and above	4.59
Pupil teacher ratio- Higher education	69.39
Schools with ICT labs	40.55
National Achievement Survey (NAS) Scores (Class X)	88.7

Investment 3.24

Expenditure on higher and technical education	4.25
Expenditure on research and development (State govt.)	5.42
Expenditure on science, technology and environment	5.84
FDI inflow	0.33
Venture capital deals	0

Knowledge Workers 5.66

Knowledge-intensive employment	1.54
NGOs involved in knowledge intensive areas	5.36
Private R&D units	3.25
State funded R&D units	13.47

Business Environment 8.94

Ease of doing business ranking	0
Online services transactions	5.94
Internet subscribers	7.89
Incubator centres	2.22
Common facility centres	10.58
Cluster Strength	24.39

Safety and Legal Environment 44.71

Information Technology/Intellectual Property related acts	94.51
Cyber crime police stations	5.82
Pendency of court cases	25.86

Performance 16.94

Knowledge Diffusion 23.06

ICT exports	4.84
High and medium high-tech manufacturing entities	2.65
Geographical Indications (GI) registered	36.36
Citations	45.01

Knowledge Output 10.82

Grassroot innovations	24.44
Patent applications filed	4.96
Trademark applications filed	1.29
Presence of startups	9.37
Industrial Design applications filed	0.23
New businesses registered	17.57
Publications	43.58

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- Overperforming
- Performing within expected range
- Underperforming

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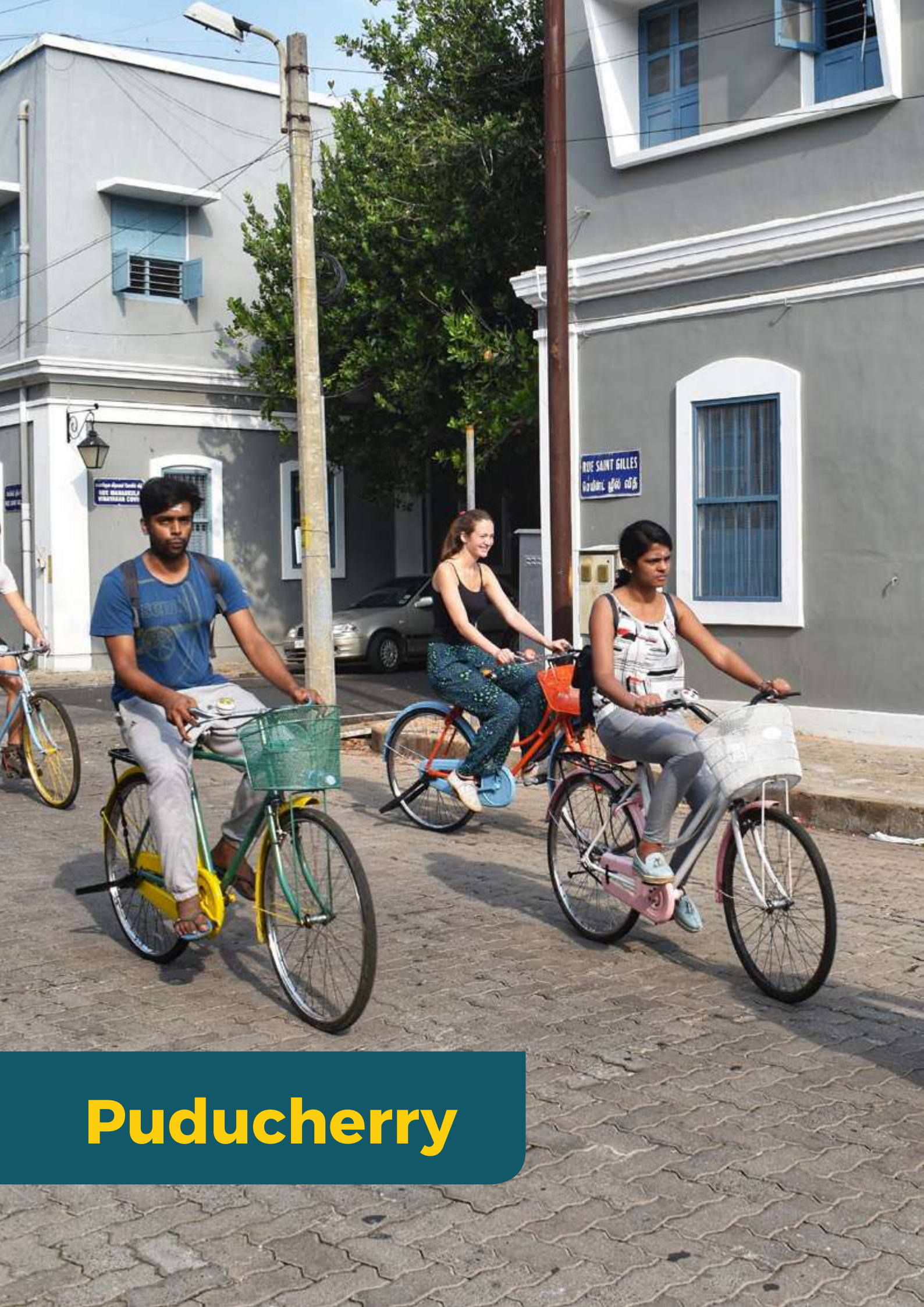


Puducherry

Rank

04

Category

UT/ City State

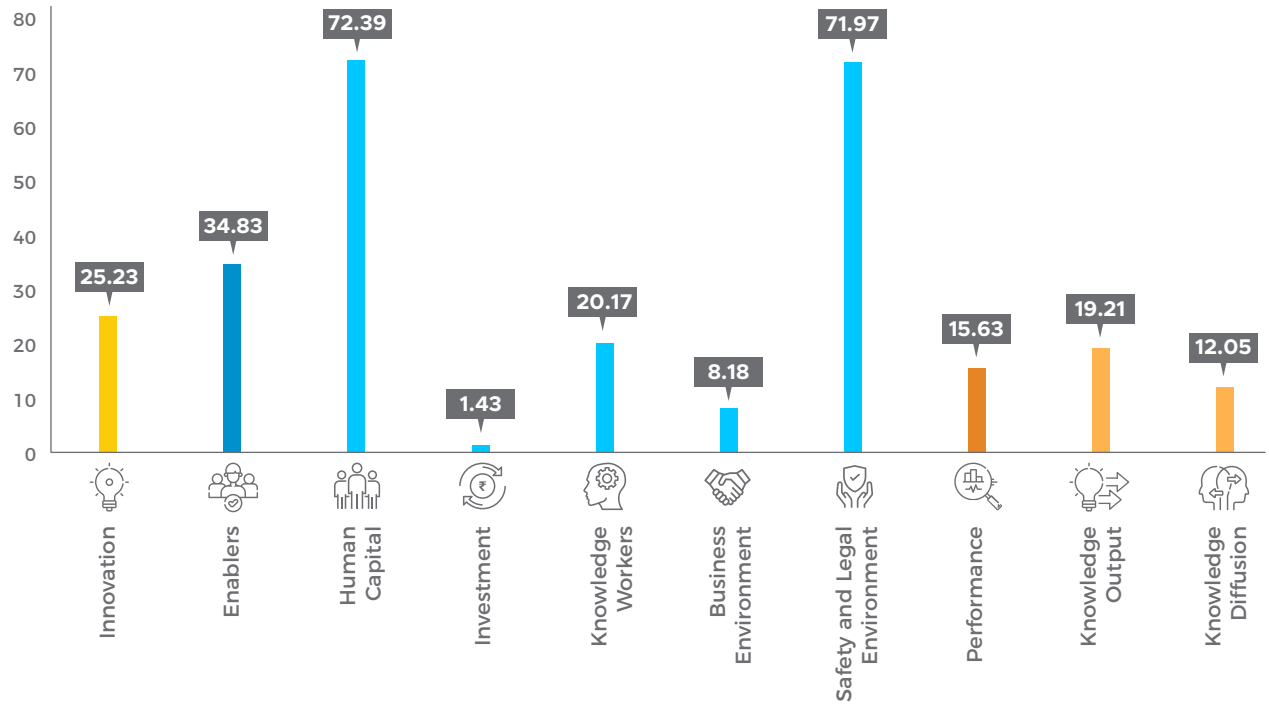
Efficiency Ratio

0.44

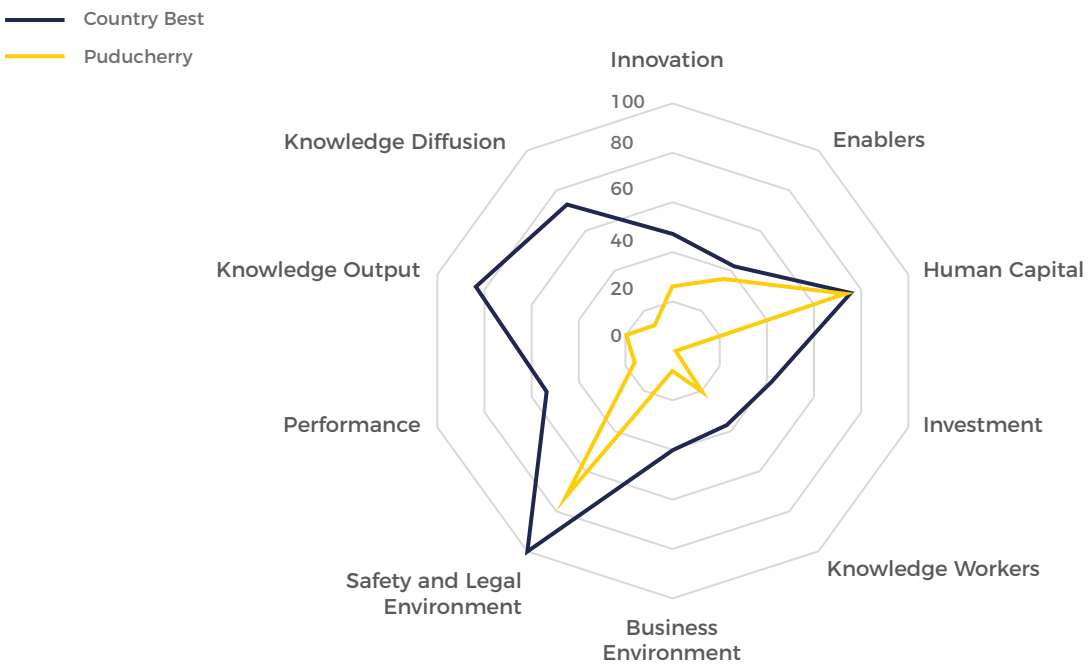
GSDP Per Capita

₹ 1,42,583

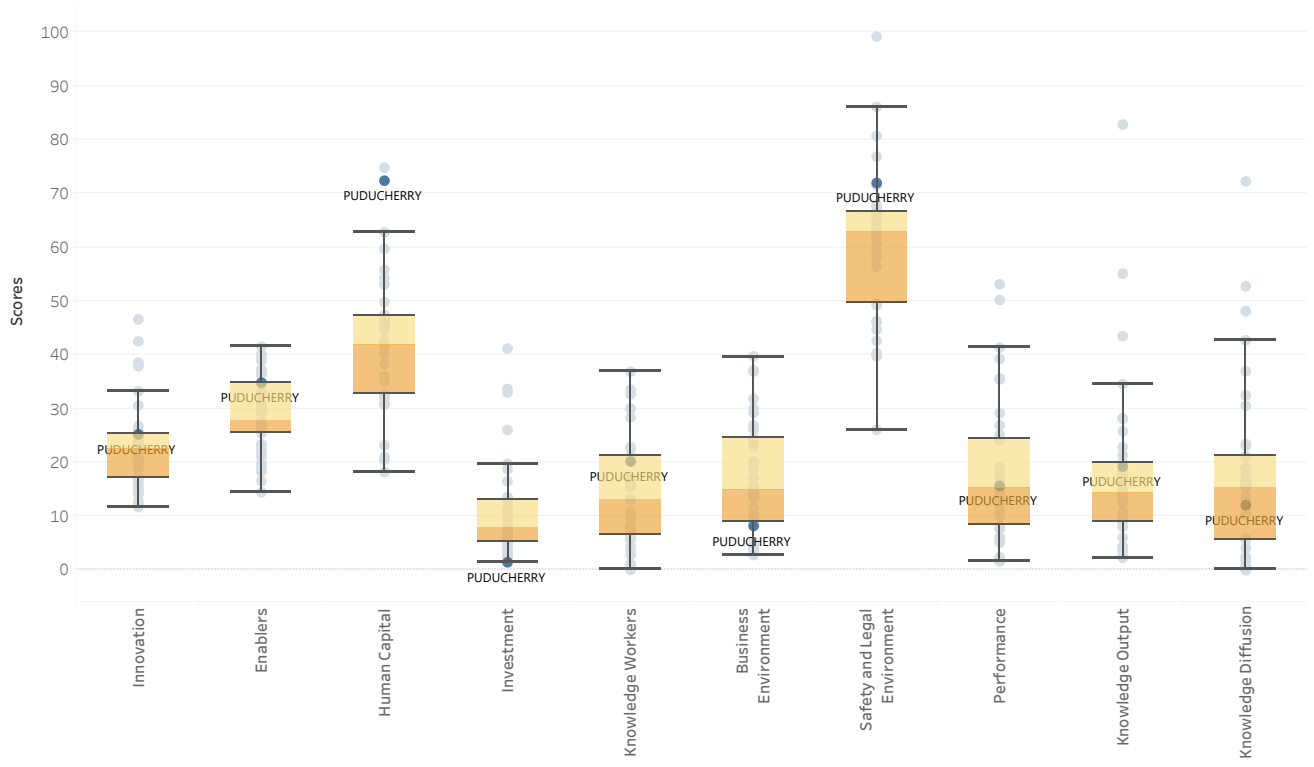
Scores



Country Comparison



Relative Performance



Innovation

25.23

Enablers 34.83

Human Capital 72.39

Enrolment in Ph.D.	78.78
Enrolment in engineering and technology	96.55
Colleges connected through NMEICT	87.79
Higher education institutions with NAAC grade A and above	11.69
Pupil teacher ratio- Higher education	97.96
Schools with ICT labs	54.73
National Achievement Survey (NAS) Scores (Class X)	82.87

Investment 1.43

Expenditure on higher and technical education	1.87
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	4.95
FDI inflow	0.22
Venture capital deals	0

Knowledge Workers 20.17

Knowledge-intensive employment	21.04
NGOs involved in knowledge intensive areas	8.42
Private R&D units	56.38
State funded R&D units	0

Business Environment 8.18

Ease of doing business ranking	7.14
Online services transactions	8.68
Internet subscribers	14.37
Incubator centres	3.39
Common facility centres	0
Cluster Strength	14.63

Safety and Legal Environment 71.97

Information Technology/Intellectual Property related acts	89.01
Cyber crime police stations	48.93
Pendency of court cases	74.26

Performance 15.63

Knowledge Diffusion 12.05

ICT exports	7.64
High and medium high-tech manufacturing entities	5.18
Geographical Indications (GI) registered	4.55
Citations	30.49

Knowledge Output 19.21

Grassroot innovations	5.19
Patent applications filed	55.97
Trademark applications filed	6.34
Presence of startups	12.8
Industrial Design applications filed	0.2
New businesses registered	18.78
Publications	29.66

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- 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

Punjab

Rank

10

Category

Major State

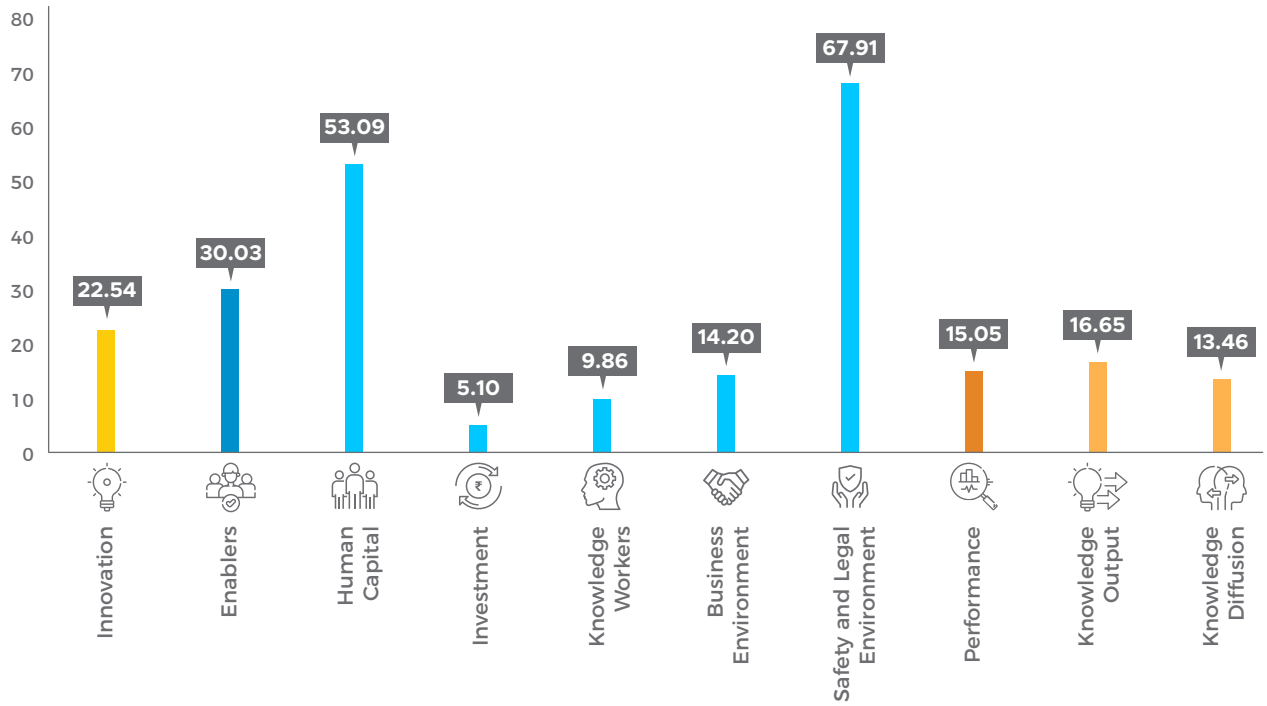
Efficiency Ratio

0.50

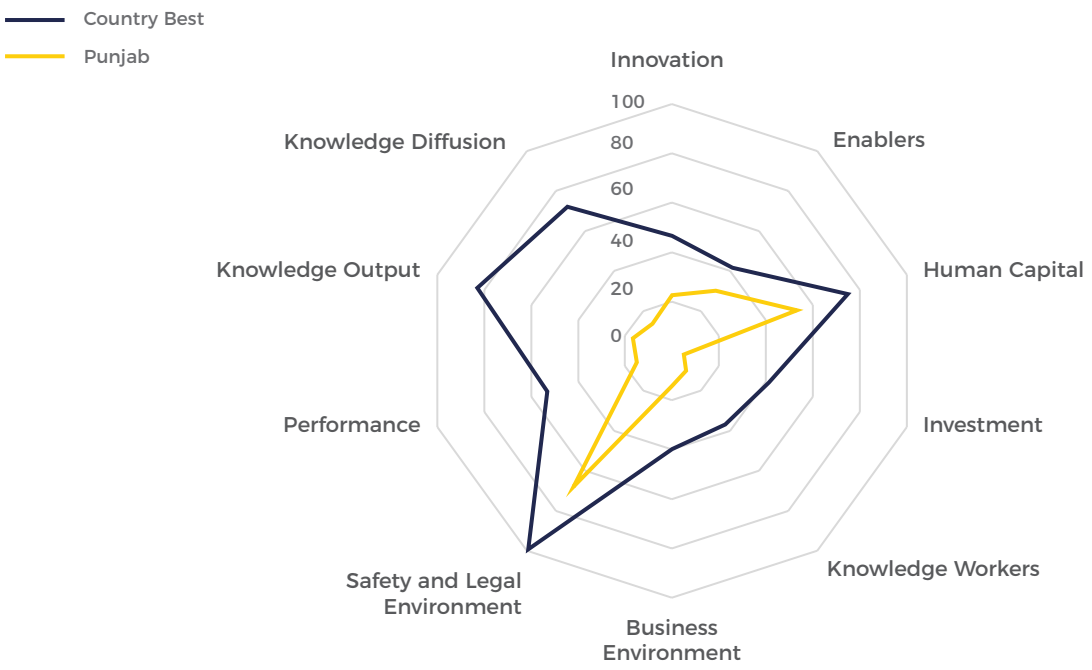
GSDP Per Capita

₹ 1,15,882

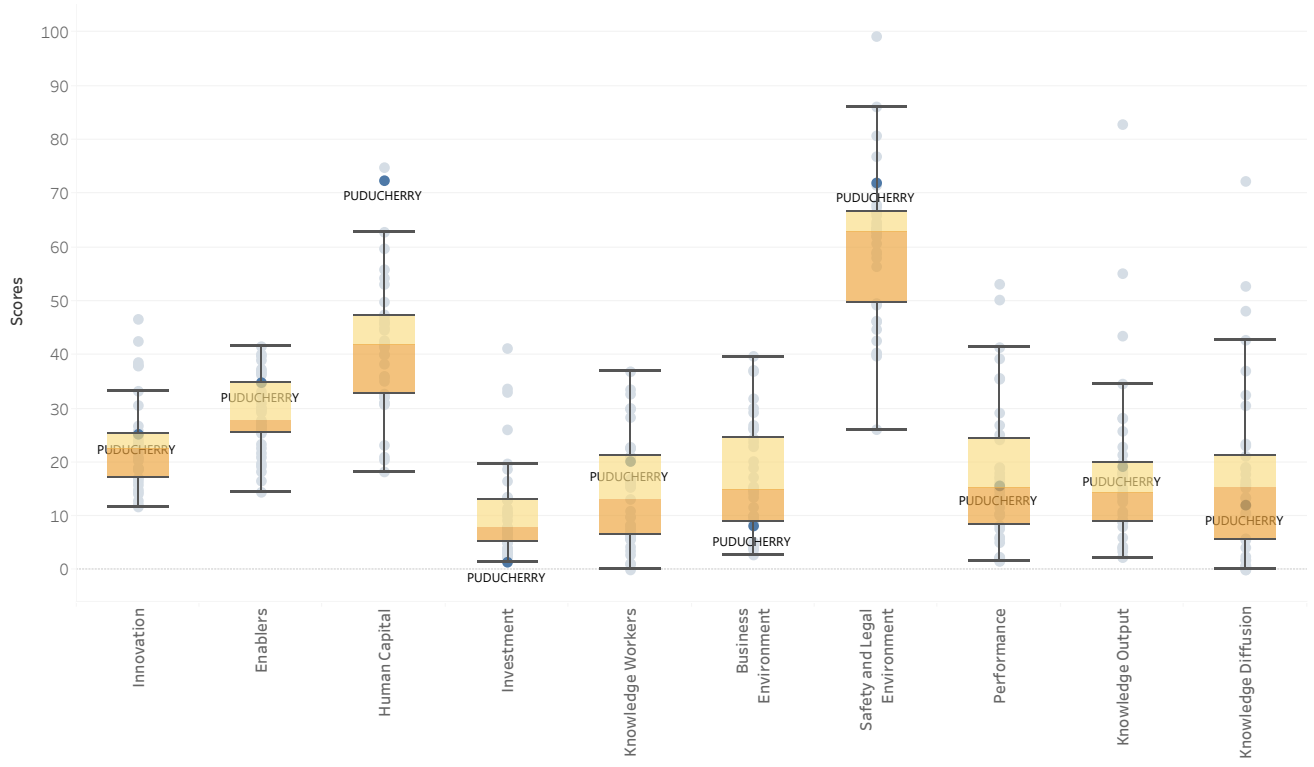
Scores



Country Comparison



Relative Performance



Innovation

22.54

Enablers 30.03

Human Capital 53.09

Enrolment in Ph.D.	40.19
Enrolment in engineering and technology	35
Colleges connected through NMEICT	57.66
Higher education institutions with NAAC grade A and above	14.15
Pupil teacher ratio- Higher education	87.76
Schools with ICT labs	57.21
National Achievement Survey (NAS) Scores (Class X)	85.02

Investment 5.10

Expenditure on higher and technical education	1.83
Expenditure on research and development (State govt.)	18.72
Expenditure on science, technology and environment	0.67
FDI inflow	2.47
Venture capital deals	0

Knowledge Workers 9.86

Knowledge-intensive employment	10.48
NGOs involved in knowledge intensive areas	1.55
Private R&D units	10.62
State funded R&D units	17.47

Business Environment 14.2

Ease of doing business ranking	35.71
Online services transactions	6.28
Internet subscribers	30.81
Incubator centres	1.68
Common facility centres	0
Cluster Strength	17.89

Safety and Legal Environment 67.91

Information Technology/Intellectual Property related acts	92.31
Cyber crime police stations	4.4
Pendency of court cases	98.57

Performance 15.05

Knowledge Diffusion 13.46

ICT exports	0.78
High and medium high-tech manufacturing entities	2.39
Geographical Indications (GI) registered	4.55
Citations	46.53

Knowledge Output 16.65

Grassroot innovations	3.7
Patent applications filed	30.21
Trademark applications filed	13.7
Presence of startups	7.69
Industrial Design applications filed	2.25
New businesses registered	14.85
Publications	43.94

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All the indicators have been treated using relevant denominators eg. population, GDP etc.

- Overperforming
- Performing within expected range
- Underperforming

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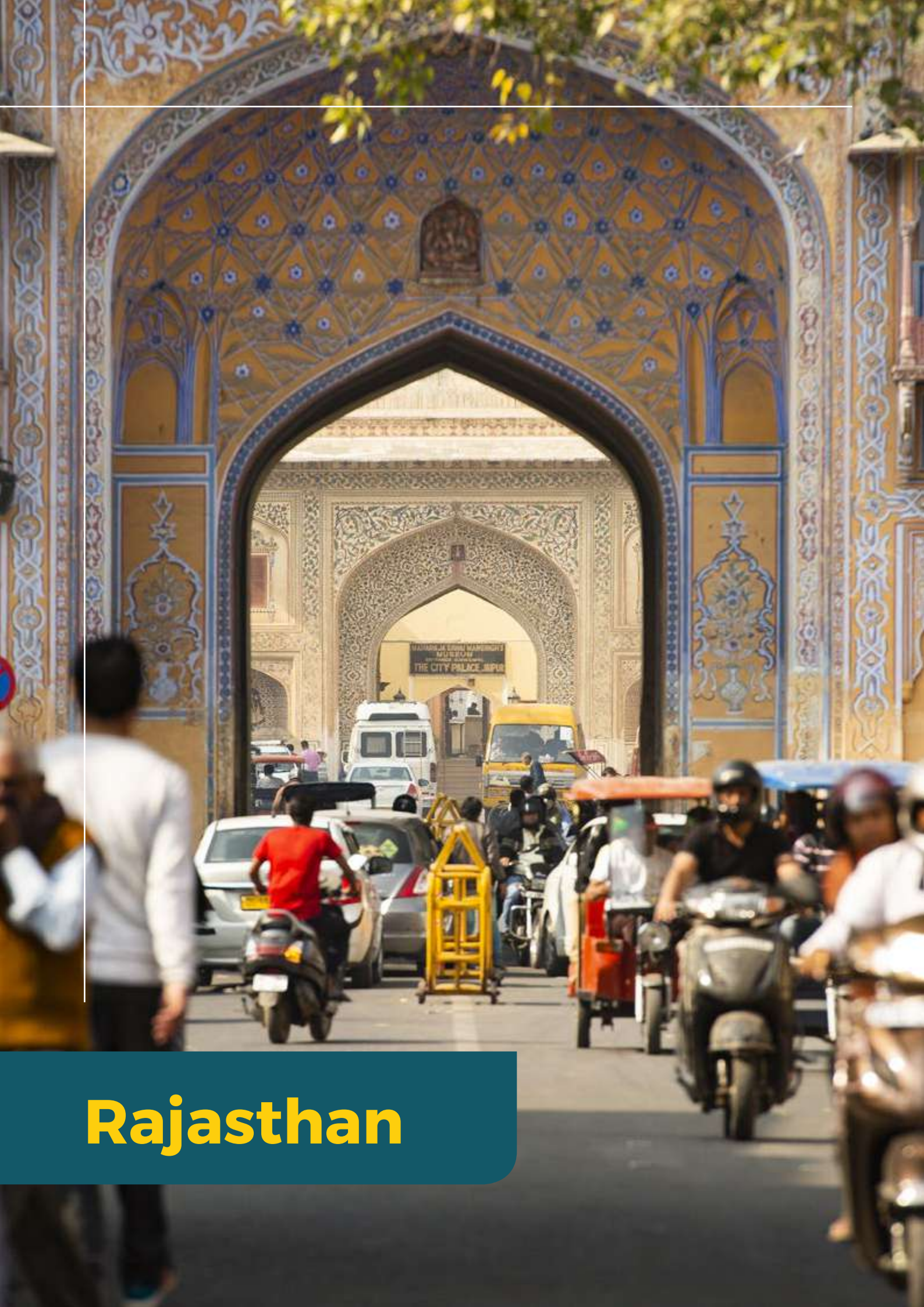


Rajasthan

Rank

12

Category

Major State

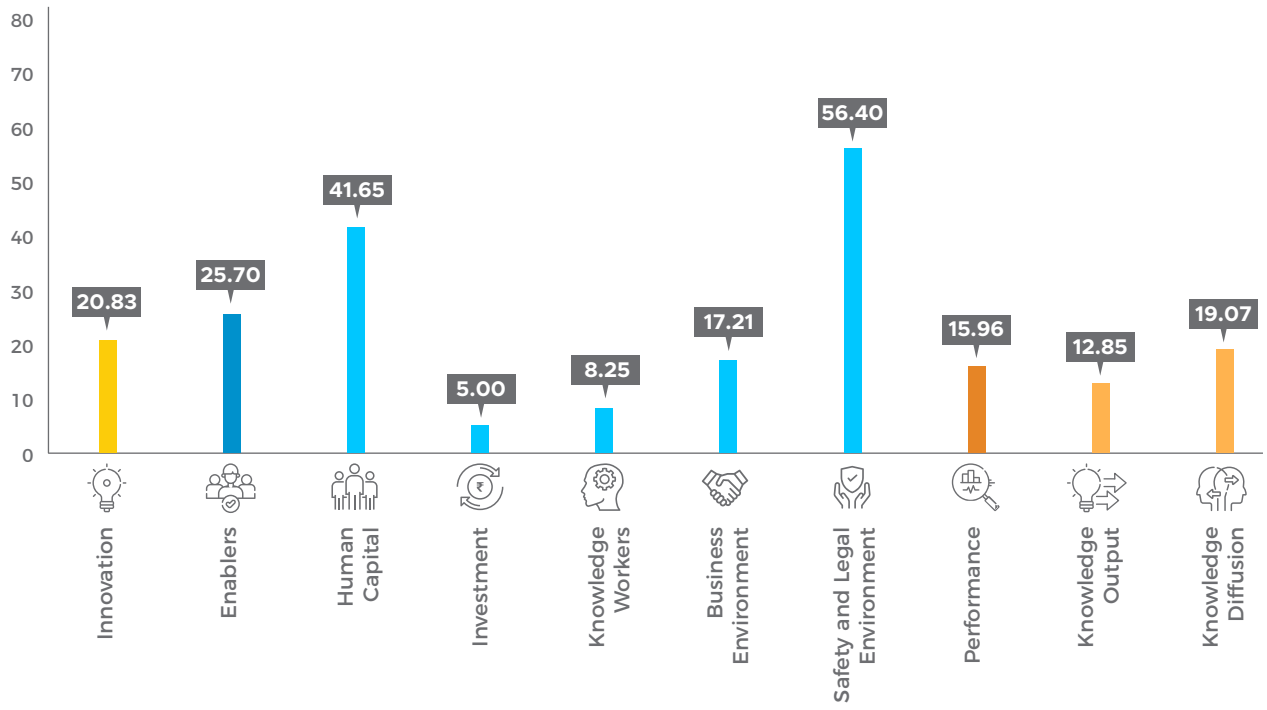
Efficiency Ratio

0.62

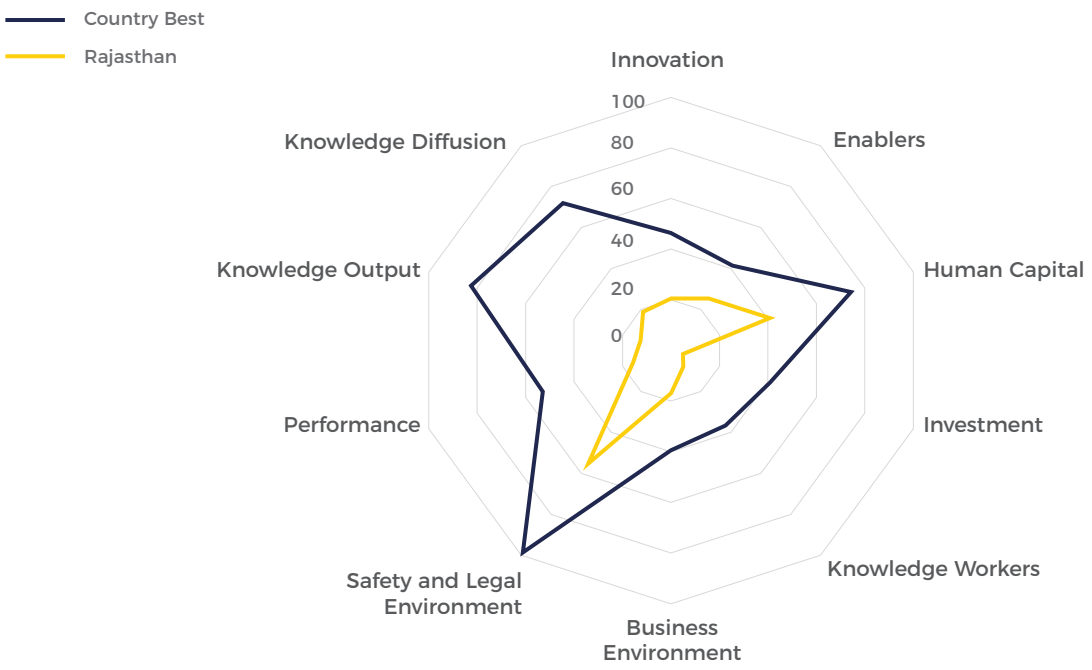
GSDP Per Capita

₹ 78,570

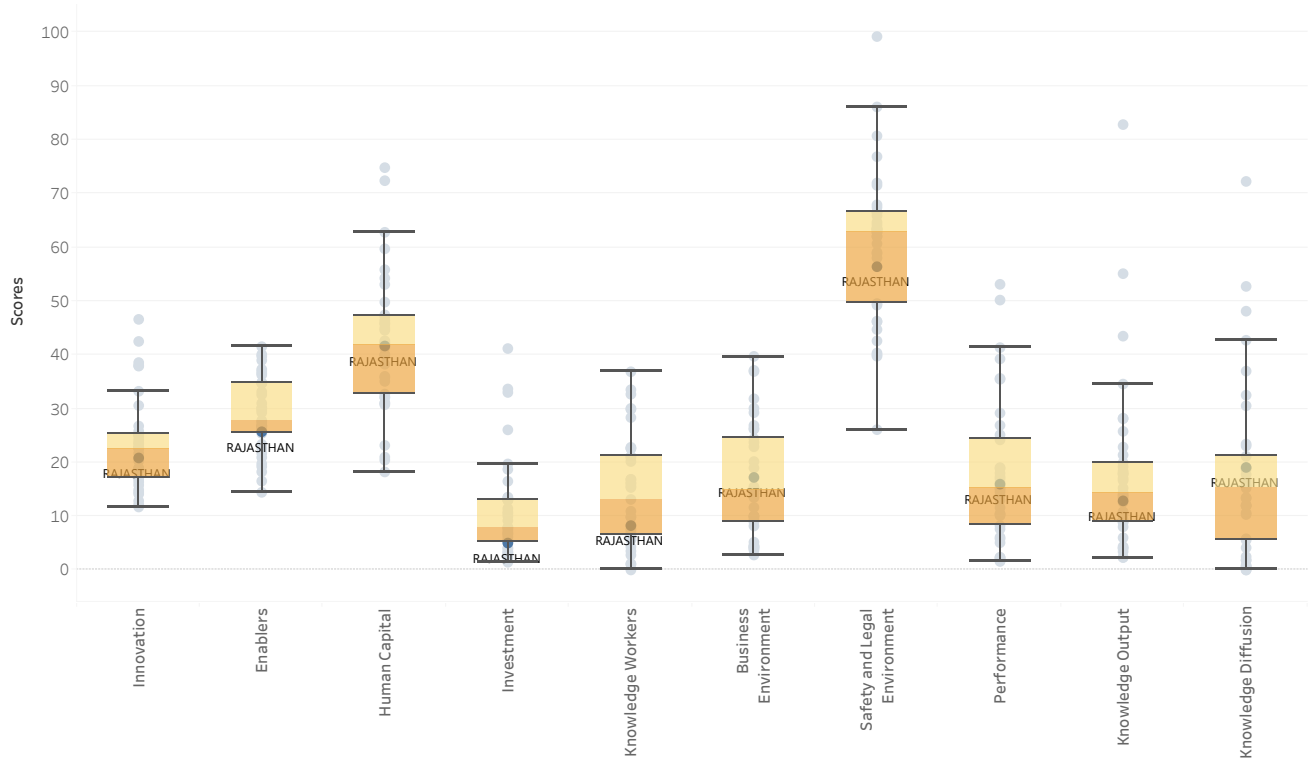
Scores



Country Comparison



Relative Performance



Innovation

20.83

Enablers 25.7

Human Capital 41.65

Enrolment in Ph.D.	18.67
Enrolment in engineering and technology	12.5
Colleges connected through NMEICT	56.36
Higher education institutions with NAAC grade A and above	1.27
Pupil teacher ratio- Higher education	65.31
Schools with ICT labs	45.9
National Achievement Survey (NAS) Scores (Class X)	96.47

Investment 5.00

Expenditure on higher and technical education	0
Expenditure on research and development (State govt.)	4.35
Expenditure on science, technology and environment	1.03
FDI inflow	3.44
Venture capital deals	15.62

Knowledge Workers 8.25

Knowledge-intensive employment	9.48
NGOs involved in knowledge intensive areas	3.72
Private R&D units	5
State funded R&D units	14.43

Business Environment 17.21

Ease of doing business ranking	75
Online services transactions	9.51
Internet subscribers	13.86
Incubator centres	1.6
Common facility centres	0
Cluster Strength	34.96

Safety and Legal Environment 56.4

Information Technology/Intellectual Property related acts	86.81
Cyber crime police stations	1.78
Pendency of court cases	72.57

Performance 15.96

Knowledge Diffusion 19.07

ICT exports	1.08
High and medium high-tech manufacturing entities	4.11
Geographical Indications (GI) registered	34.09
Citations	35.06

Knowledge Output 12.85

Grassroot innovations	6.3
Patent applications filed	5.65
Trademark applications filed	5.66
Presence of startups	14.92
Industrial Design applications filed	1.08
New businesses registered	22.75
Publications	34.72

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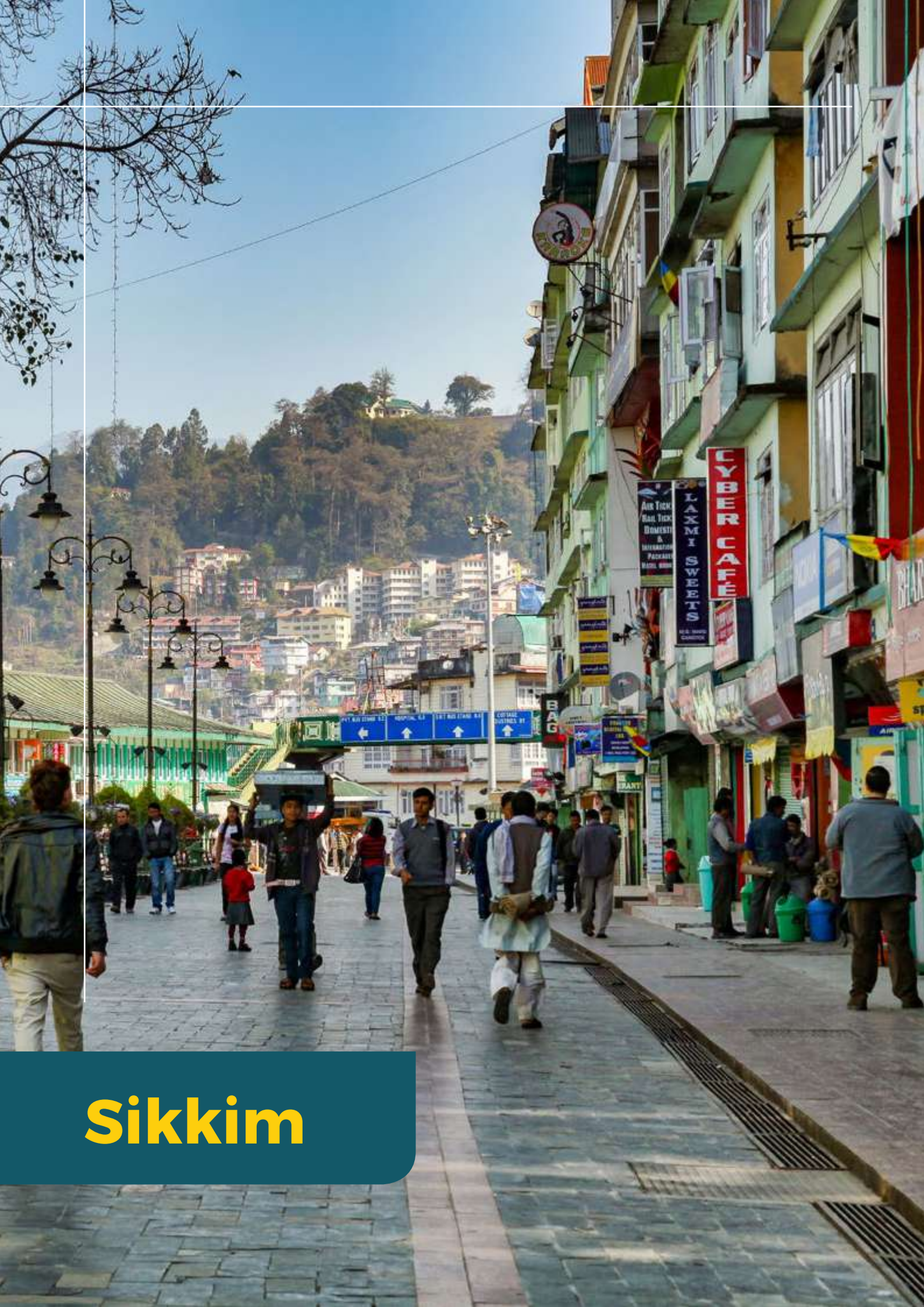
- Overperforming
- Performing within expected range
- Underperforming

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



Sikkim

Rank

04

Category

North East and Hill State

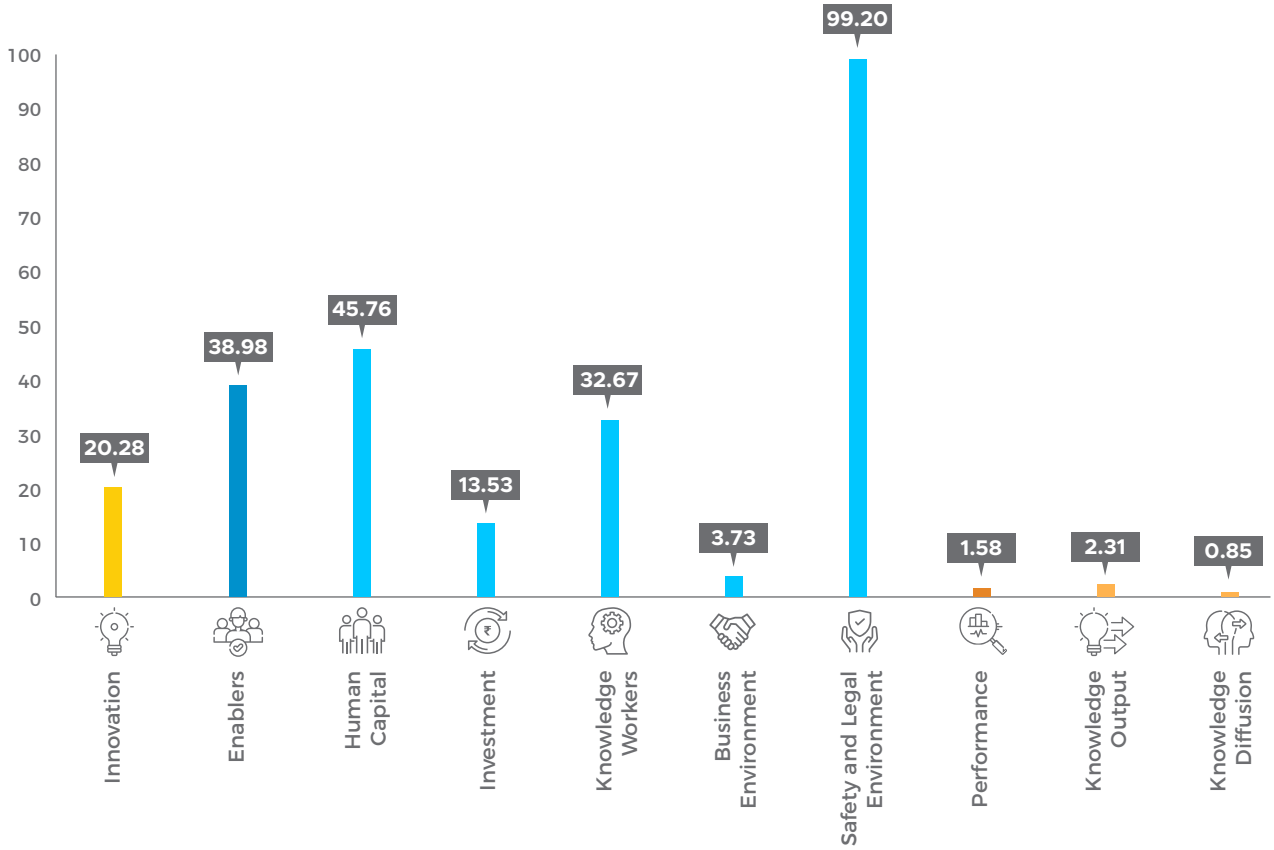
Efficiency Ratio

0.04

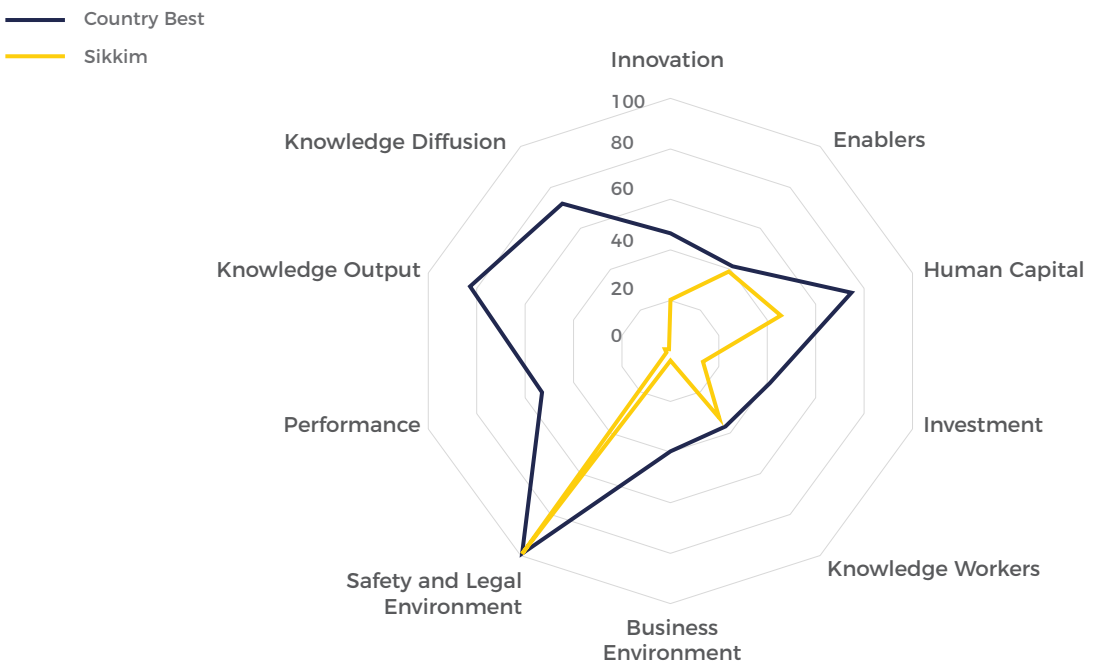
GSDP Per Capita

₹ 2,42,002

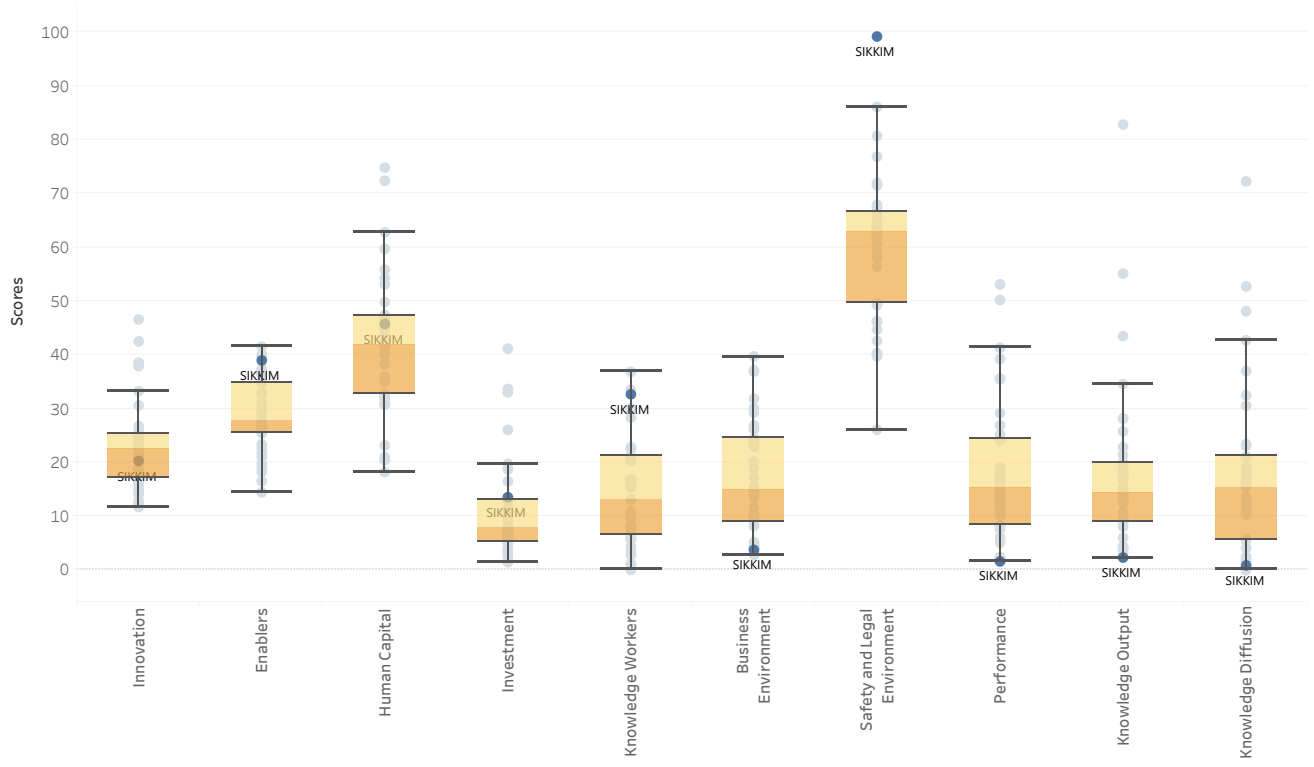
Scores



Country Comparison



Relative Performance



Innovation

20.28

Enablers 38.98

Human Capital 45.76

Enrolment in Ph.D.	80.11
Enrolment in engineering and technology	23.02
Colleges connected through NMEICT	48.83
Higher education institutions with NAAC grade A and above	0
Pupil teacher ratio- Higher education	69.39
Schools with ICT labs	24.13
National Achievement Survey (NAS) Scores (Class X)	83.74

Investment 13.53

Expenditure on higher and technical education	43.61
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	18.13
FDI inflow	12.75
Venture capital deals	0

Knowledge Workers 32.67

Knowledge-intensive employment	100
NGOs involved in knowledge intensive areas	2.87
Private R&D units	7.2
State funded R&D units	0

Business Environment 3.73

Ease of doing business ranking	0
Online services transactions	2.52
Internet subscribers	12.04
Incubator centres	0
Common facility centres	0
Cluster Strength	4.07

Safety and Legal Environment 99.2

Information Technology/Intellectual Property related acts	97.8
Cyber crime police stations	100
Pendency of court cases	100

Performance 1.58

Knowledge Diffusion 0.85

ICT exports	0.76
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	2.27
Citations	0

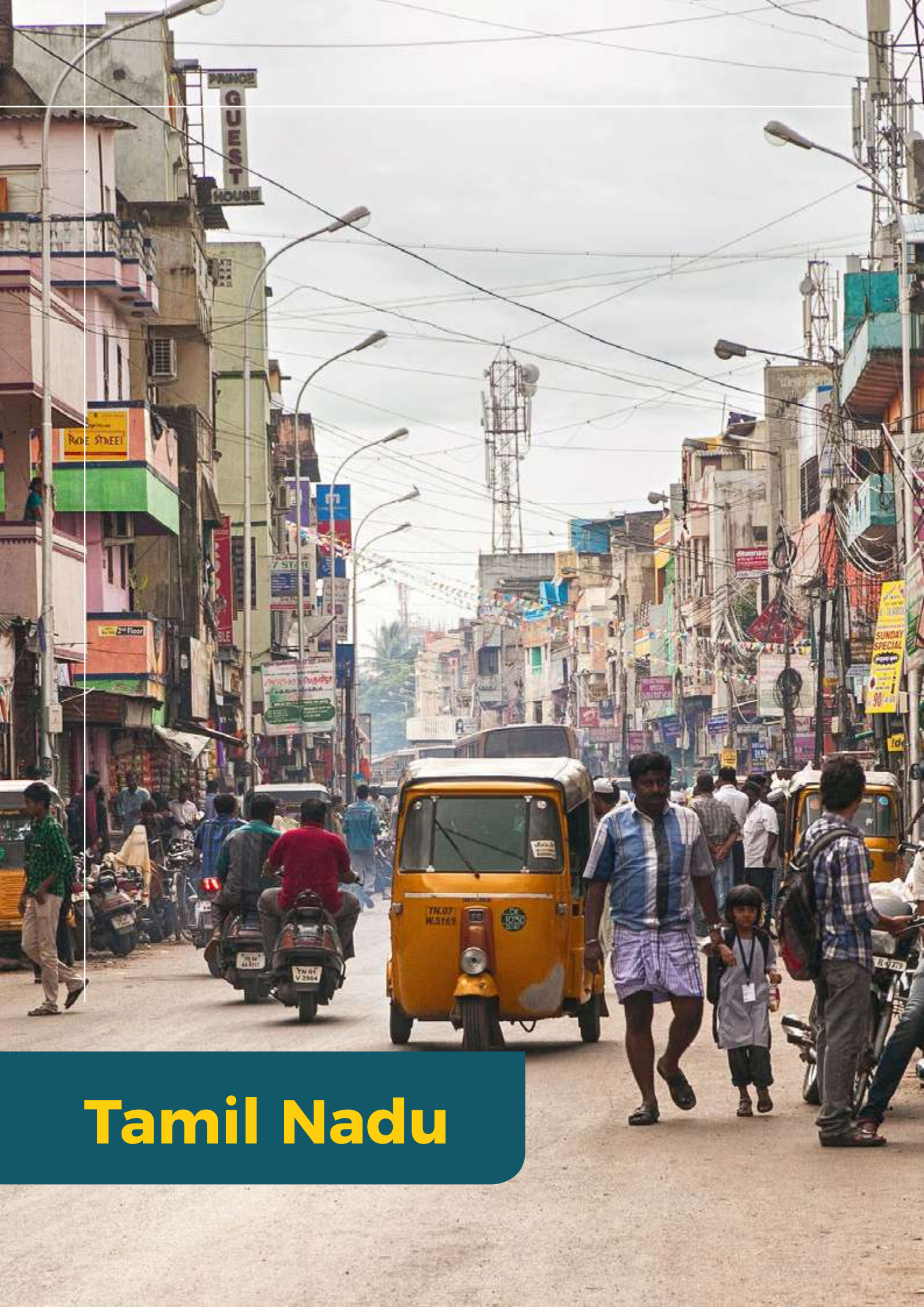
Knowledge Output 2.31

Grassroot innovations	61.48
Patent applications filed	8.32
Trademark applications filed	1.38
Presence of startups	0
Industrial Design applications filed	0
New businesses registered	0
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Tamil Nadu

Rank

03

Category

Major State

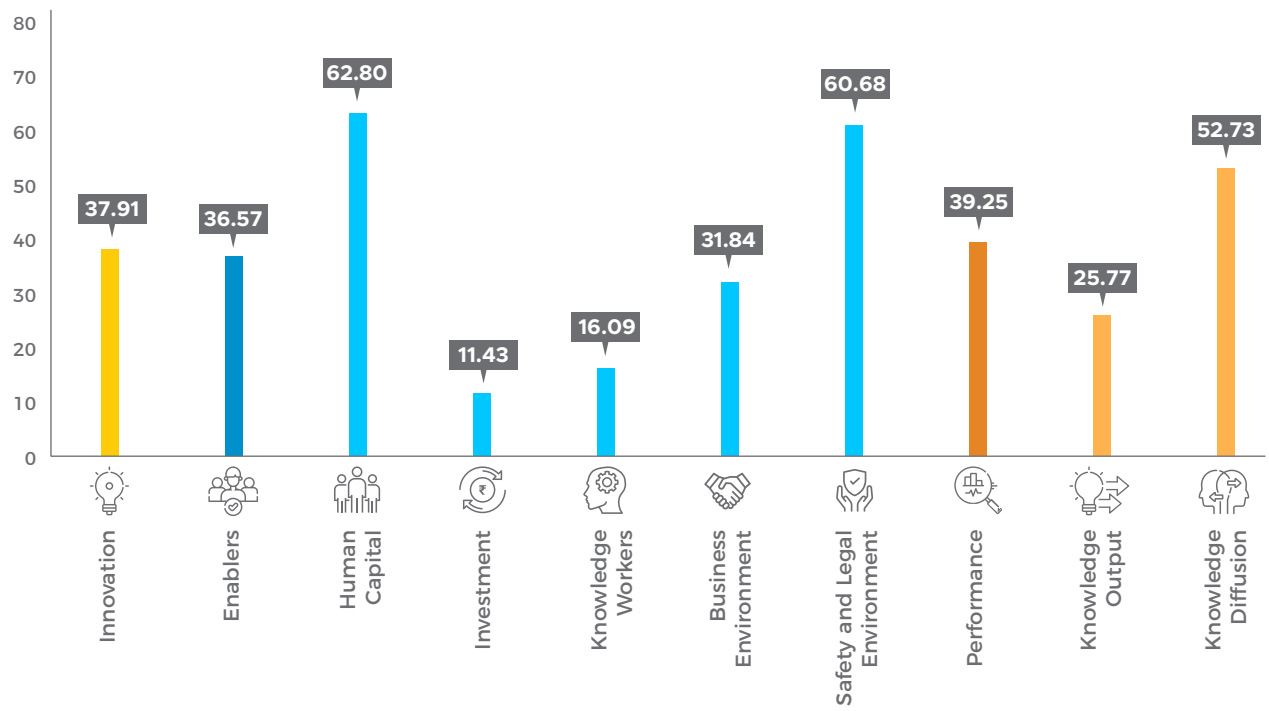
Efficiency Ratio

1.07

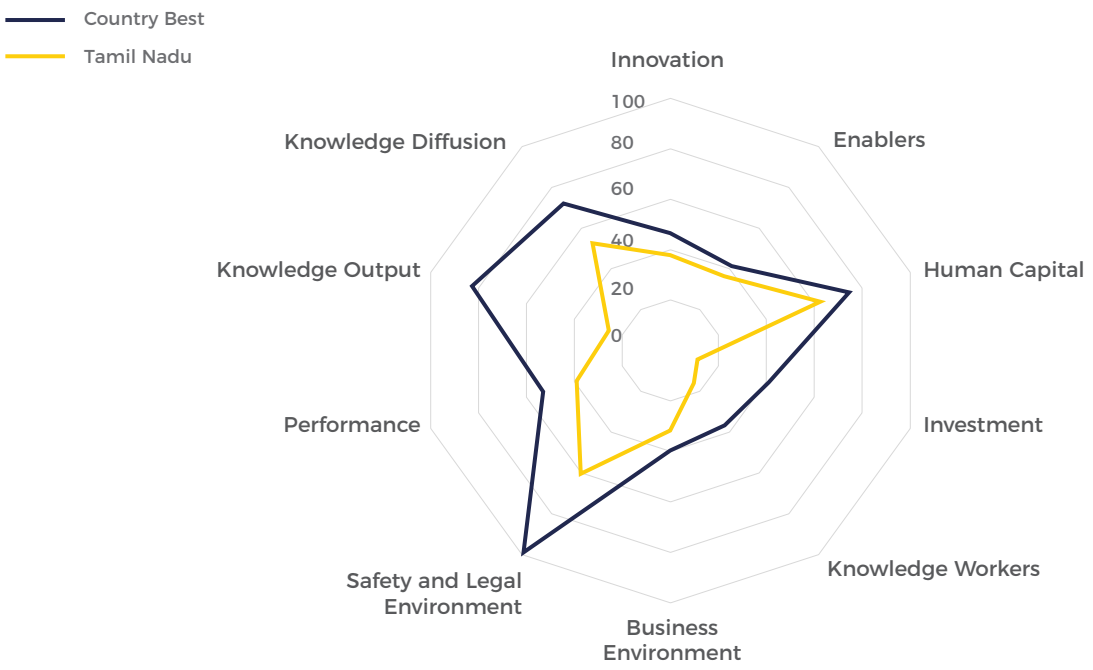
GSDP Per Capita

₹ 1,42,941

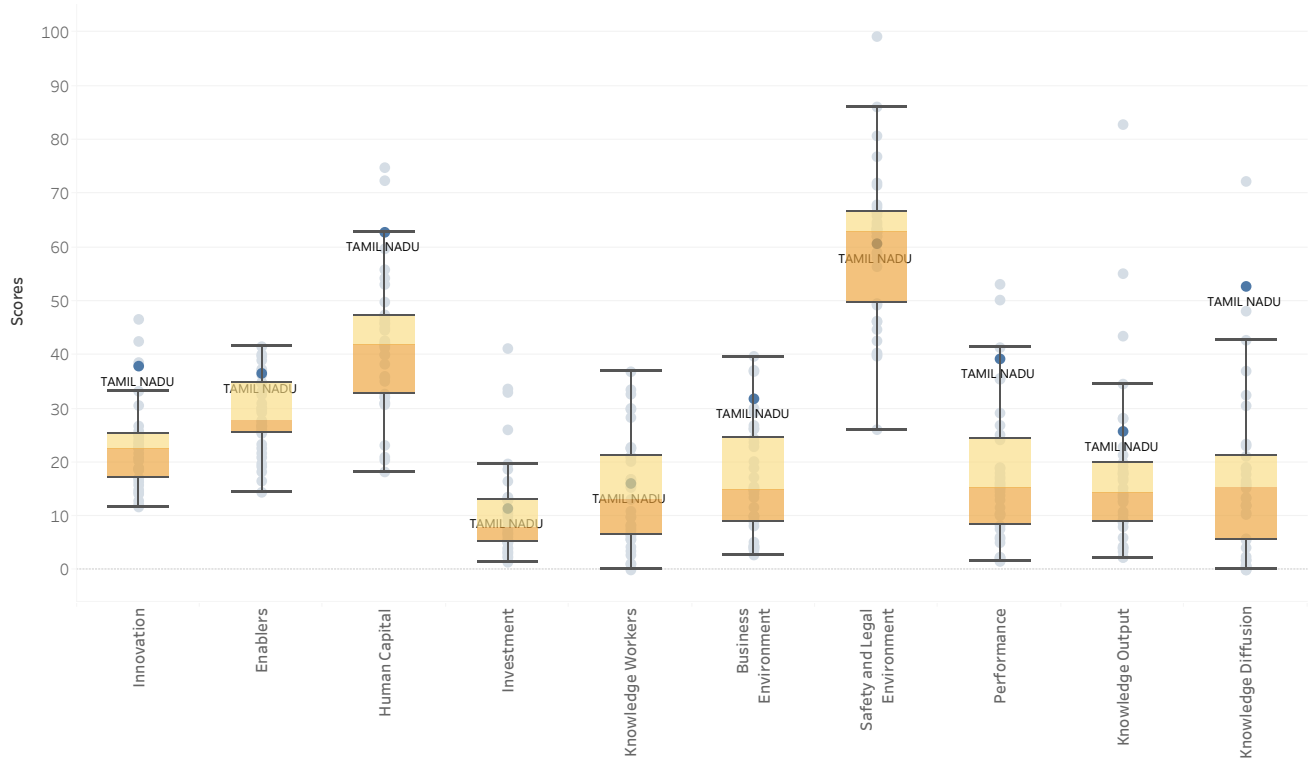
Scores



Country Comparison



Relative Performance



Innovation

37.91

Enablers 36.57

Human Capital 62.8

Enrolment in Ph.D.	43.87
Enrolment in engineering and technology	100
Colleges connected through NMEICT	78.7
Higher education institutions with NAAC grade A and above	17.44
Pupil teacher ratio- Higher education	89.8
Schools with ICT labs	20.65
National Achievement Survey (NAS) Scores (Class X)	82.04

Investment 11.43

Expenditure on higher and technical education	20.56
Expenditure on research and development (State govt.)	7.7
Expenditure on science, technology and environment	0.48
FDI inflow	10.1
Venture capital deals	21.44

Knowledge Workers 16.09

Knowledge-intensive employment	9.92
NGOs involved in knowledge intensive areas	3.91
Private R&D units	28.71
State funded R&D units	26.31

Business Environment 31.84

Ease of doing business ranking	53.57
Online services transactions	14.9
Internet subscribers	20.99
Incubator centres	4.16
Common facility centres	33.95
Cluster Strength	81.3

Safety and Legal Environment 60.68

Information Technology/Intellectual Property related acts	91.21
Cyber crime police stations	5.92
Pendency of court cases	76.86

Performance 39.25

Knowledge Diffusion 52.73

ICT exports	22.39
High and medium high-tech manufacturing entities	6.61
Geographical Indications (GI) registered	72.73
Citations	100

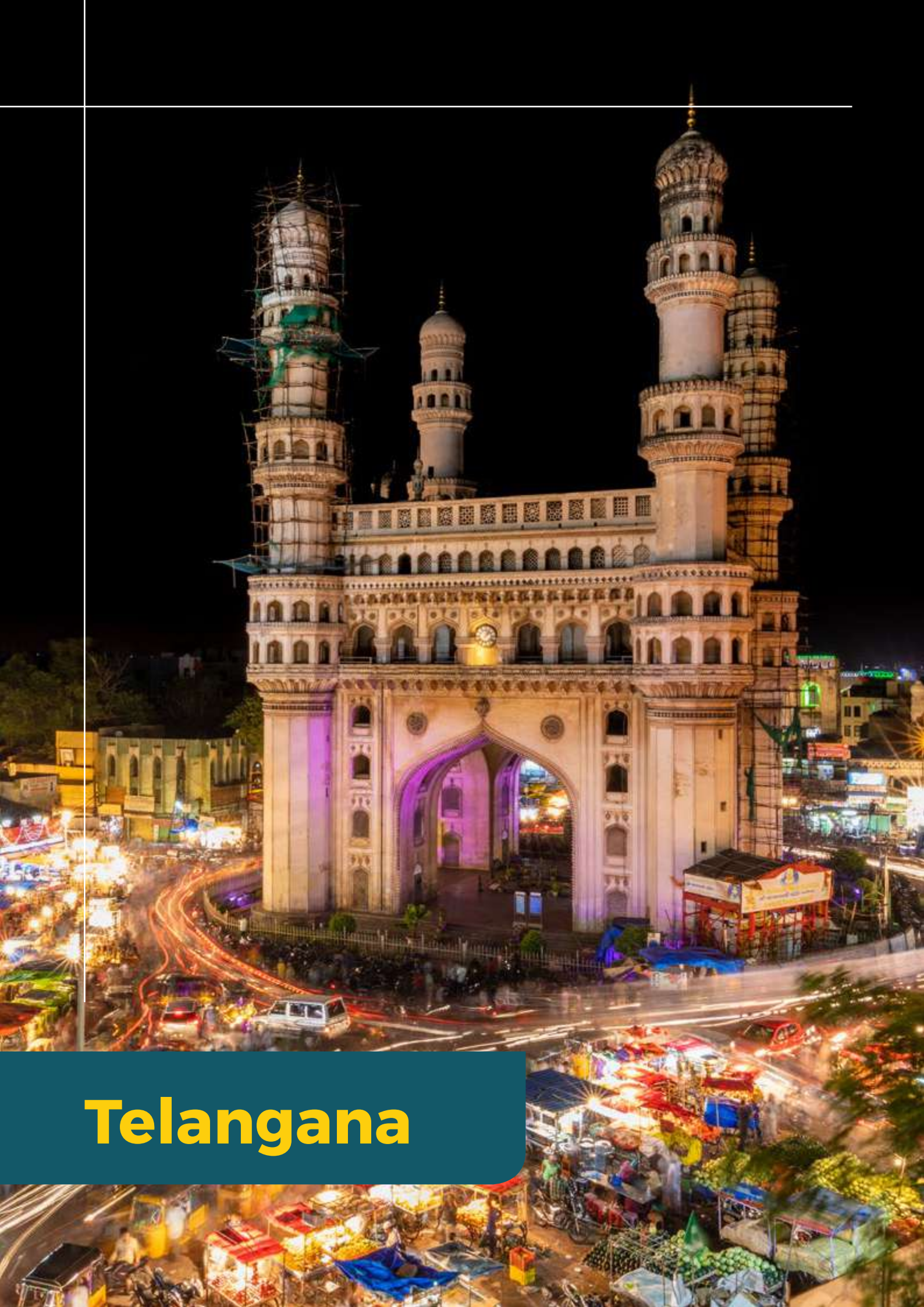
Knowledge Output 25.77

Grassroot innovations	5.93
Patent applications filed	42.08
Trademark applications filed	8.2
Presence of startups	14.03
Industrial Design applications filed	2.16
New businesses registered	23.47
Publications	100

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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



Telangana

Rank

04

Category

Major State

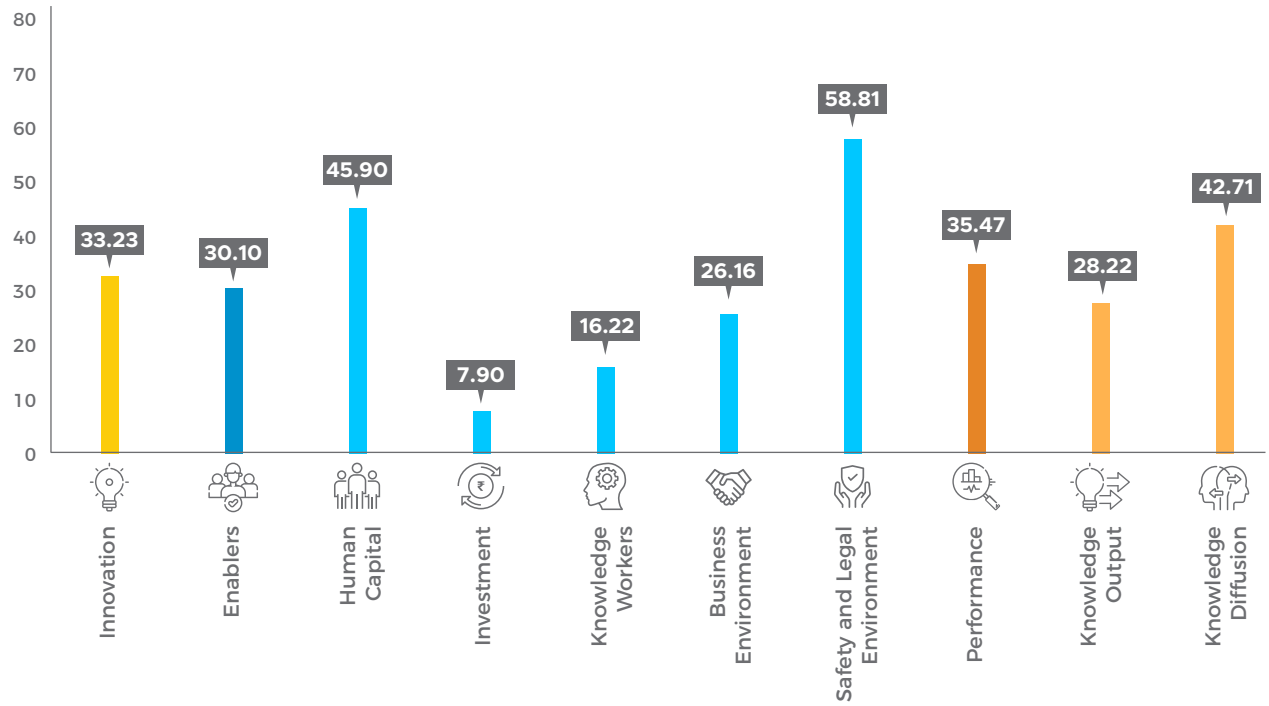
Efficiency Ratio

1.14

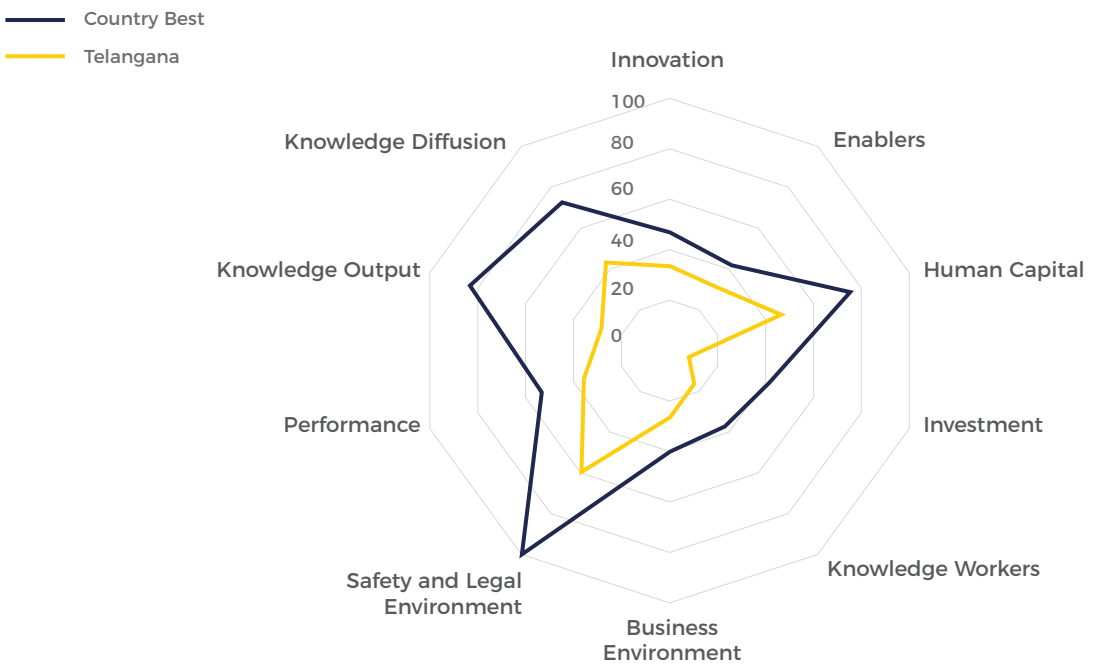
GSDP Per Capita

₹ 1,43,618

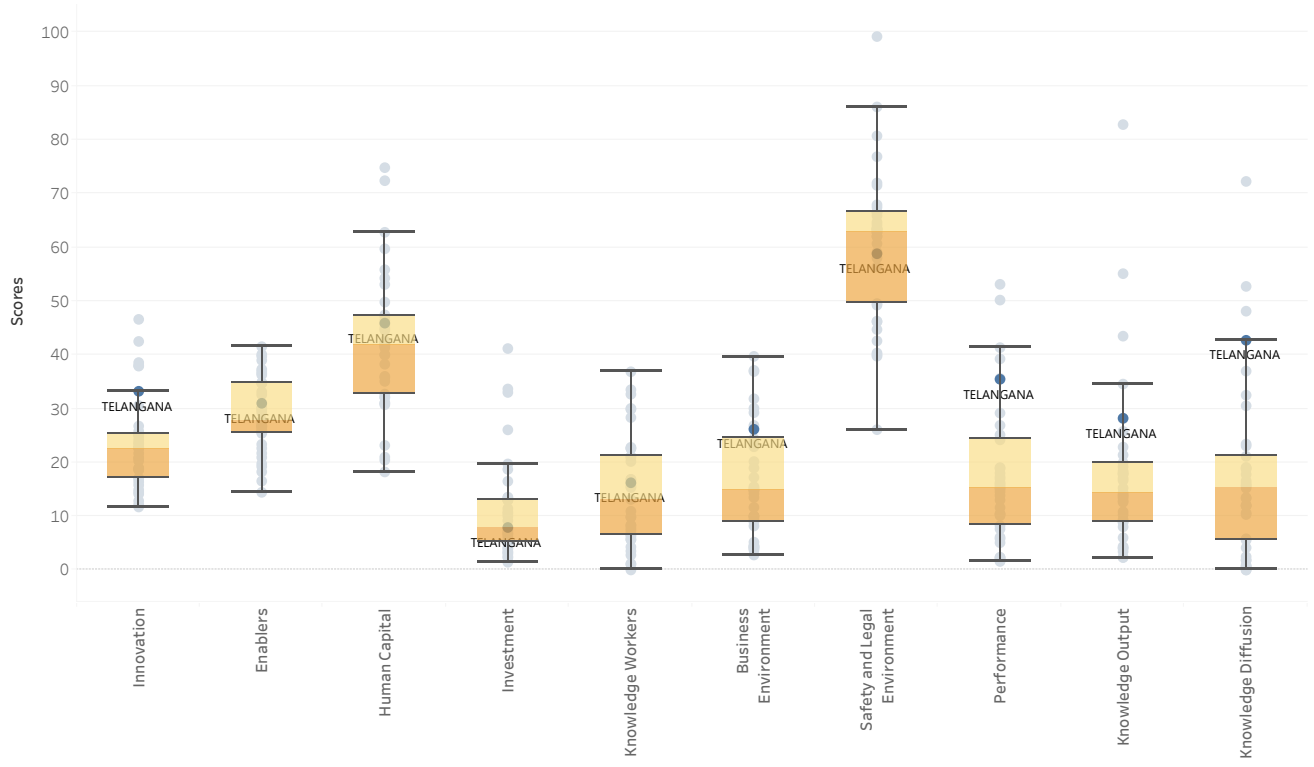
Scores



Country Comparison



Relative Performance



Innovation

33.23

Enablers 31

Human Capital 45.9

Enrolment in Ph.D.	11.95
Enrolment in engineering and technology	62.83
Colleges connected through NMEICT	44.16
Higher education institutions with NAAC grade A and above	6.11
Pupil teacher ratio- Higher education	87.76
Schools with ICT labs	14.05
National Achievement Survey (NAS) Scores (Class X)	87.21

Investment 7.90

Expenditure on higher and technical education	2.22
Expenditure on research and development (State govt.)	6.74
Expenditure on science, technology and environment	0.63
FDI inflow	17.05
Venture capital deals	12.85

Knowledge Workers 16.22

Knowledge-intensive employment	21.49
NGOs involved in knowledge intensive areas	3.86
Private R&D units	13.5
State funded R&D units	25.24

Business Environment 26.16

Ease of doing business ranking	92.86
Online services transactions	36.89
Internet subscribers	20.19
Incubator centres	5.53
Common facility centres	0
Cluster Strength	38.21

Safety and Legal Environment 58.81

Information Technology/Intellectual Property related acts	80.22
Cyber crime police stations	3.47
Pendency of court cases	85.36

Performance 35.47

Knowledge Diffusion 42.71

ICT exports	61.2
High and medium high-tech manufacturing entities	19.11
Geographical Indications (GI) registered	34.09
Citations	45.65

Knowledge Output 28.22

Grassroot innovations	3.7
Patent applications filed	37.71
Trademark applications filed	9
Presence of startups	30.11
Industrial Design applications filed	0.99
New businesses registered	51.11
Publications	47.49

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- 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

Tripura

Rank

09

Category

North East and Hill State

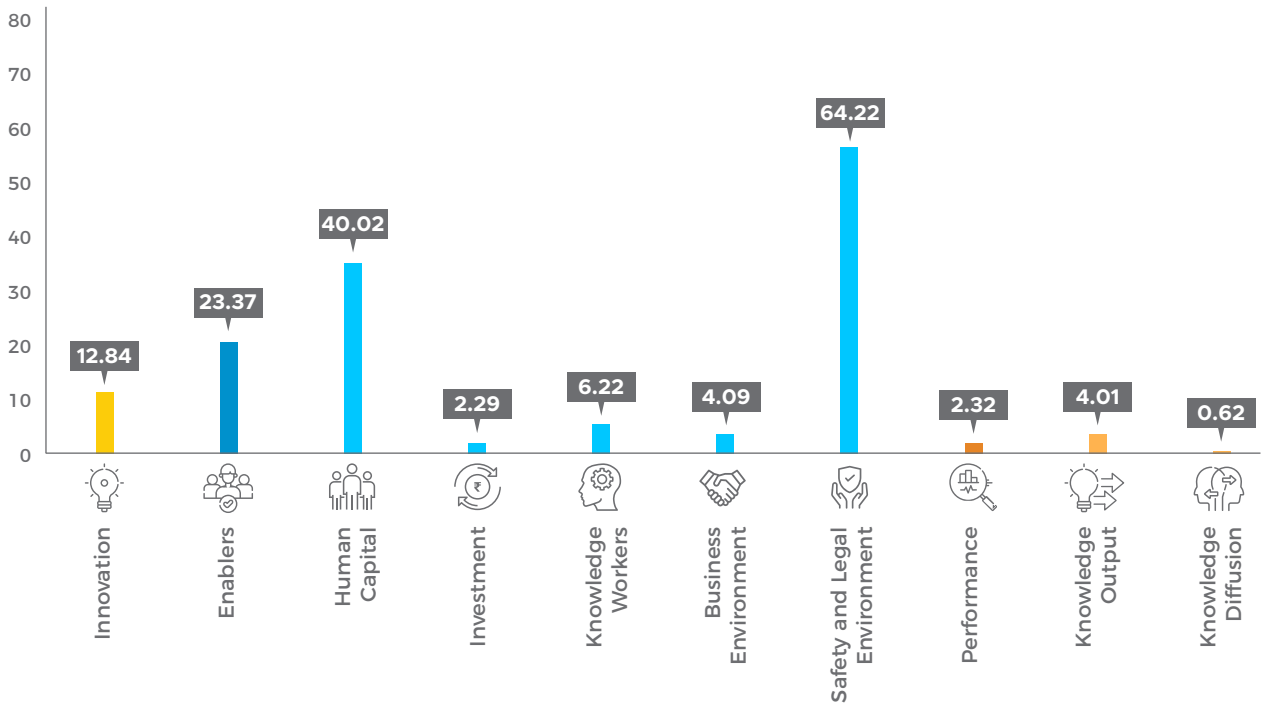
Efficiency Ratio

0.09

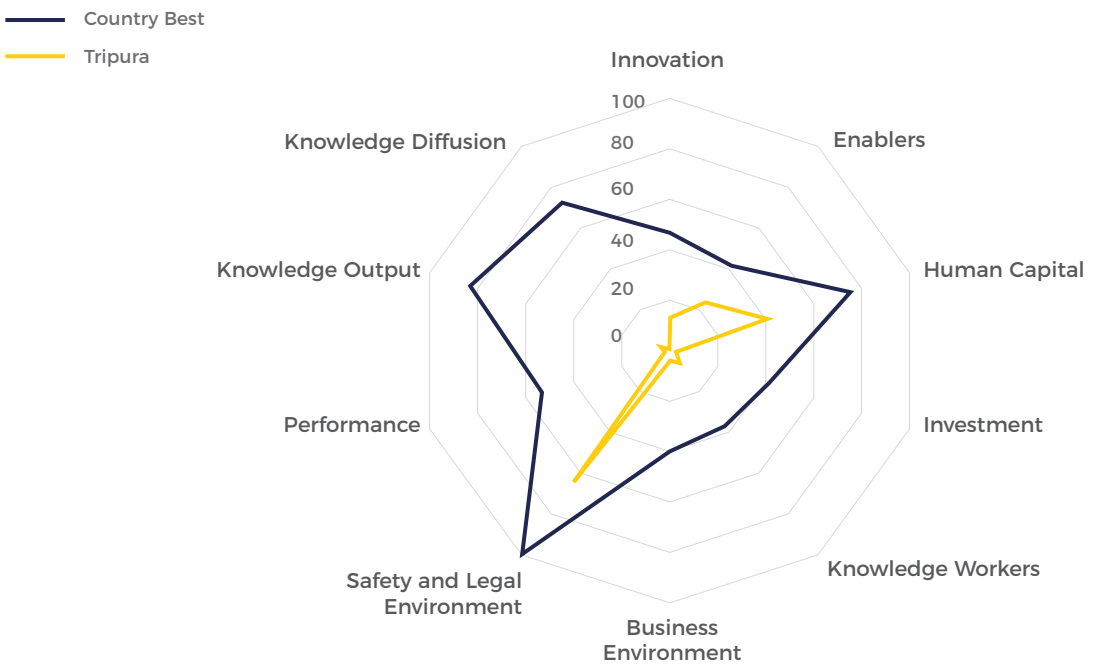
GSDP Per Capita

₹ 82,632

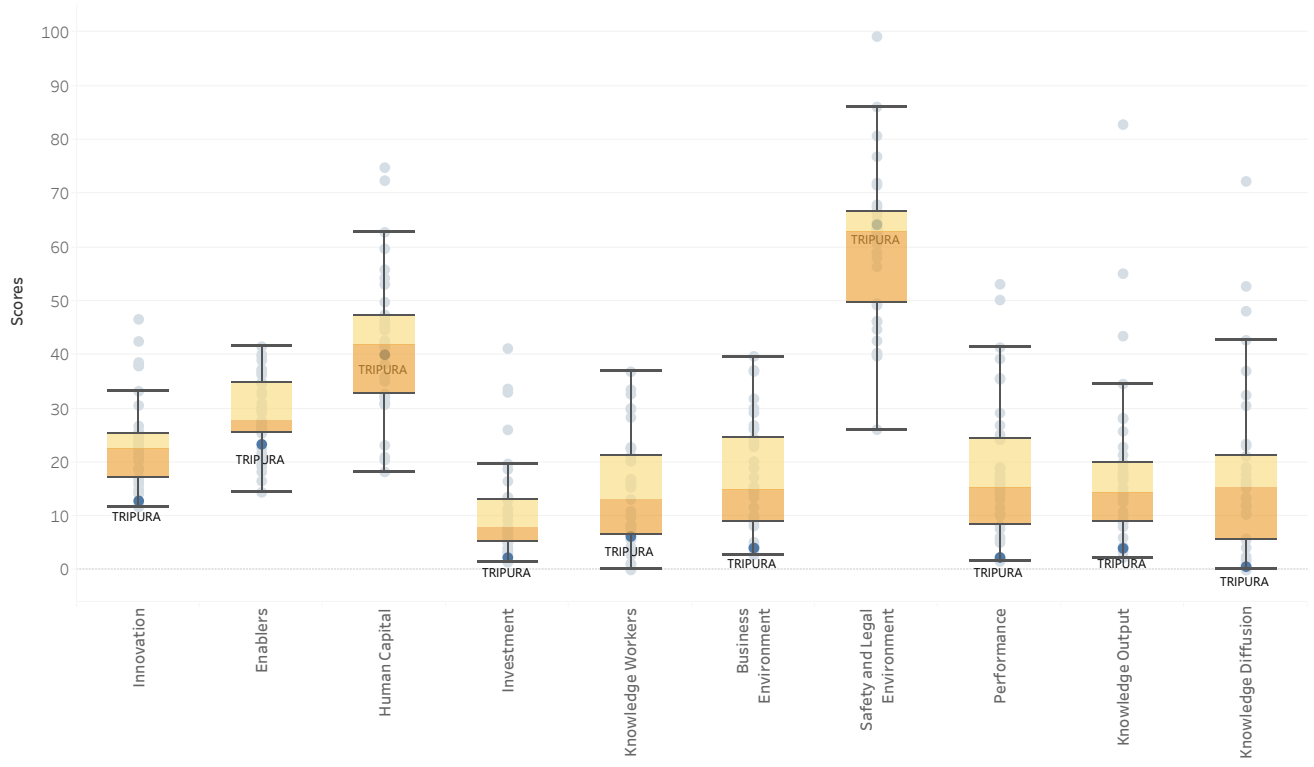
Scores



Country Comparison



Relative Performance



Innovation

12.84

Enablers 23.37

Human Capital 40.02

Enrolment in Ph.D.	7.54
Enrolment in engineering and technology	5.93
Colleges connected through NMEICT	100
Higher education institutions with NAAC grade A and above	5.11
Pupil teacher ratio- Higher education	57.14
Schools with ICT labs	33.58
National Achievement Survey (NAS) Scores (Class X)	75.28

Investment 2.29

Expenditure on higher and technical education	9.27
Expenditure on research and development (State govt.)	0
Expenditure on science, technology and environment	3.55
FDI inflow	0.02
Venture capital deals	0

Knowledge Workers 6.22

Knowledge-intensive employment	0.17
NGOs involved in knowledge intensive areas	9.06
Private R&D units	0
State funded R&D units	16.49

Business Environment 4.09

Ease of doing business ranking	0
Online services transactions	2.07
Internet subscribers	12.56
Incubator centres	1.15
Common facility centres	0
Cluster Strength	4.88

Safety and Legal Environment 64.22

Information Technology/Intellectual Property related acts	93.41
Cyber crime police stations	0
Pendency of court cases	90.36

Performance 2.32

Knowledge Diffusion 0.62

ICT exports	0
High and medium high-tech manufacturing entities	0
Geographical Indications (GI) registered	2.27
Citations	0

Knowledge Output 4.01

Grassroot innovations	28.52
Patent applications filed	3.11
Trademark applications filed	0.59
Presence of startups	6.18
Industrial Design applications filed	0
New businesses registered	9.97
Publications	0

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- Overperforming
- Performing within expected range
- Underperforming

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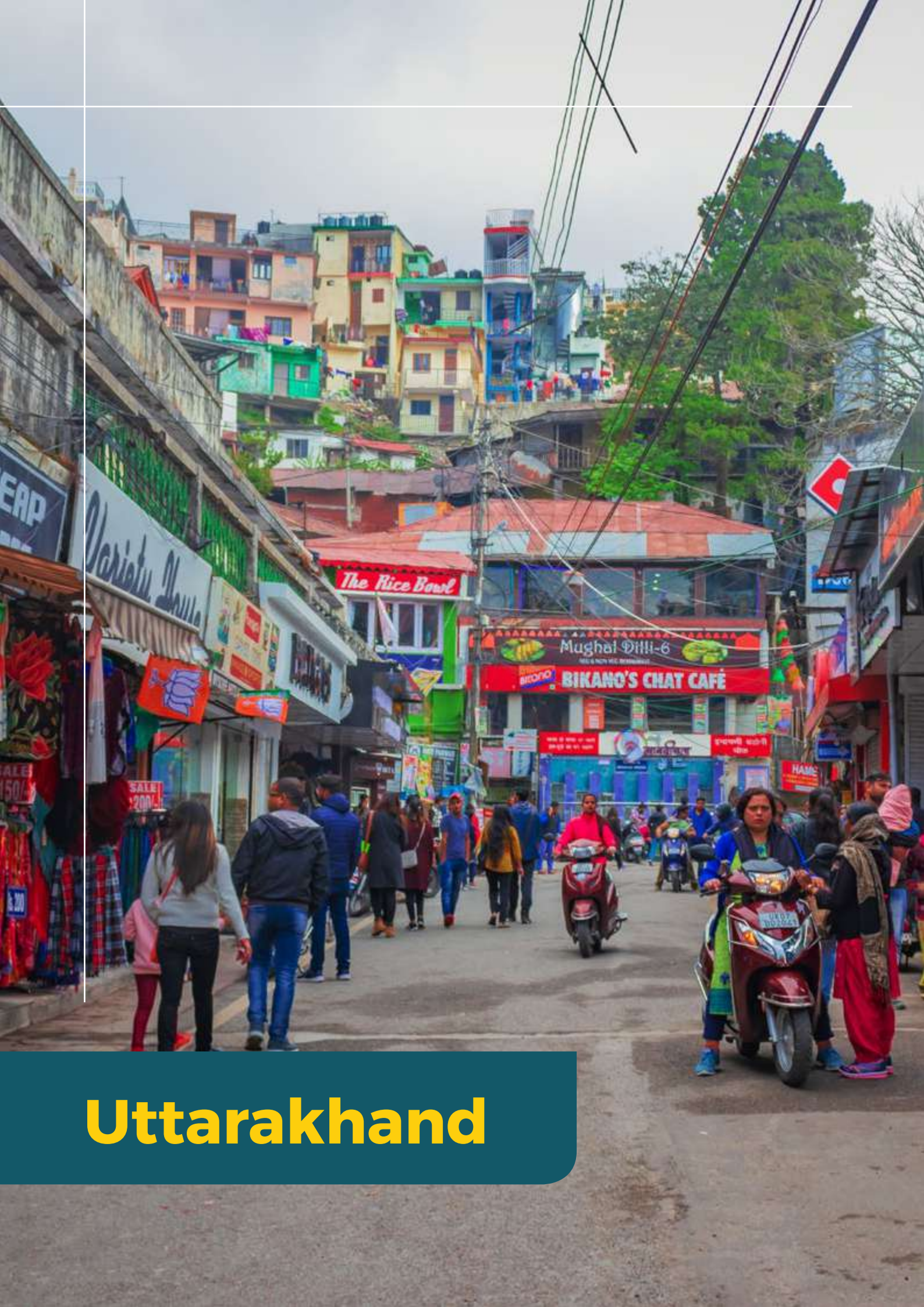


Uttarakhand

Rank

02

Category

North East and Hill State

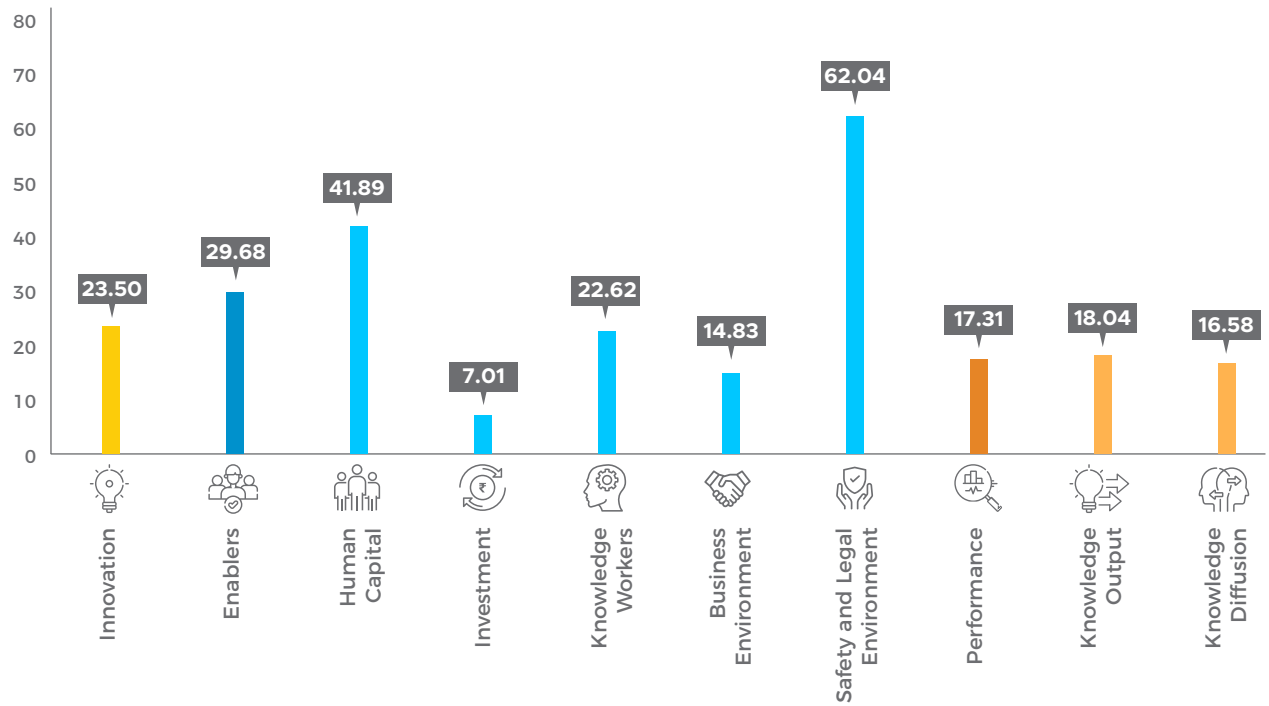
Efficiency Ratio

0.58

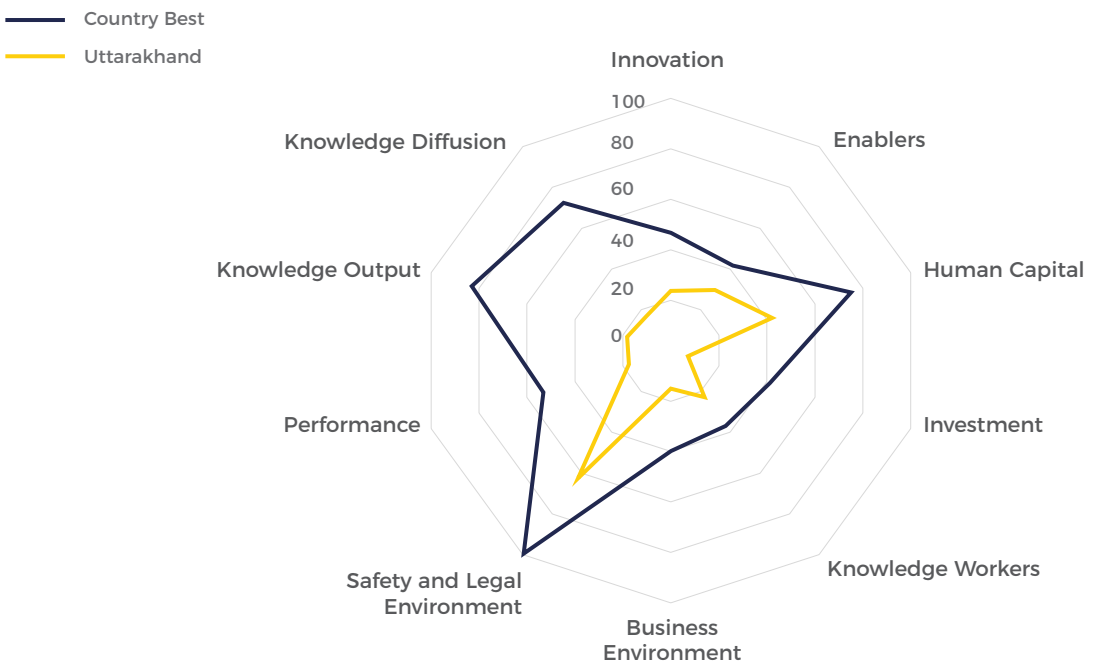
GSDP Per Capita

₹ 1,55,151

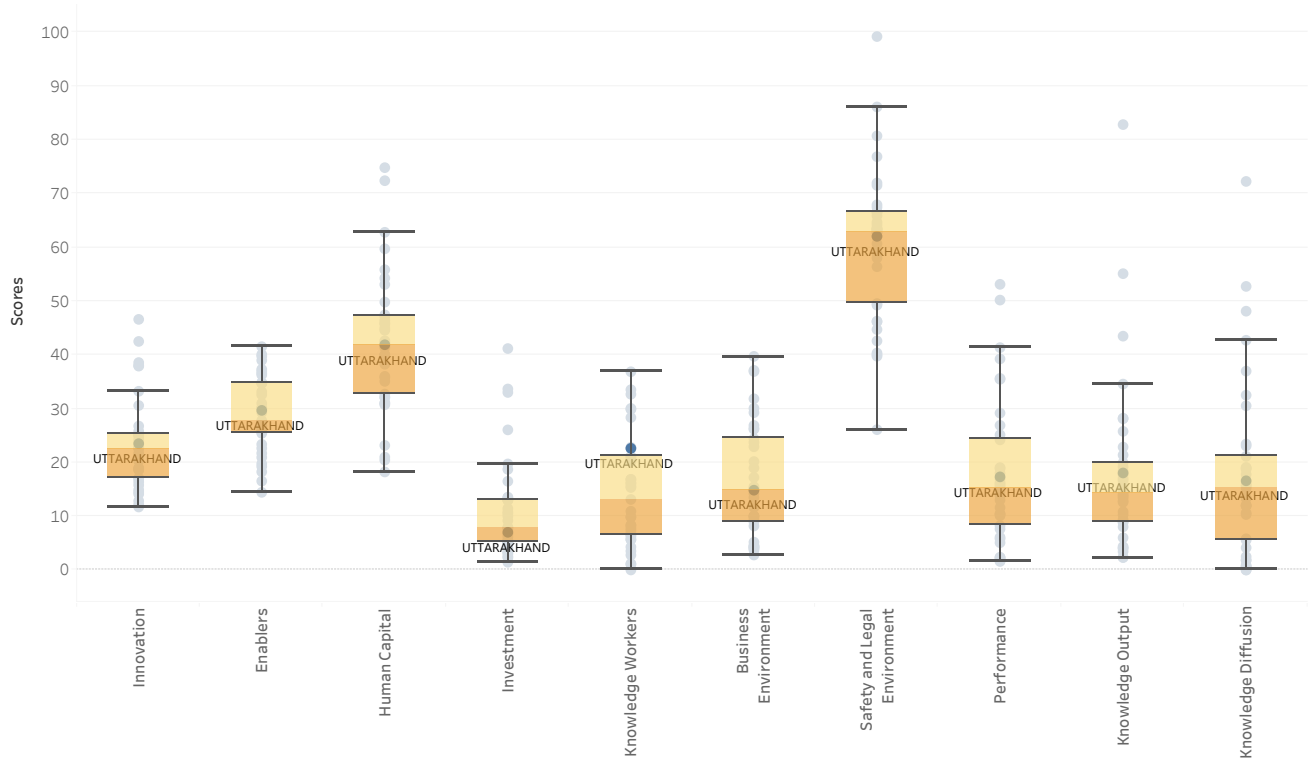
Scores



Country Comparison



Relative Performance



Innovation

23.5

Enablers 29.68

Human Capital 41.89

Enrolment in Ph.D.	56.66
Enrolment in engineering and technology	31.17
Colleges connected through NMEICT	39.48
Higher education institutions with NAAC grade A and above	1.14
Pupil teacher ratio- Higher education	69.39
Schools with ICT labs	11.19
National Achievement Survey (NAS) Scores (Class X)	86.66

Investment 7.01

Expenditure on higher and technical education	9.93
Expenditure on research and development (State govt.)	19.56
Expenditure on science, technology and environment	4.11
FDI inflow	0.68
Venture capital deals	0

Knowledge Workers 22.62

Knowledge-intensive employment	25.63
NGOs involved in knowledge intensive areas	9.21
Private R&D units	10.46
State funded R&D units	44.04

Business Environment 14.83

Ease of doing business ranking	64.29
Online services transactions	5.67
Internet subscribers	4.77
Incubator centres	1.68
Common facility centres	0
Cluster Strength	43.09

Safety and Legal Environment 62.04

Information Technology/Intellectual Property related acts	84.62
Cyber crime police stations	6.05
Pendency of court cases	87.93

Performance 17.31

Knowledge Diffusion 16.58

ICT exports	0.5
High and medium high-tech manufacturing entities	4.26
Geographical Indications (GI) registered	4.55
Citations	58.17

Knowledge Output 18.04

Grassroot innovations	28.15
Patent applications filed	19.51
Trademark applications filed	7.65
Presence of startups	15.61
Industrial Design applications filed	0.49
New businesses registered	21.9
Publications	59.95

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

Uttar Pradesh

Rank

09

Category

Major State

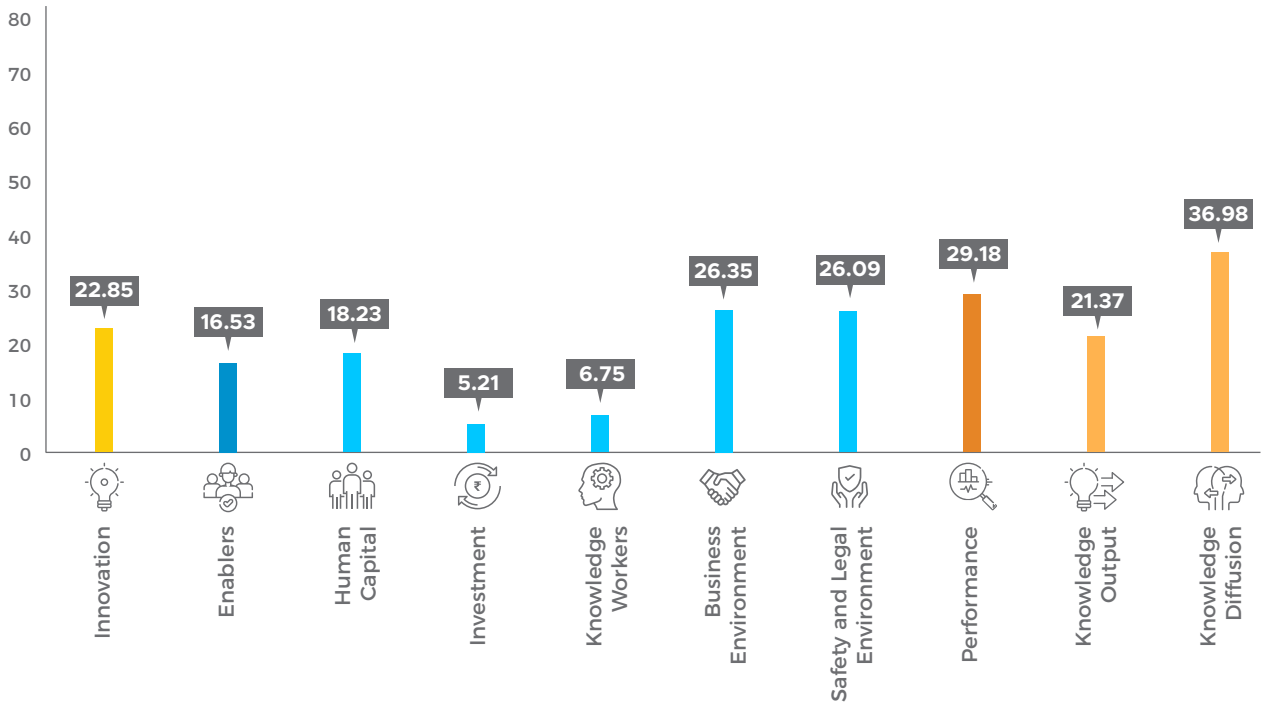
Efficiency Ratio

1.76

GSDP Per Capita

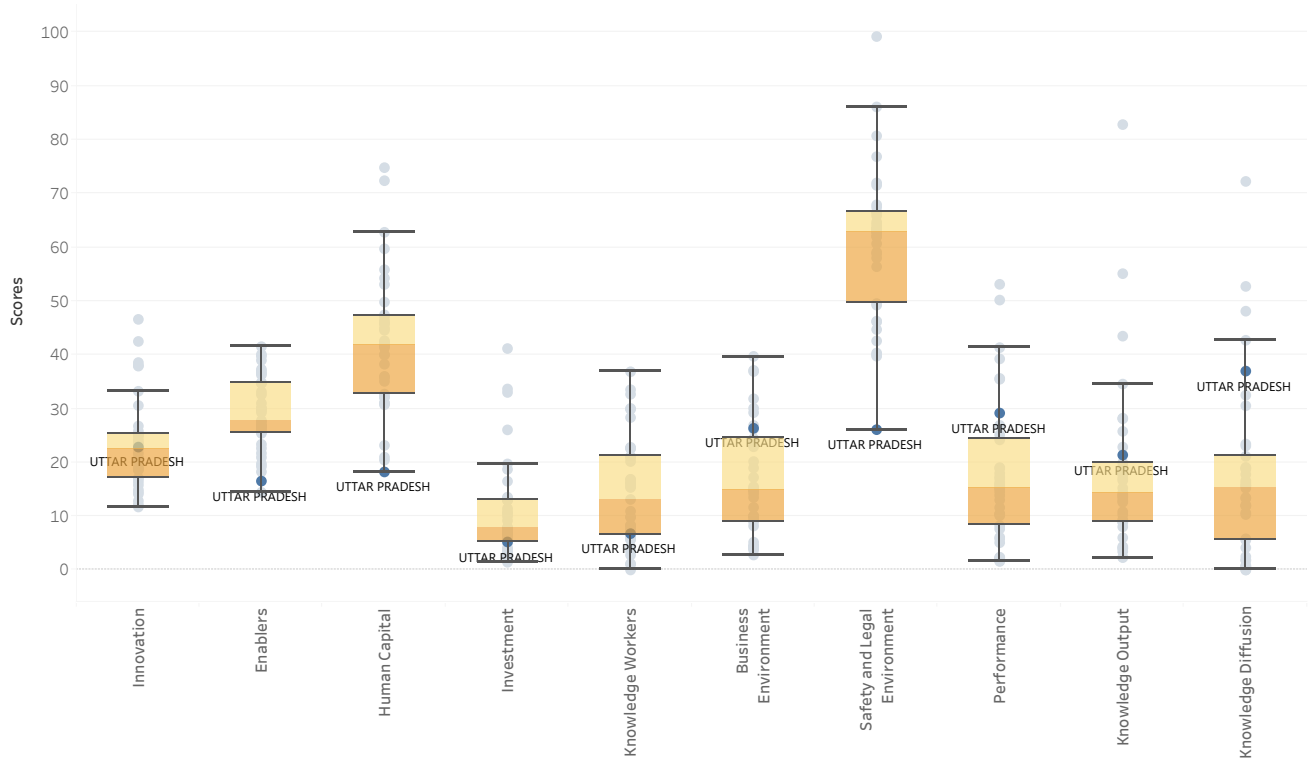
₹ 44,421

Scores



Country Comparison

Relative Performance



Innovation

22.85

Enablers 16.53

Human Capital 18.23

Enrolment in Ph.D.	11.73
Enrolment in engineering and technology	13.13
Colleges connected through NMEICT	47.79
Higher education institutions with NAAC grade A and above	1.22
Pupil teacher ratio- Higher education	30.61
Schools with ICT labs	28.48
National Achievement Survey (NAS) Scores (Class X)	0

Investment 5.21

Expenditure on higher and technical education	3.22
Expenditure on research and development (State govt.)	5.32
Expenditure on science, technology and environment	1.81
FDI inflow	2.63
Venture capital deals	12.89

Knowledge Workers 6.75

Knowledge-intensive employment	10.32
NGOs involved in knowledge intensive areas	6.86
Private R&D units	3.85
State funded R&D units	4.55

Business Environment 26.35

Ease of doing business ranking	96.43
Online services transactions	3.51
Internet subscribers	4.77
Incubator centres	0.85
Common facility centres	1.56
Cluster Strength	100

Safety and Legal Environment 26.09

Information Technology/Intellectual Property related acts	71.43
Cyber crime police stations	0.61
Pendency of court cases	0

Performance 29.18

Knowledge Diffusion 36.98

ICT exports	12.01
High and medium high-tech manufacturing entities	4.56
Geographical Indications (GI) registered	61.36
Citations	63.34

Knowledge Output 21.37

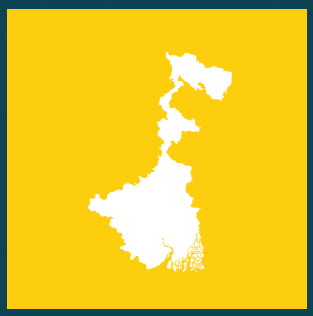
Grassroot innovations	1.11
Patent applications filed	6.18
Trademark applications filed	3.76
Presence of startups	31.07
Industrial Design applications filed	0.57
New businesses registered	40.23
Publications	62.26

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

West Bengal



Rank

11

Category

Major State

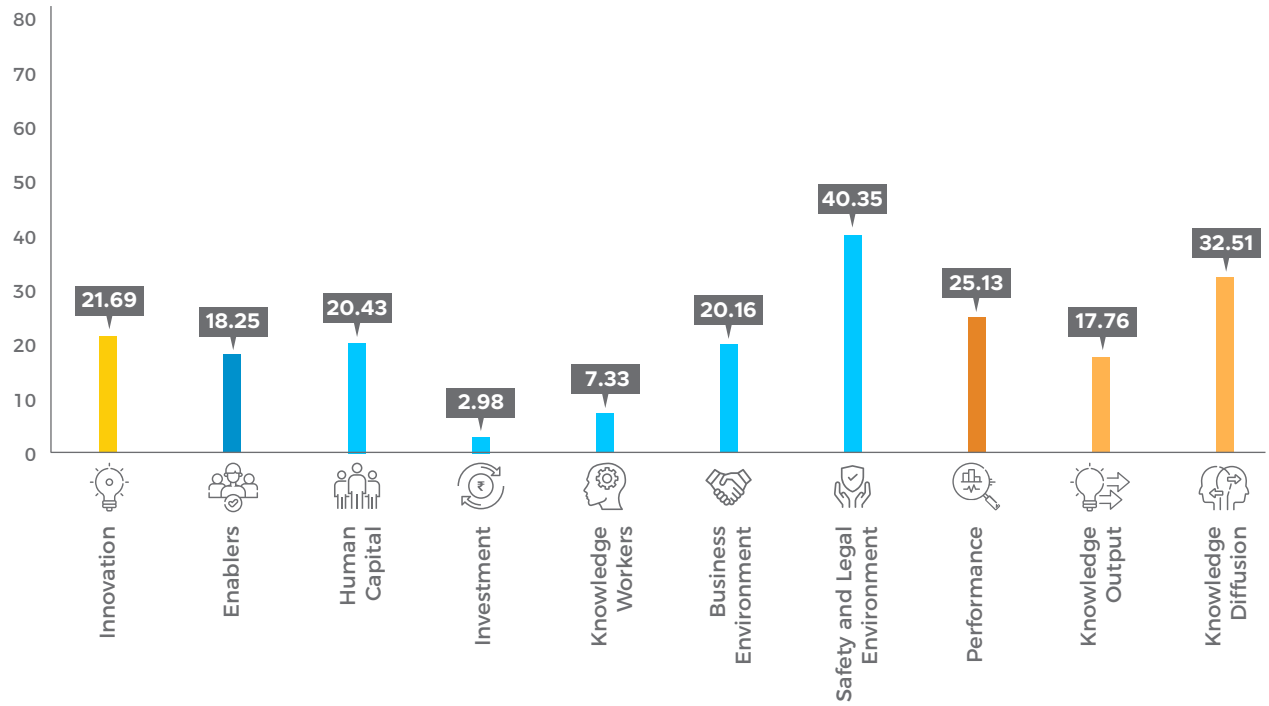
Efficiency Ratio

1.37

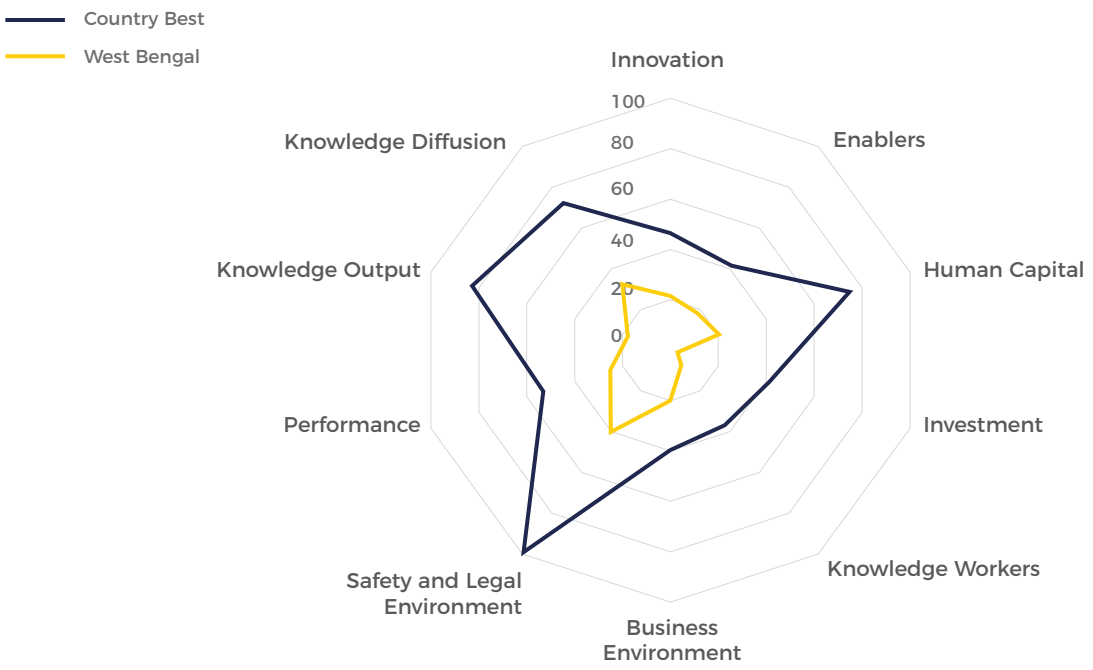
GSDP Per Capita

₹ 67,300

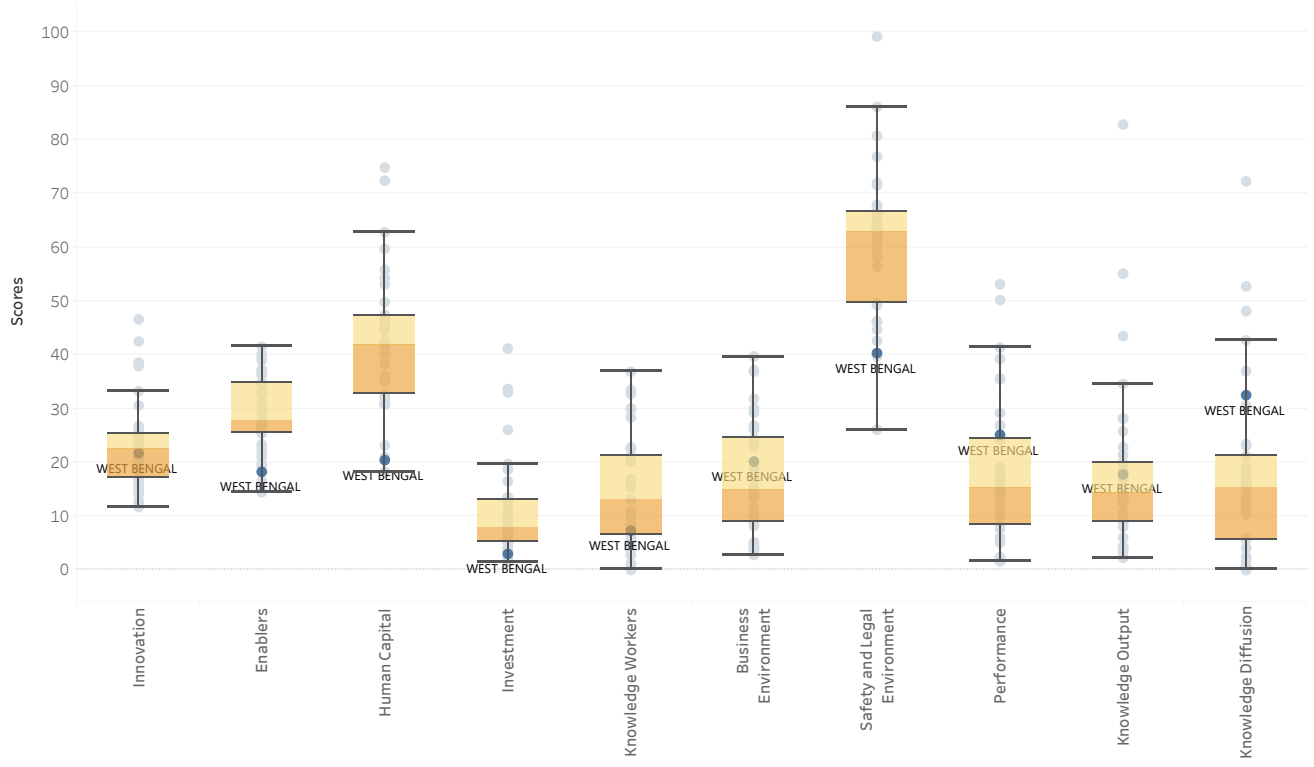
Scores



Country Comparison



Relative Performance



Innovation

21.69

Enablers 18.25

Human Capital 20.43

Enrolment in Ph.D.	15.75
Enrolment in engineering and technology	10.26
Colleges connected through NMEICT	38.96
Higher education institutions with NAAC grade A and above	9.11
Pupil teacher ratio- Higher education	53.06
Schools with ICT labs	19.65
National Achievement Survey (NAS) Scores (Class X)	0

Investment 2.98

Expenditure on higher and technical education	0
Expenditure on research and development (State govt.)	5.04
Expenditure on science, technology and environment	3.89
FDI inflow	5.19
Venture capital deals	0

Knowledge Workers 7.33

Knowledge-intensive employment	7.65
NGOs involved in knowledge intensive areas	5.93
Private R&D units	10.65
State funded R&D units	5.53

Business Environment 20.16

Ease of doing business ranking	71.43
Online services transactions	15.69
Internet subscribers	12.04
Incubator centres	0.51
Common facility centres	4.74
Cluster Strength	47.15

Safety and Legal Environment 40.35

Information Technology/Intellectual Property related acts	95.6
Cyber crime police stations	4.01
Pendency of court cases	13.29

Performance 25.13

Knowledge Diffusion 32.51

ICT exports	6.67
High and medium high-tech manufacturing entities	6.59
Geographical Indications (GI) registered	47.73
Citations	65.52

Knowledge Output 17.76

Grassroot innovations	1.85
Patent applications filed	7.36
Trademark applications filed	3.72
Presence of startups	14.16
Industrial Design applications filed	2.02
New businesses registered	32.59
Publications	65.44

All the values represent scores on a scale of 0-100
Strength and Weakness is relative to 10 states with similar GDP
All the indicators have been treated using relevant denominators eg. population, GDP etc.

- 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

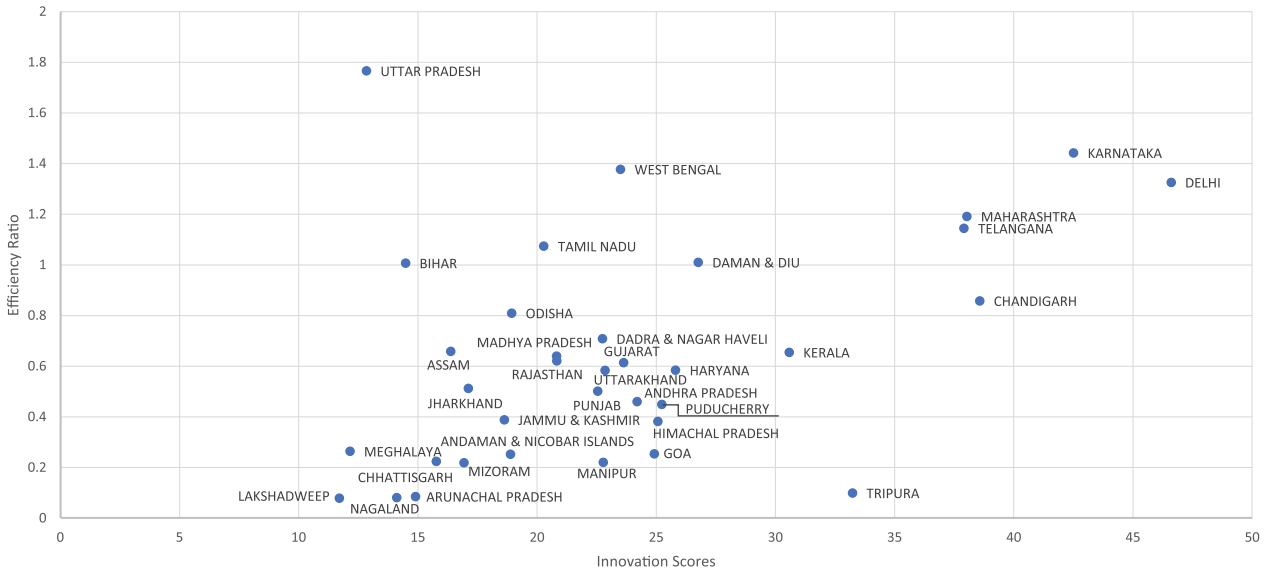
08
Efficiency of Innovation

The efficiency of states can be measured by dividing Performance scores with Enablers scores.

It is crucial to assess how efficiently the states use available resources to obtain innovative solutions. The figure below maps the efficiency of the states with respect to their innovation scores, which is measured for each state by dividing its Performance scores with Enablers scores. The states that score an efficiency of less than 1 are those that have not been able to attain a level of performance proportionate to the strength of their enabling factors.

Figure 22:

Efficiency in Innovation of Indian States



The average efficiency ratio of all the states comes down to 0.62, with 27 states achieving a ratio below 1. This implies that most of the states have not been able to efficiently convert their enabling factors into performance. At the top, Uttar Pradesh leads with an efficiency ratio of 1.77, followed by Karnataka at 1.44, and West Bengal at 1.38.

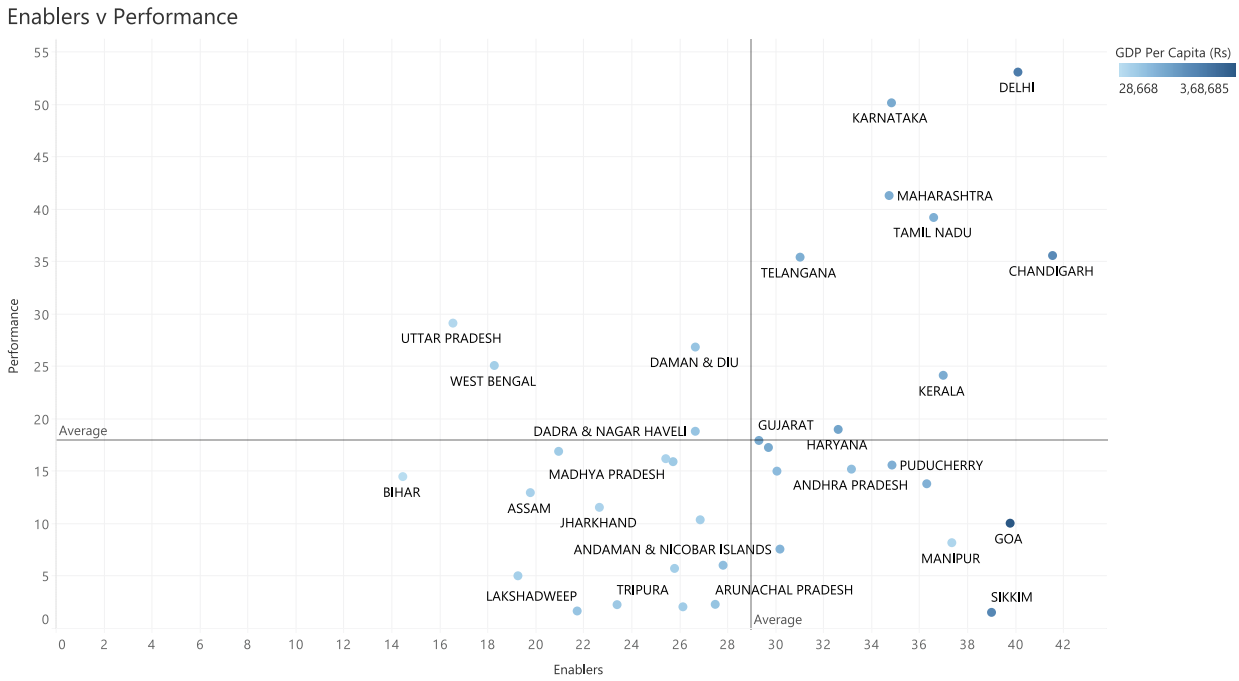
The states that score an efficiency of less than 1 are those which have not been able to attain a level of performance proportionate to the strength of their enabling factors.

The efficiency of the states can also be measured with respect to the country average scores by plotting Enablers scores against Performance scores. Figure 23 has been divided into four quadrants. The top right quadrant shows the states with both higher Enablers score and Performance score than their respective national averages, the top-left quadrant represents states with higher Performance score but lower Enablers score than their respective national averages, the bottom right quadrant shows higher Enablers score but lower Performance score than their respective national averages, and the bottom left quadrant shows groups that are a cause for concern as they are performing poorly on both parameters. Most of the states fall under this quadrant.

States like Delhi, Maharashtra, Karnataka, Tamil Nadu, and Chandigarh have attained scores well above the average in both Enablers and Performance. Currently, there are only four states in the top left quadrant, which implies that these states did not have strong enabling conditions but were able to convert them to a level of performance that scored above the national average. The states in the figure below are also color-graded based on their income per capita. Predictably, the majority of the richest states have been able to provide the best enabling conditions for innovation.

Figure 23:

Efficiency in the Innovation of Indian States Compared with National Average



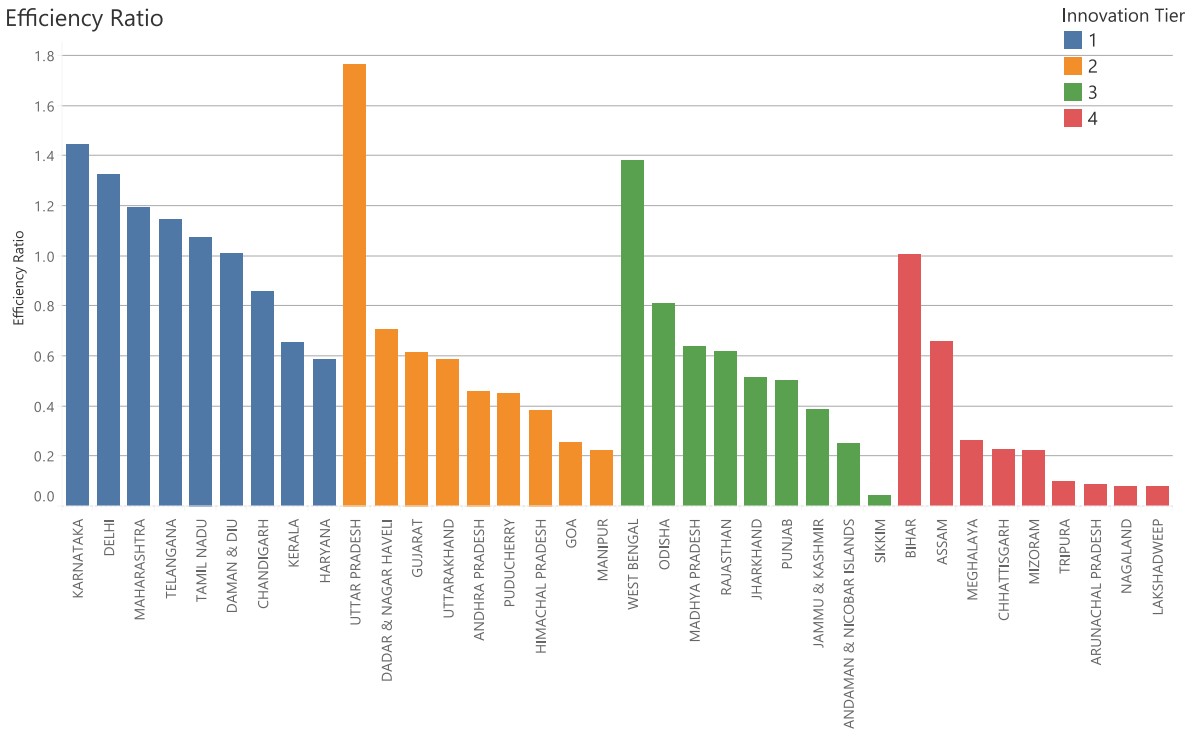
Sum of Enablers vs. sum of Performance. Color shows sum of GDP Per Capita (Rs). The marks are labeled by State. Details are shown for State.

The innovation efficiency ratio must always be analyzed jointly with innovation, Enablers and Performance scores of the India Innovation Index. Higher ratios can also be attributed to low Enablers scores. As a result, Uttar Pradesh and West Bengal have a higher ratio even though their performance across input pillars has been weak. Both these states score above average in only the Knowledge Diffusion pillar.

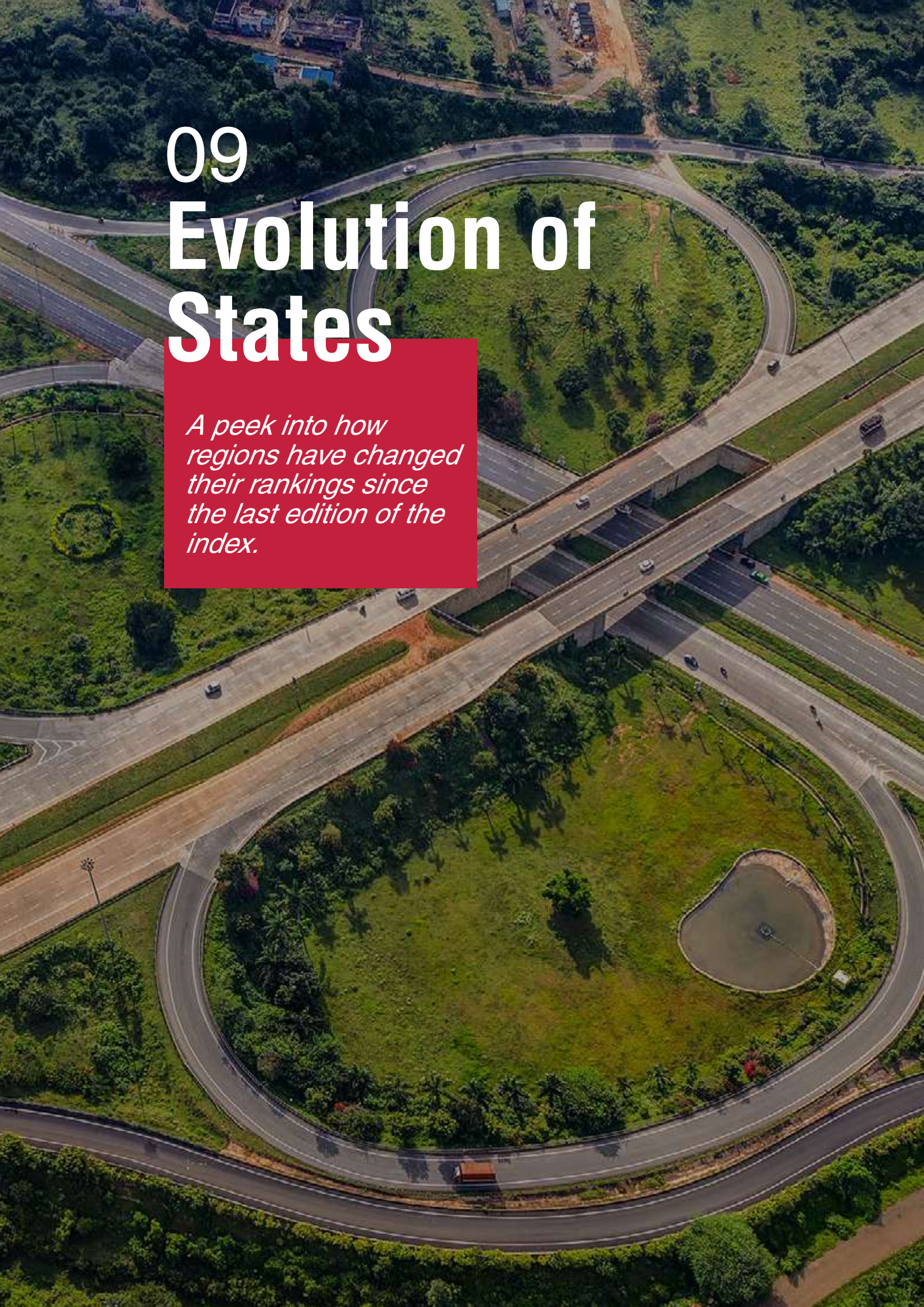
Another way to analyze efficiency is to divide the states into their innovation quartiles, where states are categorized based on their innovation scores. This will allow a comparison of states among their innovation peers. In Figure 24, the states have been divided into four tiers, with Tier 1 consisting of the most innovative states. A downward trend in efficiency can be observed in the tiers, which means that most innovative states are those that are highly efficient on average in converting enabling factors into performance.

Figure 24:

Efficiency in Innovation of Indian States Based on Innovation Tiers



Once again, Uttar Pradesh and West Bengal emerge as exceptions. However, these states rely on strong performance rather than strong enabling conditions. If these states are provisioned with the latter, their overall innovation scores will improve significantly.



09 Evolution of States

A peek into how regions have changed their rankings since the last edition of the index.

A comparison of the current rankings with the previous ones can help track the progress of states and serve as an incentive for local governments to continue working toward improving the level of innovation in their states.

Overall, Delhi has retained the top rank while Chandigarh made a big leap from 2019's ranking and landed the in second place this year. Two other union territories, Daman and Diu and Puducherry, have also made huge leaps in their respective rankings since last year, and finished in the top 10 scorers. As the top ranker for both years, Delhi managed to improve even further. Last year, Delhi's achievement was mainly driven by its Performance score while its Enablers scores ranked significantly lower, but in the 2020 index, it ranked at the top in both the dimensions, thus achieving a more balanced score. At the other end, Lakshadweep achieved the lowest score among all the regions.

Daman and Diu is ranked third after Delhi and Chandigarh by jumping three positions since last year, whereas last year's third rank-holder, Goa slipped to the 5th position. Goa also lost the top rank in Enablers to Delhi. Jammu and Kashmir, which has now been categorized as a union territory, secured an overall 26th rank among all states and finished second to last under its respective category.

Among major states, Karnataka retained its top position, but Maharashtra replaced Tamil Nadu in the second rank, while the latter slipped to the third position owing to its comparatively lower score in Performance. The scores of the rest of the major states have also fluctuated slightly. Another change in this year's index is that Bihar replaced Jharkhand as the lowest ranking state.

Among the NE/Hill states, Himachal Pradesh moved up from the second position to emerge as the top ranker this year, while last year's top performer, Sikkim, slipped to the fourth position. There has been little change in the rankings of the rest of the states within this category, except for Mizoram and Tripura. While Mizoram significantly improved its position, Tripura slipped even lower in the rankings, only scoring higher than Meghalaya, which remained at the bottom of the rankings for both the years.

Two other union territories, Daman and Diu and Puducherry have also made huge leaps in the rankings since last year, and finished in the top 10 scorers.

Some of the states have made huge strides since the last edition of index was published, some maintained their positions, while some slipped to lower positions in the process. Hence, it can be deduced that the level of competitiveness is high among the states, which is essential for them to continually improve on their enabling and performance factors.

Table 7:

Ranking Comparison

Innovation Rank		
2019	MAJOR STATES	2020
1	KARNATAKA	1
2	TAMIL NADU	3 ↓
3	MAHARASHTRA	2 ↑
4	TELANGANA	4
5	HARYANA	6 ↓
6	KERALA	5 ↑
7	UTTAR PRADESH	9 ↓
8	WEST BENGAL	11 ↓
9	GUJARAT	8 ↑
10	ANDHRA PRADESH	7 ↑
11	PUNJAB	10 ↑
12	ODISHA	14 ↓
13	RAJASTHAN	12 ↑
14	MADHYA PRADESH	13 ↑
15	CHHATTISGARH	16 ↓
16	BIHAR	17 ↓
17	JHARKHAND	15 ↑

Innovation Rank		
2019	NE AND HILL STATES	2020
1	SIKKIM	4 ↓
2	HIMACHAL PRADESH	1 ↑
3	UTTARAKHAND	2 ↑
4	MANIPUR	3 ↑
6	TRIPURA	9 ↓
7	ARUNACHAL PRADESH	7
8	ASSAM	6 ↑
9	NAGALAND	8 ↑
10	MIZORAM	5 ↑
11	MEGHALAYA	10 ↑

Innovation Rank		
2019	UT AND CITY STATES	2020
1	DELHI	1
2	CHANDIGARH	2
3	GOA	5 ↓
4	PUDUCHERRY	4
5	ANDAMAN & NICOBAR ISLANDS	7 ↓
6	DAMAN & DIU	3 ↑
7	DADRA & NAGAR HAVELI	6 ↑
8	LAKSHADWEEP	9 ↓
-	JAMMU & KASHMIR	8

Note: Category of Jammu and Kashmir has changed compared to India Innovation Index 2019.

10 Learnings & Recommendations

States can learn from their peers on some components and be the role models on other components.

The India Innovation Index, while calculating overall scores on innovation and performance, also highlights the components in different pillars and dimensions that substantiate the said score. As seen from the analyses, states do not score uniformly well in all the components, so a state can learn from its peers on some components and be the role models for other regions on some components. The categorization based on geographical characteristics and administrative capabilities further facilitates fair comparisons and creates scope for valued learnings. Following are some of the observations that pave the way for learning and improvement:

1. States such as Delhi, Karnataka, and Maharashtra have retained their top position in the 2020 index. Chandigarh is the new entrant to the top ranks, replacing Tamil Nadu from the 2019 index. The scores of the top four states are within a comparable range in terms of innovation, with Chandigarh and Maharashtra having a difference of 0.5. However, these states have varied performance, which is further highlighted in Figure 25. Chandigarh has outperformed the other states in four indicators of Human Capital, Knowledge Workers and Safety and Legal Environment, but has underperformed in Knowledge Diffusion. Delhi, which had outperformed other states in the 2019 index in at least five components, has maintained consistent performance in 2020, with the highest level of Knowledge Output in both 2019 and 2020. Karnataka, on the other hand, continues to receive the highest score in Investment and has the highest Knowledge Diffusion. Maharashtra continues to retain its position from last year and has increased significantly in Safety and Legal Environment alongside Human Capital, and Knowledge Workers. It has, however, declined in Investment since last year's rankings.

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2. In the case of the low-performing states, as shown in Figure 26, the major deficiency in innovation and performance indicators can be accrued to low levels of investment, Knowledge Workers, and an inadequate Business Environment. Arunachal Pradesh, which ranks the second-highest in pillars such as investment and Knowledge Workers, has a Knowledge Diffusion score of less than 1. These states are much closer to the top-performing states in Human Capital but that has not translated into adequate Knowledge Output or Knowledge Diffusion. The focus for these states seem to be on improving investments, Knowledge Workers, and the Business Environment, which could help create a conducive ecosystem to generate more Knowledge Output and Knowledge Diffusion.

As seen from the analyses, states do not score uniformly well in all the components, so a state can learn from its peers on some components and be the role models to learn from on other components.

Figure 25:

Comparing Top-Ranking States across Pillars

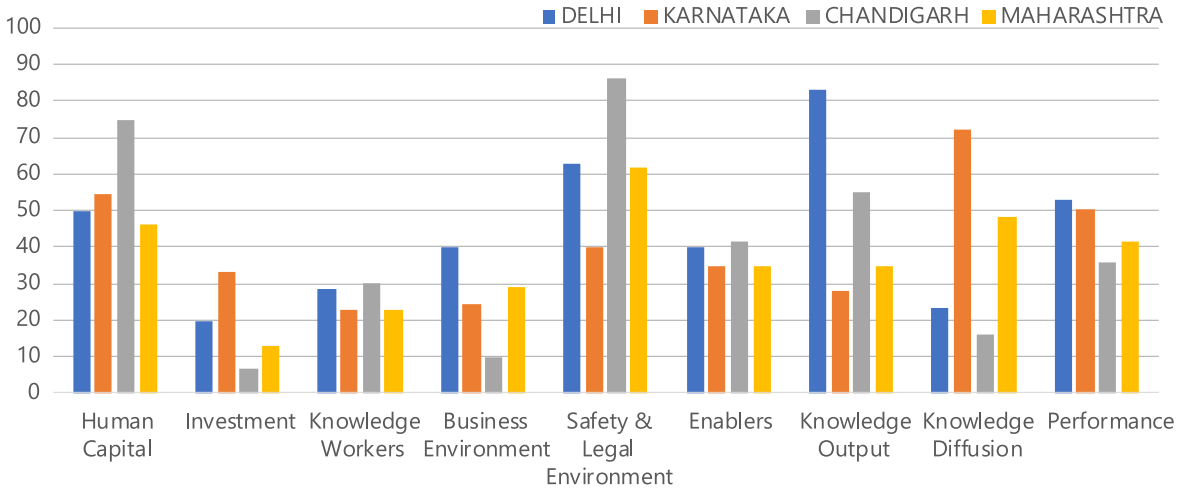
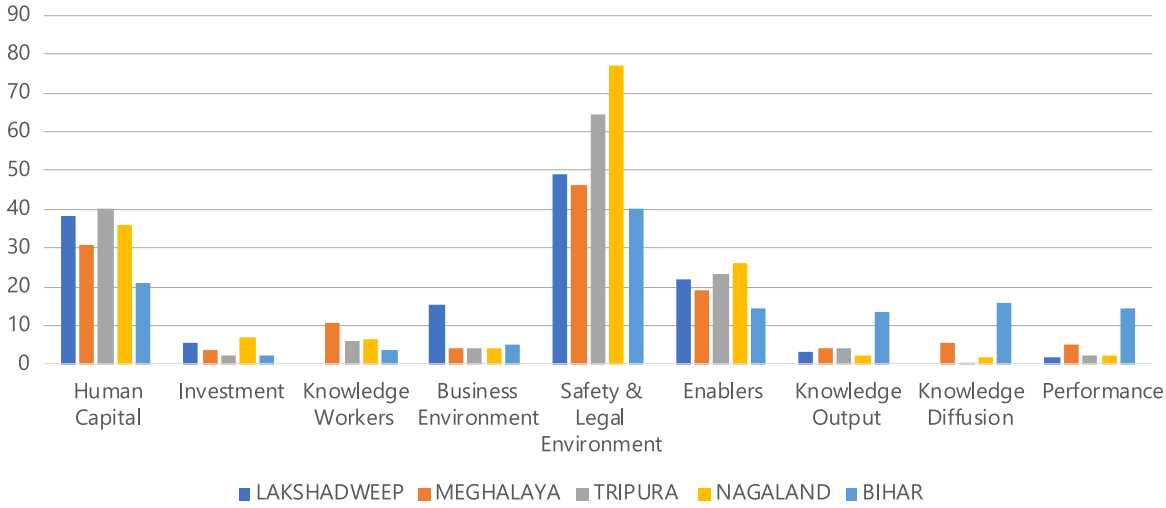


Figure 26:

Comparing Low-Performing States across Pillars



Underlying Issues at National and State Levels

The analysis of the index observations provides us with two broad categories of issues, namely, national-level issues and state-level issues. While these issues must be addressed by the collaboration of central as well as state governments, this section will point out the underlying issues under the said categories. The national-level issues can be further broken down into state-specific issues, as the former's occurrence can be attributed to the existing regional imbalance across several pillars.

National-level Issues

This edition of the Innovation Index saw improvement in the overall average score, thus presenting a promising growth for the Indian innovation ecosystem. However, India needs to focus on its performance across key pillars such as Knowledge Workers, Business Environment, and Knowledge Output. To achieve this, a few steps can be taken:

1. One of the major challenges observed was regional imbalance with respect to the presence of research institutions in most North-Eastern and Central States. Weaker representation of both private and public R&D units shows the inability to tap into the innovative tendencies of these states. The central government can bring in reforms to revive the research ecosystem across the nation.

    - To promote business sector R&D, the government could target specific areas under which top R&D-intensive domestic firms are eligible for tax incentives, low-interest loans, and priority procurement.

    - The government must consider providing direct R&D grants to companies. This is a deviation from R&D funding mostly going to academic institutions, with the absence of any intention to commercialize innovative concepts. Such practices have been heavily recommended by the US and Israel.

2. Another problem that comes to light due to regional imbalance is the lack of incubator centres that hurt the growth of young businesses and innovation ventures. To combat this, a tier-based incubator ecosystem must be established. This must involve creating outcome-oriented sustainable incubator models that foster the rise of competitive firms. While these businesses may not be funded by venture capital deals, they will play a vital role in the health of local economies and the innovation environment.

3. In terms of performance, limited grassroots innovations observed across the nation is a major concern. Such innovations have been unanimously acknowledged as a cost-effective route toward sustainable development. The innovations from grassroots at a state level can set up precedents to push for a circular approach to nurture an innovation-driven economy that is marked by limited wastage. Through successful outreach programs, the value chain of grassroots innovation can be revived by the rural citizenry. This can be followed up by launching a dedicated scale-up fund to allow grassroots innovations to transition into micro and small-scale industries.

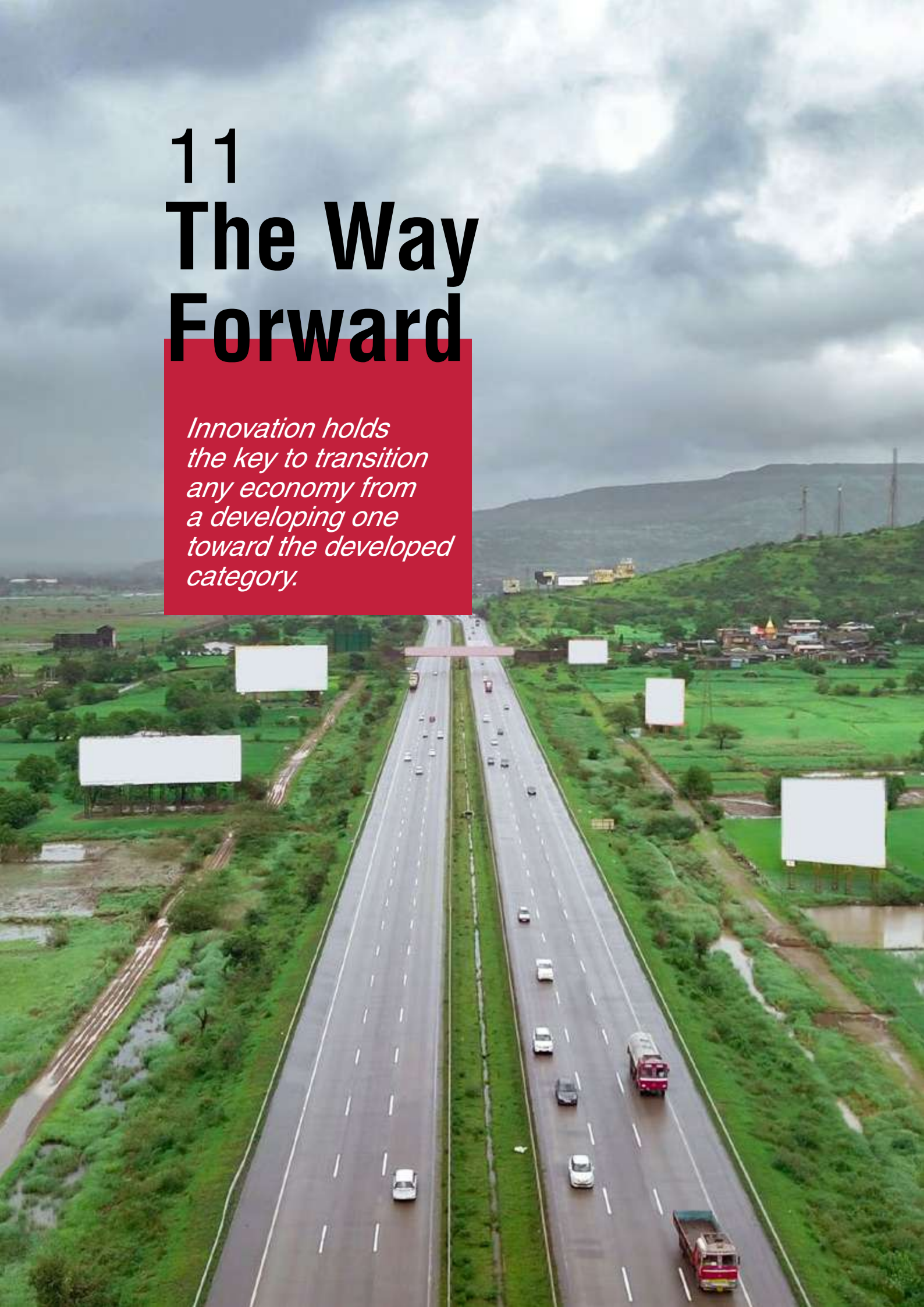
State-Level Issues

State Innovation Cells: States are the major source to kickstart any form of grassroots innovation. To achieve the same, special government-backed entities must be established, such as innovation cells. The purpose of such cells must be to promote the culture of innovation and foster the spirit of entrepreneurship at various levels. This must follow a bottom-up approach where the said culture can be imbibed from the school level. For instance, Telangana established its innovation cell in 2017, thus paving the way for other states to follow.

Create State-level Engagements to Showcase Best Practices: Based on the pillar-level analysis, it is abundantly clear that states have varying strengths and weaknesses. To celebrate this strength and to promote peer-to-peer learning, a platform must be established to allow the sharing of best practices. This aligns with the democratic practice of cooperative federalism and allows states to learn from the success of their peers. Such a platform also holds tremendous potential to eliminate any form of regional disparity and thus pushes forward the overall innovative capacity of the nation.

11
The Way Forward

Innovation holds the key to transition any economy from a developing one toward the developed category.



As India heads into an uncertain future where the global economy is still reeling from the pandemic, innovation holds the key to transition any developing economy toward the developed category.

The objective of the index is to serve as an actionable tool for policymakers to recognize challenges and address them to improve the innovation ecosystem at both state and national levels. This also allows states to carefully study and analyze the performance of their peers and identify best practices. This practice encourages cooperative and competitive federalism amongst the states.

The current edition of the index is strengthened by its framework when compared with the previous iteration, with the introduction of new indicators across several pillars and also with the modification of the methodology for certain indicators to provide more accurate outcomes. To strengthen the core of the index while successfully highlighting the results observed, the following can be done in the successive editions:

- **Showcase Best Practices:** Under the ambit of cooperative federalism, the best practices observed within the states should be often documented and disseminated to encourage peer-to-peer learning. For instance, based on the exclusive challenges identified in the state scorecards, each state can be pushed to emulate some of the best practices. Practices such as low pendency of court cases observed in Sikkim and the proportionately high number of online services transactions as seen in Kerala can be showcased as successful case studies.

- **Focus on State-Specific Policies:** To ensure that the index's framework is even more robust to capture the best picture for the Indian innovative ecosystem, a micro-analysis of the state-level policies must be done. The objective of this reform is to focus on State innovation policies, local innovation cells, and the Knowledge Output developing from such entities. This will further delve into the state-level nuances required to understand the underlying innovative tendencies within a state.

As India heads into an uncertain future where the global economy is still reeling from the pandemic, innovation holds the key to transition any economy from a developing one toward the developed category. India has the potential and capacity to be such a nation that can transform its economic identity by relying on innovation. The central Government consulted stakeholders to formulate the STIP 2020. This is a crucial step to allow a decentralized focus on innovation where policies are inclusive and the benefits follow the bottom-up approach. A policy such as the STIP holds the promise that would allow successful leverage of the strengths of each state and thus convert their Enablers into Performance.

References:

1. Chattopadhyay, D. (2020). Financing Innovation in India: Challenges and Opportunities. Global Innovation Index 2020, (157-162)
2. Cornell University, INSEAD, and WIPO (2020). The Global Innovation Index 2020: Who Will Finance Innovation? Ithaca, Fontainebleau, and Geneva.
3. Fagerberg, J., Martin, B. R., & Andersen, E. S. (Eds.). (2013). Innovation studies: evolution and future challenges. OUP Oxford.
4. Fagerberg, J., Mowery, D. C., & Nelson, R. R. (Eds.). (2005). The Oxford handbook of innovation. Oxford university press.
5. Kapoor, A. & Goyal, S. (2020). "How Ministry of Textiles Developed the Indigenous Supply Chain in India for Manufacturing of High-Quality PPEs and Testing Swabs during COVID-19 Pandemic Situation". Institute for Competitiveness. https://competitiveness.in/report-on-manufacturing-of-ppe/ (last accessed 15 December 2020)
6. Kurup, R. (2020, May 06). Delhi ranks top in Internet penetration, Kerala comes second. The Hindu Business Line. Retrieved from https://www.thehindubusinessline.com/info-tech/delhi-ranks-top-in-internet-penetration-kerala-comes-second/article31516751.ece
7. Ministry of Human Resource and Development. (2019). All India Survey on Higher Education 2018-19. New Delhi.
8. Mukherjee, A. Bajaj, P & Gulati, S. (2019). "Demographic Changes and their Macroeconomic Ramifications in India". RBI Bulletin July 2019. https://rbidocs.rbi.org.in/rdocs/bulletin/pdfs/01art11072019c6e50f97d88d48feb06d7056289dcd69.pdf (last accessed 15 December 2020)
9. Nair, A., Guldiken, O., Fainshmidt, S., & Pezeshkan, A. (2015). Innovation in India: A review of past research and future directions. Asia Pacific Journal of Management, 32(4), 925-958. https://link.springer.com/article/10.1007/s10490-015-9442-z (last accessed 15 December 2020)
10. Abdi, H., & Williams, L. J. (2010). Principal component analysis. Wiley interdisciplinary reviews: computational statistics, 2(4), 433-459.
11. Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. Journal of applied psychology, 78(1), 98.
12. Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International journal of medical education, 2, 53.
13. Vyas, S., & Kumaranayake, L. (2006). Constructing socio-economic status indices: how to use principal components analysis. Health policy and planning, 21(6), 459-468.
14. Williams, B., Onsman, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices. Australasian Journal of Paramedicine, 8(3).
15. Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. Tutorials in quantitative methods for psychology, 9(2), 79-94.

12

Appendix

Appendix A: Indicator definitions and sources

Dimension	Indicator name	Definition	Source
Enablers			
Human Capital	Enrolment in PhD	Enrolment in PhD in the state (per lakh of population)	AISHE-All India Survey of Higher Education
	Enrolment 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
	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
	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
	Schools with ICT labs	Percentage of schools with Information & Technology Labs	U-DISE – Unified-District Information System for Education
	National Achievement Survey (NAS) Scores (Class X)	Assessment in modern Indian language, English, mathematics, science and social studies (Class X NAS Scores)- Average score	NCERT-National Council for Education Research and Training
Investment	Expenditure on higher and technical education	State government expenditure on higher and technical education (per lakh of population) (Capital Expenditure); Average of three years	MHRD- Analysis of Budgeted Expenditure on Education
	Expenditure on Research and Development (State Govt.)	State government on Research and Development (% of GSDP); Average of three years	DST- Department of Science & Technology, Ministry of Science & Technology
	Expenditure on Science, Technology and Environment	Expenditure on Science, Technology and Environment by state government (% of GSDP) (Revenue Expenditure); Average of three years	RBI- State Finances- A Study of State Budgets

	FDI inflows	Foreign Direct Investment (FDI), (% of GSDP)	DPIIT-Department for Promotion of Industry and Internal Trade
	Venture capital deals	Venture capital investment: Number of deals (per crore of GSDP)	DPIIT-Department for Promotion of Industry and Internal Trade
Knowledge Workers	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, Ministry of Statistics and Programme Implementation
	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
	Private R&D units	Number of private R&D units in the state (per lakh of population)	DST- Department of Science & Technology
	State funded R&D units	Number of R&D Institutions funded by the state (per lakh of population)	DST- Department of Science & Technology
Business Environment	Ease of Doing Business Ranking	Ease of Doing Business rank	DPIIT-Department for Promotion of Industry and Internal Trade
	Online services transaction	Total amount of online services transactions (per thousand population)	e-TAAL
	Internet subscribers	Number of internet subscribers per 100 population	TRAI- Telecom Regulatory Authority of India
	Incubator centres	Number of Incubator centres in the state (per lakh of population)	DPIIT- Start-up India
	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

	Cluster Strength	Cluster strength represents the potential of a region's cluster portfolio measured by summing up the performance across individual clusters.	PM-EAC, Clusters: The Drivers of Competitiveness
Safety & Legal Environment	Information Technology / Intellectual Property related Acts	Information Technology / Intellectual Property related Acts (Rate of offenses) (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
	Cyber-crime police stations	Number of cybercrime special police stations (per lakh of population)	BPRD- Bureau of Police Research & Development
	Pendency of court cases	Percentage of court cases pending (10 years and above)	NJDG- National Judiciary Data Grid
Performance			
Knowledge Output	Grassroots innovations	Number of grassroots innovations in the state (per lakh of population)	NIF- National Innovation Foundation
	Patents applications filed	Number of patent applications filed in the state (per lakh of population)	DPIIT- IP India
	Trademark application filed	Number of trademarks applications filed in the state (per lakh of population)	DPIIT- IP India
	Industrial design applications filed	Number of Industrial design applications filed in the state (per lakh of population)	DPIIT- IP India
	Presence of startups	Number of start-ups in the state (per crore of GSDP)	DIPP- Start-up India
	New businesses registered	Number of new companies and LLPs registered during 2019-20 (per crore of GSDP)	MCA- Ministry of Corporate Affairs
	Publications	Composite score using combined metric for Publications (PU) and number of colleges in NIRF Ranking 2020 (Top 100)	NIRF- National Institute Ranking Framework
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	DPIIT
	Geographical Indications GI registered	Number of registered Geographical Indications in a state	DPIIT- IP India

	Citations	Composite score using combined matric for Quality of Publications (QP) and number of colleges in NIRF Ranking 2020 (Top 100)	NIRF- National Institute Ranking Framework

Appendix B: Data availability

Indicator name	Year
Enrolment in PhD	2018-19
Enrolment in engineering and technology	2019-20
Colleges connected through NMEICT	2018-19
Higher education institutions with NAAC grade A and above	2019-20
Pupil-Teacher Ratio- Higher Education	2018-19
Schools with ICT labs	2016-17
National Achievement Survey (NAS) Scores (Class X)	2017
Expenditure on higher and technical education	2017-18, 2016-17 and 2015-16
Expenditure on Research and Development (State Govt.)	2017-18, 2016-17 and 2015-16
Expenditure on Science, Technology and Environment	2019-20, 2018-19 and 2017-18
FDI inflows	2019-20 (Oct-19 to June 2020)
Venture capital deals	2018
Knowledge-intensive employment	2017-18
NGOs involved in knowledge intensive areas	2020
Private R&D units	2018
State funded R&D units	2018
Ease of Doing Business Ranking	2019
Online services transaction	2019-20
Internet subscribers	2019-20
Incubator centres	2020
Common Facility Centres	2020
Cluster Strength	2018
Information Technology / Intellectual Property related Acts	2018
Cyber-crime police stations	2019
Pendency of court cases	2020
Grassroots innovations	2020
Patents applications filed	2018-19
Trademark application filed	2018-19
Industrial design applications filed	2018-19
Presence of startups	2020
New businesses registered	2019-20
Publications	2020
ICT exports	2017-18
High and medium high-tech manufacturing entities	2018
Geographical Indications GI registered	2018-19
Citations	2020

Appendix C: Inverted indicators

Inverted Indicators
Pupil-Teacher Ratio- Higher Education
Ease of doing business ranking
Information Technology / Intellectual Property related Acts
Pendency of court cases

Appendix D: Weights

Indicator Name	Weight
Human Capital	
Enrolment in PhD	0.137346
Enrolment in engineering and technology	0.163986
Colleges connected through NMEICT	0.138516
Higher education institutions with NAAC grade A and above	0.149776
Pupil-Teacher Ratio- Higher Education	0.143949
Schools with ICT labs	0.126296
National Achievement Survey (NAS) Scores (Class X)	0.140132
Investment	
Expenditure on higher and technical education	0.170279
Expenditure on Research and Development (State Govt.)	0.208511
Expenditure on Science, Technology and Environment	0.226097
FDI inflows	0.19779
Venture capital deals	0.197324
Knowledge Workers	
Knowledge-intensive employment	0.28947
Number of NGOs involved in knowledge intensive areas	0.232384
Private R&D units	0.242728
State funded R&D units	0.235419
Business Environment	
Ease of Doing Business Ranking	0.129336
Online services transaction	0.171585
Internet subscribers	0.188393
Incubator centres	0.155574
Common Facility Centres	0.179883
Cluster Strength	0.175229
Safety and Legal Environment	
Information Technology / Intellectual Property related acts	0.315309
Cyber-crime police stations	0.299293
Pendency of court cases	0.385398
Knowledge Output	
Grassroots innovations	0.013292

Patents applications filed	0.174702
Trademark application filed	0.191848
Industrial design applications filed	0.142278
Presence of start-ups	0.176851
New businesses registered	0.189757
Publications	0.111271
Knowledge Diffusion	
ICT exports	0.282836
High and medium high-tech manufacturing entities	0.155677
Geographical Indications GI registered	0.295961
Citations	0.265526

Appendix E: Best case and worst case scenarios

Indicator Name	Best case	Worst case
Human Capital		
Enrolment in PhD	81.57658	0
Enrolment in engineering and technology	6998.039	0
Colleges connected through NMEICT		
Higher education institutions with NAAC grade A and above	40.74074	0
Pupil-Teacher Ratio- Higher Education	12	61
Schools with ICT labs	86.6	6.2
National Achievement Survey (NAS) Scores (Class X)	44.7348	0
Investment		
Expenditure on higher and technical education	51044937	733405.1
Expenditure on Research and Development (State Govt.)	0.808495	0
Expenditure on Science, Technology and Environment	0.367294	0
FDI inflows	7.995584	8.17E-05
Venture capital deals	3.44193	0
Knowledge Workers		
Knowledge-intensive employment	81.22997	0
Number of NGOs involved in knowledge intensive areas	11.41539	0
Private R&D units	2.273912	0
State funded R&D units	0.495295	0
Business Environment		
Ease of Doing Business Ranking	1	29
Online services transaction	35303.8	1000.5
Internet subscribers	202.71	30.35
Incubator centres	2.364805	0
Common Facility Centres	1.428571	0
Cluster Strength	123	0

Safety and Legal Environment		
Information Technology / Intellectual Property related acts	0	9.1
Cyber-crime police stations	0.16378	0
Pendency of court cases	0	14
Knowledge Output		
Grassroots innovations	276	6
Patents applications filed	7.8747	0
Trademark application filed	319.7176	0
Industrial design applications filed	40.28827	0
Presence of start-ups	0.023513	0.001335
New businesses registered	0.030011	0.00035
Publications	100	0
Knowledge Diffusion		
ICT exports	13.54296	0
High and medium high-tech manufacturing entities	0.00158	0
Geographical Indications GI registered	44	0
Citations	100	0

Appendix F: Dimension and Pillar scores

State	Innovation	Enablers	Human Capital	Investment	Knowledge Workers	Business Environment	Safety and Legal Environment	Performance	Knowledge Output	Knowledge Diffusion
ANDHRA PRADESH	24.19	33.14	47.43	4.1	20.86	30.06	63.24	15.25	9.35	21.14
ARUNACHAL PRADESH	14.9	27.46	35.08	33.66	7.77	2.78	58.02	2.35	4.07	0.62
ASSAM	16.38	19.75	32.08	5.44	5.69	9.41	46.15	13	10.28	15.73
BIHAR	14.48	14.43	20.98	2.49	3.51	5.17	40.02	14.53	13.41	15.66
CHHATTIS-GARH	15.77	25.76	35.77	6.15	4.28	15.17	67.46	5.78	6	5.55
DELHI	46.6	40.08	49.81	19.72	28.35	39.72	62.8	53.12	82.83	23.42
GOA	24.92	39.76	55.84	13.43	33.52	36.9	59.09	10.09	18.39	1.79
GUJARAT	23.63	29.28	44.97	10.81	21.16	26.87	42.59	17.98	17.07	18.9
HARYANA	25.81	32.59	47.22	16.49	15.57	18.96	64.69	19.03	22.85	15.22
HIMACHAL PRADESH	25.06	36.28	44.58	10.49	36.86	22.91	66.54	13.85	14.39	13.31

JAMMU & KASHMIR	18.62	26.83	31.04	12.99	16.84	9.99	63.31	10.41	8.9	11.93
JHARKHAND	17.12	22.63	23.16	26.05	2.77	11.63	49.54	11.6	12.6	10.61
KARNATAKA	42.5	34.81	54.27	33.01	22.58	24.43	39.75	50.19	28.13	72.26
KERALA	30.58	36.97	59.72	9.18	15.34	37.12	63.46	24.2	17.86	30.54
MADHYA PRADESH	20.82	25.4	32.7	7.47	8.36	14.79	63.66	16.24	13.74	18.75
MAHARASH-TRA	38.03	34.71	46.43	13.04	22.81	29.26	62.01	41.35	34.57	48.12
MANIPUR	22.78	37.32	40.01	41.18	29.87	4.04	71.52	8.23	13.97	2.48
MEGHALAYA	12.15	19.23	30.73	3.93	10.92	4.33	46.26	5.07	4.35	5.79
MIZORAM	16.93	27.79	42.62	10	1.02	4.57	80.73	6.08	8.02	4.13
NAGALAND	14.11	26.11	36.01	6.76	6.58	4.36	76.86	2.11	2.36	1.86
ODISHA	18.94	20.93	42.1	3.24	5.66	8.94	44.71	16.94	10.82	23.06
PUNJAB	22.54	30.03	53.09	5.1	9.86	14.2	67.91	15.05	16.65	13.46
RAJASTHAN	20.83	25.7	41.65	5	8.25	17.21	56.4	15.96	12.85	19.07
SIKKIM	20.28	38.98	45.76	13.53	32.67	3.73	99.2	1.58	2.31	0.85
TAMIL NADU	37.91	36.57	62.8	11.43	16.09	31.84	60.68	39.25	25.77	52.73
TELANGANA	33.23	31	45.9	7.9	16.22	26.16	58.81	35.47	28.22	42.71
TRIPURA	12.84	23.37	40.02	2.29	6.22	4.09	64.22	2.32	4.01	0.62
UTTARA-KHAND	23.5	29.68	41.89	7.01	22.62	14.83	62.04	17.31	18.04	16.58
UTTAR PRADESH	22.85	16.53	18.23	5.21	6.75	26.35	26.09	29.18	21.37	36.98
WEST BENGAL	21.69	18.25	20.43	2.98	7.33	20.16	40.35	25.13	17.76	32.51
ANDAMAN & NICOBAR ISLANDS	18.89	30.16	41.32	18.7	1.18	23.72	65.87	7.62	15.23	0
CHANDIGARH	38.57	41.52	74.82	6.62	30.04	10.03	86.11	35.62	55.1	16.14
DADRA & NAGAR HAVELI	22.74	26.63	32.13	7.91	13.11	13.47	66.52	18.86	19.96	17.76
DAMAN & DIU	26.76	26.63	42.27	3.42	9.81	14.9	62.75	26.89	43.48	10.31
LAKSHAD-WEEP	11.71	21.7	38.27	5.53	0	15.47	49.25	1.71	3.43	0
PUDUCHERRY	25.23	34.83	72.39	1.43	20.17	8.18	71.97	15.63	19.21	12.05

Appendix G: Peer Groups

State	Peer 1,Peer 2,Peer 3,Peer 4,Peer 5,Peer 6,Peer 7,Peer 8,Peer 9,Peer 10
Andhra Pradesh	Telangana, Delhi, Rajasthan, Kerala, Haryana, Madhya Pradesh, West Bengal, Punjab, Odisha, Bihar
Arunachal Pradesh	Nagaland, Sikkim, Mizoram, Manipur, Puducherry, Meghalaya, Andaman & Nicobar Islands, Dadra & Nagar Haveli, Daman & Diu, Chandigarh
Assam	Chhattisgarh, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Bihar, Odisha, Punjab, Goa, Tripura
Bihar	Odisha, Punjab, Assam, Chhattisgarh, Madhya Pradesh, Jharkhand, Haryana, Uttarakhand, Kerala, Delhi
Chhattisgarh	Assam, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Bihar, Odisha, Punjab, Goa, Tripura
Delhi	Telangana, Andhra Pradesh, Kerala, Haryana, Madhya Pradesh, Rajasthan, West Bengal, Punjab, Odisha, Bihar
Goa	Tripura, Chandigarh, Meghalaya, Puducherry, Manipur, Sikkim, Nagaland, Arunachal Pradesh, Mizoram, Jammu & Kashmir
Gujarat	Tamil Nadu, Uttar Pradesh, Karnataka, West Bengal, Rajasthan, Andhra Pradesh, Telangana, Delhi, Kerala, Haryana
Haryana	Madhya Pradesh, Kerala, Delhi, Telangana, Andhra Pradesh, Punjab, Rajasthan, Odisha, Bihar, West Bengal
Himachal Pradesh	Jammu & Kashmir, Goa, Uttarakhand, Tripura, Chandigarh, Meghalaya, Puducherry, Manipur, Sikkim, Nagaland
Jammu & Kashmir	Himachal Pradesh, Goa, Tripura, Uttarakhand, Chandigarh, Meghalaya, Puducherry, Manipur, Sikkim, Nagaland
Jharkhand	Chhattisgarh, Assam, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Bihar, Odisha, Goa, Punjab, Tripura
Karnataka	Uttar Pradesh, Gujarat, Tamil Nadu, West Bengal, Rajasthan, Andhra Pradesh, Telangana, Delhi, Kerala, Haryana
Kerala	Haryana,Delhi,Madhya Pradesh,Telangana, Andhra Pradesh, Rajasthan, Punjab, Odisha, West Bengal, Bihar
Madhya Pradesh	Haryana, Kerala, Delhi, Telangana, Andhra Pradesh, Punjab, Odisha, Bihar, Rajasthan, West Bengal
Maharashtra	Tamil Nadu, Gujarat, Uttar Pradesh, Karnataka, West Bengal, Rajasthan, Andhra Pradesh, Telangana, Delhi, Kerala
Manipur	Sikkim, Nagaland, Arunachal Pradesh, Mizoram, Puducherry, Meghalaya, Chandigarh, Andaman & Nicobar Islands, Dadra & Nagar Haveli, Daman & Diu
Meghalaya	Puducherry, Chandigarh, Manipur, Sikkim, Nagaland, Arunachal Pradesh, Tripura, Mizoram, Andaman & Nicobar Islands, Dadra & Nagar Haveli
Mizoram	Arunachal Pradesh, Nagaland, Sikkim, Manipur, Andaman & Nicobar Islands, Puducherry, Dadra & Nagar Haveli, Meghalaya, Daman & Diu, Lakshadweep
Nagaland	Arunachal Pradesh, Sikkim, Manipur, Mizoram, Puducherry, Meghalaya, Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu

State	Peer 1,Peer 2,Peer 3,Peer 4,Peer 5,Peer 6,Peer 7,Peer 8,Peer 9,Peer 10
Odisha	Bihar, Punjab, Madhya Pradesh, Assam, Haryana, Chhattisgarh, Jharkhand, Kerala, Uttarakhand, Delhi
Punjab	Odisha,Bihar,Madhya Pradesh, Haryana, Kerala, Assam, Chhattisgarh, Jharkhand, Delhi, Uttarakhand
Rajasthan	Andhra Pradesh, West Bengal, Telangana, Delhi, Kerala, Haryana, Madhya Pradesh, Punjab, Odisha ,Bihar
Sikkim	Manipur, Nagaland, Arunachal Pradesh, Mizoram, Puducherry, Meghalaya, Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu
Tamil Nadu	Gujarat, Uttar Pradesh, Karnataka, West Bengal, Rajasthan, Andhra Pradesh, Telangana, Delhi, Kerala, Haryana
Telangana	Andhra Pradesh, Delhi, Kerala, Rajasthan, Haryana, Madhya Pradesh, West Bengal, Punjab, Odisha, Bihar
Tripura	Chandigarh, Meghalaya, Puducherry, Manipur, Sikkim, Nagaland, Arunachal Pradesh, Mizoram, Goa, Andaman & Nicobar Islands
Uttarakhand	Jharkhand ,Chhattisgarh, Assam, Himachal Pradesh, Jammu & Kashmir, Goa, Tripura, Chandigarh, Meghalaya, Puducherry
Uttar Pradesh	Karnataka, Gujarat, Tamil Nadu, West Bengal, Rajasthan, Andhra Pradesh, Telangana, Delhi, Kerala, Haryana
West Bengal	Rajasthan, Andhra Pradesh, Telangana, Delhi, Kerala, Haryana, Madhya Pradesh, Punjab, Odisha, Bihar
Andaman & Nicobar Islands	Dadra & Nagar Haveli, Daman & Diu, Lakshadweep, Mizoram, Arunachal Pradesh, Nagaland, Sikkim, Manipur, Puducherry, Meghalaya
Chandigarh	Meghalaya, Tripura, Puducherry, Manipur, Sikkim, Nagaland, Arunachal Pradesh, Mizoram, Andaman & Nicobar Islands, Dadra & Nagar Haveli
Dadra & Nagar Haveli	Daman & Diu, Lakshadweep, Andaman & Nicobar Islands, Mizoram, Arunachal Pradesh, Nagaland, Sikkim, Manipur, Puducherry, Meghalaya
Daman & Diu	Dadra & Nagar Haveli, Lakshadweep, Andaman & Nicobar Islands, Mizoram, Arunachal Pradesh, Nagaland, Sikkim, Manipur, Puducherry, Meghalaya
Lakshadweep	Daman & Diu, Dadra & Nagar Haveli, Andaman & Nicobar Islands, Mizoram,Arunachal Pradesh, Nagaland, Sikkim, Manipur, Puducherry, Meghalaya
Puducherry	Meghalaya, Manipur, Sikkim, Chandigarh, Nagaland, Arunachal Pradesh, Mizoram, Tripura, Andaman & Nicobar Islands, Dadra & Nagar Haveli

Appendix H: Indicator Data

Andhra Pradesh

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	10.03
	Enrolment in engineering and technology	4509.35
	Colleges connected through NMEICT	14.80
	Higher education institutions with NAAC grade A and above	3.78
	Pupil teacher ratio - Higher education	18.00
	Schools with ICT labs	20.60
	National Achievement Survey (NAS) Scores (Class X)	42.10
Investment	Expenditure on higher and technical education	3104201.06
	Expenditure on research and development (State government)	0.10
	Expenditure on science, technology and environment	0.0013
	FDI inflow	0.25
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	10.26
	NGOs involved in knowledge intensive areas	0.65
	Private R&D units	0.82
	State funded R&D units	0.17
Business Environment	Ease of doing business ranking	1.00
	Online services transactions	19952.90
	Internet subscribers	65.15
	Incubator centres	0.03
	Common facility centres	0.06
	Cluster Strength	47.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.00
	Cyber crime police stations	0.002
	Pendency of court cases	1.25
Knowledge Output	Grassroot innovations	7.00
	Patent applications filed	0.65
	Trademark applications filed	7.11
	Presence of startups	0.003
	Industrial Design applications filed	0.12
	New businesses registered	0.0049
	Publications	32.04
Knowledge Diffusion	ICT exports	0.11
	High and medium high-tech manufacturing entities	0.00013
	Geographical Indications (GI) registered	19.00
	Citations	30.84

Arunachal Pradesh

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	48.85
	Enrolment in engineering and technology	910.63
	Colleges connected through NMEICT	2.80
	Higher education institutions with NAAC grade A and above	3.70
	Pupil teacher ratio - Higher education	31.00
	Schools with ICT labs	19.50
	National Achievement Survey (NAS) Scores (Class X)	36.89
Investment	Expenditure on higher and technical education	36831205.38
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.37
	FDI inflow	0.03
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.00
	NGOs involved in knowledge intensive areas	3.47
	Private R&D units	0.00
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	1006.00
	Internet subscribers	51.99
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	0.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.80
	Cyber crime police stations	0.00
	Pendency of court cases	3.60
Knowledge Output	Grassroot innovations	252.00
	Patent applications filed	0.36
	Trademark applications filed	1.95
	Presence of startups	0.0027
	Industrial Design applications filed	0.07
	New businesses registered	0.0019
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	1.00
	Citations	0.00

Assam

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	15.83
	Enrolment in engineering and technology	255.68
	Colleges connected through NMEICT	12.40
	Higher education institutions with NAAC grade A and above	2.79
	Pupil teacher ratio - Higher education	31.00
	Schools with ICT labs	10.80
	National Achievement Survey (NAS) Scores (Class X)	42.30
Investment	Expenditure on higher and technical education	775779.09
	Expenditure on research and development (State government)	0.16
	Expenditure on science, technology and environment	0.01
	FDI inflow	0.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	1.49
	NGOs involved in knowledge intensive areas	0.70
	Private R&D units	0.04
	State funded R&D units	0.07
Business Environment	Ease of doing business ranking	20.00
	Online services transactions	2007.50
	Internet subscribers	41.06
	Incubator centres	0.02
	Common facility centres	0.08
	Cluster Strength	27.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	5.10
	Cyber crime police stations	0.00
	Pendency of court cases	1.41
Knowledge Output	Grassroot innovations	31.00
	Patent applications filed	0.35
	Trademark applications filed	4.11
	Presence of startups	0.004
	Industrial Design applications filed	0.02
	New businesses registered	0.0042
	Publications	45.69
Knowledge Diffusion	ICT exports	0.01
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	7.00
	Citations	45.71

Bihar

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	3.23
	Enrolment in engineering and technology	290.41
	Colleges connected through NMEICT	17.60
	Higher education institutions with NAAC grade A and above	1.09
	Pupil teacher ratio - Higher education	61.00
	Schools with ICT labs	14.80
	National Achievement Survey (NAS) Scores (Class X)	35.24
Investment	Expenditure on higher and technical education	5370193.82
	Expenditure on research and development (State government)	0.03
	Expenditure on science, technology and environment	0.00
	FDI inflow	0.03
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	1.59
	NGOs involved in knowledge intensive areas	0.52
	Private R&D units	0.0039
	State funded R&D units	0.04
Business Environment	Ease of doing business ranking	26.00
	Online services transactions	1452.10
	Internet subscribers	30.35
	Incubator centres	0.01
	Common facility centres	0.03
	Cluster Strength	28.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.00
	Cyber crime police stations	0.0009
	Pendency of court cases	12.51
Knowledge Output	Grassroot innovations	37.00
	Patent applications filed	0.05
	Trademark applications filed	3.74
	Presence of startups	0.0042
	Industrial Design applications filed	0.01
	New businesses registered	0.01
	Publications	36.15
Knowledge Diffusion	ICT exports	0.000008
	High and medium high-tech manufacturing entities	0.0000026
	Geographical Indications (GI) registered	13.00
	Citations	30.40

Chhattisgarh

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	5.77
	Enrolment in engineering and technology	956.89
	Colleges connected through NMEICT	18.20
	Higher education institutions with NAAC grade A and above	1.00
	Pupil teacher ratio - Higher education	28.00
	Schools with ICT labs	33.20
	National Achievement Survey (NAS) Scores (Class X)	36.16
Investment	Expenditure on higher and technical education	9573841.11
	Expenditure on research and development (State government)	0.10
	Expenditure on science, technology and environment	0.01
	FDI inflow	0.000081
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	3.49
	NGOs involved in knowledge intensive areas	0.42
	Private R&D units	0.04
	State funded R&D units	0.04
Business Environment	Ease of doing business ranking	6.00
	Online services transactions	7300.10
	Internet subscribers	43.26
	Incubator centres	0.03
	Common facility centres	0.00
	Cluster Strength	21.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.30
	Cyber crime police stations	0.0039
	Pendency of court cases	0.80
Knowledge Output	Grassroot innovations	38.00
	Patent applications filed	0.16
	Trademark applications filed	7.72
	Presence of startups	0.0046
	Industrial Design applications filed	0.08
	New businesses registered	0.0040
	Publications	0.00
Knowledge Diffusion	ICT exports	0.29
	High and medium high-tech manufacturing entities	0.00010
	Geographical Indications (GI) registered	6.00
	Citations	0.00

Delhi

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	56.06
	Enrolment in engineering and technology	728.58
	Colleges connected through NMEICT	16.30
	Higher education institutions with NAAC grade A and above	25.26
	Pupil teacher ratio - Higher education	52.00
	Schools with ICT labs	46.40
	National Achievement Survey (NAS) Scores (Class X)	44.73
Investment	Expenditure on higher and technical education	7198500.40
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.0042
	FDI inflow	5.63
	Venture capital deals	0.63
Knowledge Workers	Knowledge-intensive employment	10.75
	NGOs involved in knowledge intensive areas	2.84
	Private R&D units	1.98
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	12.00
	Online services transactions	5737.60
	Internet subscribers	202.71
	Incubator centres	0.33
	Common facility centres	0.00
	Cluster Strength	58.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.30
	Cyber crime police stations	0.00
	Pendency of court cases	0.78
Knowledge Output	Grassroot innovations	21.00
	Patent applications filed	7.87
	Trademark applications filed	319.72
	Presence of startups	0.02
	Industrial Design applications filed	9.17
	New businesses registered	0.03
	Publications	59.98
Knowledge Diffusion	ICT exports	0.28
	High and medium high-tech manufacturing entities	0.00063
	Geographical Indications (GI) registered	1.00
	Citations	61.51

Goa

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	20.29
	Enrolment in engineering and technology	2507.00
	Colleges connected through NMEICT	8.80
	Higher education institutions with NAAC grade A and above	19.64
	Pupil teacher ratio - Higher education	16.00
	Schools with ICT labs	63.60
	National Achievement Survey (NAS) Scores (Class X)	42.47
Investment	Expenditure on higher and technical education	20034806.38
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.09
	FDI inflow	0.69
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	41.46
	NGOs involved in knowledge intensive areas	0.21
	Private R&D units	1.58
	State funded R&D units	0.07
Business Environment	Ease of doing business ranking	24.00
	Online services transactions	4021.40
	Internet subscribers	74.69
	Incubator centres	0.48
	Common facility centres	1.43
	Cluster Strength	45.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.60
	Cyber crime police stations	0.07
	Pendency of court cases	7.09
Knowledge Output	Grassroot innovations	19.00
	Patent applications filed	3.02
	Trademark applications filed	46.14
	Presence of startups	0.01
	Industrial Design applications filed	0.34
	New businesses registered	0.01
	Publications	0.00
Knowledge Diffusion	ICT exports	0.13
	High and medium high-tech manufacturing entities	0.000079
	Geographical Indications (GI) registered	1.00
	Citations	0.00

Gujarat

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	9.79
	Enrolment in engineering and technology	1786.52
	Colleges connected through NMEICT	26.50
	Higher education institutions with NAAC grade A and above	0.96
	Pupil teacher ratio - Higher education	26.00
	Schools with ICT labs	53.00
	National Achievement Survey (NAS) Scores (Class X)	36.47
Investment	Expenditure on higher and technical education	2459669.49
	Expenditure on research and development (State government)	0.08
	Expenditure on science, technology and environment	0.06
	FDI inflow	1.69
	Venture capital deals	0.11
Knowledge Workers	Knowledge-intensive employment	15.25
	NGOs involved in knowledge intensive areas	0.49
	Private R&D units	0.59
	State funded R&D units	0.19
Business Environment	Ease of doing business ranking	10.00
	Online services transactions	12683.70
	Internet subscribers	64.77
	Incubator centres	0.05
	Common facility centres	0.06
	Cluster Strength	73.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.70
	Cyber crime police stations	0.00
	Pendency of court cases	10.20
Knowledge Output	Grassroot innovations	84.00
	Patent applications filed	1.44
	Trademark applications filed	47.85
	Presence of startups	0.01
	Industrial Design applications filed	1.97
	New businesses registered	0.01
	Publications	27.84
Knowledge Diffusion	ICT exports	0.23
	High and medium high-tech manufacturing entities	0.00077
	Geographical Indications (GI) registered	16.00
	Citations	30.61

Haryana

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	15.17
	Enrolment in engineering and technology	2460.87
	Colleges connected through NMEICT	26.90
	Higher education institutions with NAAC grade A and above	2.07
	Pupil teacher ratio - Higher education	26.00
	Schools with ICT labs	48.40
	National Achievement Survey (NAS) Scores (Class X)	36.47
Investment	Expenditure on higher and technical education	8176221.42
	Expenditure on research and development (State government)	0.07
	Expenditure on science, technology and environment	0.01
	FDI inflow	1.21
	Venture capital deals	1.50
Knowledge Workers	Knowledge-intensive employment	9.47
	NGOs involved in knowledge intensive areas	0.37
	Private R&D units	0.86
	State funded R&D units	0.07
Business Environment	Ease of doing business ranking	16.00
	Online services transactions	6067.60
	Internet subscribers	59.01
	Incubator centres	0.07
	Common facility centres	0.21
	Cluster Strength	42.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.60
	Cyber crime police stations	0.01
	Pendency of court cases	0.10
Knowledge Output	Grassroot innovations	73.00
	Patent applications filed	2.05
	Trademark applications filed	63.24
	Presence of startups	0.01
	Industrial Design applications filed	1.62
	New businesses registered	0.01
	Publications	0.00
Knowledge Diffusion	ICT exports	4.18
	High and medium high-tech manufacturing entities	0.00041
	Geographical Indications (GI) registered	2.00
	Citations	0.00

Himachal Pradesh

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	27.90
	Enrolment in engineering and technology	1298.91
	Colleges connected through NMEICT	20.30
	Higher education institutions with NAAC grade A and above	0.93
	Pupil teacher ratio - Higher education	27.00
	Schools with ICT labs	56.60
	National Achievement Survey (NAS) Scores (Class X)	36.30
Investment	Expenditure on higher and technical education	20180223.12
	Expenditure on research and development (State government)	0.14
	Expenditure on science, technology and environment	0.0010
	FDI inflow	0.09
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	30.29
	NGOs involved in knowledge intensive areas	0.47
	Private R&D units	0.12
	State funded R&D units	0.50
Business Environment	Ease of doing business ranking	7.00
	Online services transactions	8071.90
	Internet subscribers	81.62
	Incubator centres	0.03
	Common facility centres	0.00
	Cluster Strength	43.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.10
	Cyber crime police stations	0.01
	Pendency of court cases	0.67
Knowledge Output	Grassroot innovations	49.00
	Patent applications filed	2.81
	Trademark applications filed	15.66
	Presence of startups	0.0031
	Industrial Design applications filed	0.96
	New businesses registered	0.0039
	Publications	33.92
Knowledge Diffusion	ICT exports	0.01
	High and medium high-tech manufacturing entities	0.000025
	Geographical Indications (GI) registered	9.00
	Citations	29.88

Jammu & Kashmir

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	21.39
	Enrolment in engineering and technology	664.91
	Colleges connected through NMEICT	14.90
	Higher education institutions with NAAC grade A and above	0.00
	Pupil teacher ratio - Higher education	35.00
	Schools with ICT labs	24.60
	National Achievement Survey (NAS) Scores (Class X)	31.60
Investment	Expenditure on higher and technical education	10514535.63
	Expenditure on research and development (State government)	0.26
	Expenditure on science, technology and environment	0.0032
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	9.96
	NGOs involved in knowledge intensive areas	1.11
	Private R&D units	0.01
	State funded R&D units	0.22
Business Environment	Ease of doing business ranking	21.00
	Online services transactions	1250.30
	Internet subscribers	56.43
	Incubator centres	0.02
	Common facility centres	0.14
	Cluster Strength	15.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.50
	Cyber crime police stations	0.02
	Pendency of court cases	3.12
Knowledge Output	Grassroot innovations	79.00
	Patent applications filed	0.32
	Trademark applications filed	9.27
	Presence of startups	0.0046
	Industrial Design applications filed	0.02
	New businesses registered	0.0044
	Publications	21.19
Knowledge Diffusion	ICT exports	0.0034
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	9.00
	Citations	25.48

Jharkhand

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	8.80
	Enrolment in engineering and technology	584.30
	Colleges connected through NMEICT	14.60
	Higher education institutions with NAAC grade A and above	0.66
	Pupil teacher ratio - Higher education	60.00
	Schools with ICT labs	23.00
	National Achievement Survey (NAS) Scores (Class X)	36.32
Investment	Expenditure on higher and technical education	5737445.87
	Expenditure on research and development (State government)	0.05
	Expenditure on science, technology and environment	0.06
	FDI inflow	8.00
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	3.13
	NGOs involved in knowledge intensive areas	0.36
	Private R&D units	0.02
	State funded R&D units	0.01
Business Environment	Ease of doing business ranking	5.00
	Online services transactions	1448.70
	Internet subscribers	30.35
	Incubator centres	0.02
	Common facility centres	0.00
	Cluster Strength	28.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.90
	Cyber crime police stations	0.02
	Pendency of court cases	6.94
Knowledge Output	Grassroot innovations	40.00
	Patent applications filed	0.49
	Trademark applications filed	3.81
	Presence of startups	0.0046
	Industrial Design applications filed	0.05
	New businesses registered	0.01
	Publications	45.71
Knowledge Diffusion	ICT exports	0.0029
	High and medium high-tech manufacturing entities	0.000022
	Geographical Indications (GI) registered	0.00
	Citations	41.67

Karnataka

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	21.77
	Enrolment in engineering and technology	2835.61
	Colleges connected through NMEICT	31.50
	Higher education institutions with NAAC grade A and above	4.21
	Pupil teacher ratio - Higher education	15.00
	Schools with ICT labs	29.40
	National Achievement Survey (NAS) Scores (Class X)	43.64
Investment	Expenditure on higher and technical education	3157219.01
	Expenditure on research and development (State government)	0.04
	Expenditure on science, technology and environment	0.05
	FDI inflow	3.41
	Venture capital deals	3.44
Knowledge Workers	Knowledge-intensive employment	12.42
	NGOs involved in knowledge intensive areas	0.56
	Private R&D units	0.70
	State funded R&D units	0.22
Business Environment	Ease of doing business ranking	17.00
	Online services transactions	3084.70
	Internet subscribers	69.06
	Incubator centres	0.10
	Common facility centres	0.26
	Cluster Strength	82.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	9.10
	Cyber crime police stations	0.07
	Pendency of court cases	2.83
Knowledge Output	Grassroot innovations	9.00
	Patent applications filed	3.58
	Trademark applications filed	29.07
	Presence of startups	0.01
	Industrial Design applications filed	0.72
	New businesses registered	0.01
	Publications	51.06
Knowledge Diffusion	ICT exports	13.54
	High and medium high-tech manufacturing entities	0.00014
	Geographical Indications (GI) registered	44.00
	Citations	51.03

Kerala

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	20.01
	Enrolment in engineering and technology	2812.05
	Colleges connected through NMEICT	33.10
	Higher education institutions with NAAC grade A and above	7.39
	Pupil teacher ratio - Higher education	18.00
	Schools with ICT labs	68.30
	National Achievement Survey (NAS) Scores (Class X)	40.22
Investment	Expenditure on higher and technical education	4453739.70
	Expenditure on research and development (State government)	0.03
	Expenditure on science, technology and environment	0.05
	FDI inflow	0.16
	Venture capital deals	0.67
Knowledge Workers	Knowledge-intensive employment	6.48
	NGOs involved in knowledge intensive areas	0.21
	Private R&D units	0.22
	State funded R&D units	0.22
Business Environment	Ease of doing business ranking	28.00
	Online services transactions	35303.80
	Internet subscribers	75.01
	Incubator centres	0.08
	Common facility centres	0.46
	Cluster Strength	55.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.20
	Cyber crime police stations	0.0029
	Pendency of court cases	0.90
Knowledge Output	Grassroot innovations	37.00
	Patent applications filed	0.83
	Trademark applications filed	29.14
	Presence of startups	0.01
	Industrial Design applications filed	0.40
	New businesses registered	0.01
	Publications	41.39
Knowledge Diffusion	ICT exports	0.59
	High and medium high-tech manufacturing entities	0.0000017
	Geographical Indications (GI) registered	30.00
	Citations	42.44

Madhya Pradesh

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	5.64
	Enrolment in engineering and technology	1331.79
	Colleges connected through NMEICT	17.90
	Higher education institutions with NAAC grade A and above	1.48
	Pupil teacher ratio - Higher education	33.00
	Schools with ICT labs	18.40
	National Achievement Survey (NAS) Scores (Class X)	35.32
Investment	Expenditure on higher and technical education	5551650.13
	Expenditure on research and development (State government)	0.10
	Expenditure on science, technology and environment	0.04
	FDI inflow	0.23
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	9.51
	NGOs involved in knowledge intensive areas	0.66
	Private R&D units	0.07
	State funded R&D units	0.06
Business Environment	Ease of doing business ranking	4.00
	Online services transactions	2991.00
	Internet subscribers	43.26
	Incubator centres	0.04
	Common facility centres	0.00
	Cluster Strength	30.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.60
	Cyber crime police stations	0.0013
	Pendency of court cases	1.69
Knowledge Output	Grassroot innovations	13.00
	Patent applications filed	0.27
	Trademark applications filed	12.12
	Presence of startups	0.01
	Industrial Design applications filed	0.09
	New businesses registered	0.01
	Publications	43.88
Knowledge Diffusion	ICT exports	0.12
	High and medium high-tech manufacturing entities	0.000080
	Geographical Indications (GI) registered	11.00
	Citations	43.37

Maharashtra

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	7.83
	Enrolment in engineering and technology	2031.08
	Colleges connected through NMEICT	24.80
	Higher education institutions with NAAC grade A and above	7.73
	Pupil teacher ratio - Higher education	27.00
	Schools with ICT labs	44.40
	National Achievement Survey (NAS) Scores (Class X)	38.65
Investment	Expenditure on higher and technical education	776103.38
	Expenditure on research and development (State government)	0.01
	Expenditure on science, technology and environment	0.02
	FDI inflow	2.79
	Venture capital deals	0.84
Knowledge Workers	Knowledge-intensive employment	17.07
	NGOs involved in knowledge intensive areas	1.16
	Private R&D units	1.04
	State funded R&D units	0.09
Business Environment	Ease of doing business ranking	13.00
	Online services transactions	2333.10
	Internet subscribers	74.69
	Incubator centres	0.05
	Common facility centres	0.27
	Cluster Strength	109.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.60
	Cyber crime police stations	0.04
	Pendency of court cases	5.21
Knowledge Output	Grassroot innovations	6.00
	Patent applications filed	3.79
	Trademark applications filed	57.64
	Presence of startups	0.01
	Industrial Design applications filed	1.96
	New businesses registered	0.02
	Publications	68.17
Knowledge Diffusion	ICT exports	3.66
	High and medium high-tech manufacturing entities	0.00019
	Geographical Indications (GI) registered	33.00
	Citations	69.32

Manipur

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	38.10
	Enrolment in engineering and technology	189.03
	Colleges connected through NMEICT	17.60
	Higher education institutions with NAAC grade A and above	1.16
	Pupil teacher ratio - Higher education	22.00
	Schools with ICT labs	26.10
	National Achievement Survey (NAS) Scores (Class X)	37.84
Investment	Expenditure on higher and technical education	1437300.22
	Expenditure on research and development (State government)	0.81
	Expenditure on science, technology and environment	0.27
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.15
	NGOs involved in knowledge intensive areas	11.42
	Private R&D units	0.11
	State funded R&D units	0.07
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	1000.50
	Internet subscribers	51.99
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	10.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.00
	Cyber crime police stations	0.04
	Pendency of court cases	1.99
Knowledge Output	Grassroot innovations	216.00
	Patent applications filed	0.25
	Trademark applications filed	2.52
	Presence of startups	0.01
	Industrial Design applications filed	0.00
	New businesses registered	0.01
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	4.00
	Citations	0.00

Meghalaya

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	38.86
	Enrolment in engineering and technology	213.39
	Colleges connected through NMEICT	7.80
	Higher education institutions with NAAC grade A and above	4.76
	Pupil teacher ratio - Higher education	26.00
	Schools with ICT labs	7.70
	National Achievement Survey (NAS) Scores (Class X)	27.67
Investment	Expenditure on higher and technical education	1280802.89
	Expenditure on research and development (State government)	0.04
	Expenditure on science, technology and environment	0.0029
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.00
	NGOs involved in knowledge intensive areas	0.34
	Private R&D units	0.07
	State funded R&D units	0.20
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	1075.90
	Internet subscribers	51.99
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	12.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	2.10
	Cyber crime police stations	0.03
	Pendency of court cases	8.93
Knowledge Output	Grassroot innovations	156.00
	Patent applications filed	0.20
	Trademark applications filed	2.29
	Presence of startups	0.0016
	Industrial Design applications filed	0.00
	New businesses registered	0.0019
	Publications	17.83
Knowledge Diffusion	ICT exports	0.03
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	2.00
	Citations	18.00

Mizoram

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	71.36
	Enrolment in engineering and technology	269.84
	Colleges connected through NMEICT	6.30
	Higher education institutions with NAAC grade A and above	6.90
	Pupil teacher ratio - Higher education	18.00
	Schools with ICT labs	6.20
	National Achievement Survey (NAS) Scores (Class X)	40.83
Investment	Expenditure on higher and technical education	4542872.23
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.11
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.00
	NGOs involved in knowledge intensive areas	0.46
	Private R&D units	0.00
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	25.00
	Online services transactions	1989.60
	Internet subscribers	51.99
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	0.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.50
	Cyber crime police stations	0.09
	Pendency of court cases	1.63
Knowledge Output	Grassroot innovations	185.00
	Patent applications filed	2.28
	Trademark applications filed	1.28
	Presence of startups	0.0015
	Industrial Design applications filed	0.00
	New businesses registered	0.0018
	Publications	13.26
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	1.00
	Citations	14.12

Nagaland

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	24.87
	Enrolment in engineering and technology	372.02
	Colleges connected through NMEICT	12.10
	Higher education institutions with NAAC grade A and above	6.15
	Pupil teacher ratio - Higher education	19.00
	Schools with ICT labs	17.30
	National Achievement Survey (NAS) Scores (Class X)	32.03
Investment	Expenditure on higher and technical education	2668769.94
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.06
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.00
	NGOs involved in knowledge intensive areas	1.67
	Private R&D units	0.05
	State funded R&D units	0.05
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	1412.70
	Internet subscribers	51.99
	Incubator centres	0.05
	Common facility centres	0.00
	Cluster Strength	8.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.10
	Cyber crime police stations	0.05
	Pendency of court cases	0.79
Knowledge Output	Grassroot innovations	128.00
	Patent applications filed	0.25
	Trademark applications filed	1.47
	Presence of startups	0.0030
	Industrial Design applications filed	0.00
	New businesses registered	0.00037
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	3.00
	Citations	0.00

Odisha

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	8.87
	Enrolment in engineering and technology	1889.00
	Colleges connected through NMEICT	21.10
	Higher education institutions with NAAC grade A and above	1.87
	Pupil teacher ratio - Higher education	27.00
	Schools with ICT labs	38.80
	National Achievement Survey (NAS) Scores (Class X)	39.68
Investment	Expenditure on higher and technical education	2873960.23
	Expenditure on research and development (State government)	0.04
	Expenditure on science, technology and environment	0.02
	FDI inflow	0.03
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	1.25
	NGOs involved in knowledge intensive areas	0.61
	Private R&D units	0.07
	State funded R&D units	0.07
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	3038.20
	Internet subscribers	43.95
	Incubator centres	0.05
	Common facility centres	0.15
	Cluster Strength	30.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.50
	Cyber crime police stations	0.01
	Pendency of court cases	10.38
Knowledge Output	Grassroot innovations	72.00
	Patent applications filed	0.39
	Trademark applications filed	4.13
	Presence of startups	0.0034
	Industrial Design applications filed	0.09
	New businesses registered	0.01
	Publications	43.58
Knowledge Diffusion	ICT exports	0.66
	High and medium high-tech manufacturing entities	0.000041
	Geographical Indications (GI) registered	16.00
	Citations	45.01

Punjab

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	32.78
	Enrolment in engineering and technology	2449.61
	Colleges connected through NMEICT	22.20
	Higher education institutions with NAAC grade A and above	5.77
	Pupil teacher ratio - Higher education	18.00
	Schools with ICT labs	52.20
	National Achievement Survey (NAS) Scores (Class X)	38.03
Investment	Expenditure on higher and technical education	1655073.61
	Expenditure on research and development (State government)	0.15
	Expenditure on science, technology and environment	0.0024
	FDI inflow	0.20
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	8.52
	NGOs involved in knowledge intensive areas	0.18
	Private R&D units	0.24
	State funded R&D units	0.09
Business Environment	Ease of doing business ranking	19.00
	Online services transactions	3156.20
	Internet subscribers	83.45
	Incubator centres	0.04
	Common facility centres	0.00
	Cluster Strength	22.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.70
	Cyber crime police stations	0.01
	Pendency of court cases	0.20
Knowledge Output	Grassroot innovations	16.00
	Patent applications filed	2.38
	Trademark applications filed	43.81
	Presence of startups	0.0030
	Industrial Design applications filed	0.90
	New businesses registered	0.0047
	Publications	43.94
Knowledge Diffusion	ICT exports	0.11
	High and medium high-tech manufacturing entities	0.000037
	Geographical Indications (GI) registered	2.00
	Citations	46.53

Rajasthan

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	15.23
	Enrolment in engineering and technology	874.87
	Colleges connected through NMEICT	21.70
	Higher education institutions with NAAC grade A and above	0.52
	Pupil teacher ratio - Higher education	29.00
	Schools with ICT labs	43.10
	National Achievement Survey (NAS) Scores (Class X)	43.16
Investment	Expenditure on higher and technical education	735044.72
	Expenditure on research and development (State government)	0.04
	Expenditure on science, technology and environment	0.0037
	FDI inflow	0.28
	Venture capital deals	0.54
Knowledge Workers	Knowledge-intensive employment	7.70
	NGOs involved in knowledge intensive areas	0.42
	Private R&D units	0.11
	State funded R&D units	0.07
Business Environment	Ease of doing business ranking	8.00
	Online services transactions	4263.00
	Internet subscribers	54.24
	Incubator centres	0.04
	Common facility centres	0.00
	Cluster Strength	43.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.20
	Cyber crime police stations	0.0029
	Pendency of court cases	3.84
Knowledge Output	Grassroot innovations	23.00
	Patent applications filed	0.44
	Trademark applications filed	18.10
	Presence of startups	0.0046
	Industrial Design applications filed	0.44
	New businesses registered	0.01
	Publications	34.72
Knowledge Diffusion	ICT exports	0.15
	High and medium high-tech manufacturing entities	0.000064
	Geographical Indications (GI) registered	15.00
	Citations	35.06

Sikkim

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	65.35
	Enrolment in engineering and technology	1611.23
	Colleges connected through NMEICT	18.80
	Higher education institutions with NAAC grade A and above	0.00
	Pupil teacher ratio - Higher education	27.00
	Schools with ICT labs	25.60
	National Achievement Survey (NAS) Scores (Class X)	37.46
Investment	Expenditure on higher and technical education	22672215.52
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.07
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	81.23
	NGOs involved in knowledge intensive areas	0.33
	Private R&D units	0.16
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	1864.80
	Internet subscribers	51.10
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	5.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.20
	Cyber crime police stations	0.16
	Pendency of court cases	0.00
Knowledge Output	Grassroot innovations	172.00
	Patent applications filed	0.66
	Trademark applications filed	4.42
	Presence of startups	0.0013
	Industrial Design applications filed	0.00
	New businesses registered	0.00034
	Publications	0.00
Knowledge Diffusion	ICT exports	0.10
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	1.00
	Citations	0.00

Tamil Nadu

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	35.79
	Enrolment in engineering and technology	6998.04
	Colleges connected through NMEICT	30.30
	Higher education institutions with NAAC grade A and above	7.11
	Pupil teacher ratio - Higher education	17.00
	Schools with ICT labs	22.80
	National Achievement Survey (NAS) Scores (Class X)	36.70
Investment	Expenditure on higher and technical education	11077401.71
	Expenditure on research and development (State government)	0.06
	Expenditure on science, technology and environment	0.0017
	FDI inflow	0.81
	Venture capital deals	0.74
Knowledge Workers	Knowledge-intensive employment	8.06
	NGOs involved in knowledge intensive areas	0.45
	Private R&D units	0.65
	State funded R&D units	0.13
Business Environment	Ease of doing business ranking	14.00
	Online services transactions	6113.20
	Internet subscribers	66.53
	Incubator centres	0.10
	Common facility centres	0.49
	Cluster Strength	100.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.80
	Cyber crime police stations	0.01
	Pendency of court cases	3.24
Knowledge Output	Grassroot innovations	22.00
	Patent applications filed	3.31
	Trademark applications filed	26.21
	Presence of startups	0.0044
	Industrial Design applications filed	0.87
	New businesses registered	0.01
	Publications	100.00
Knowledge Diffusion	ICT exports	3.03
	High and medium high-tech manufacturing entities	0.00010
	Geographical Indications (GI) registered	32.00
	Citations	100.00

Telangana

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	9.75
	Enrolment in engineering and technology	4396.53
	Colleges connected through NMEICT	17.00
	Higher education institutions with NAAC grade A and above	2.49
	Pupil teacher ratio - Higher education	18.00
	Schools with ICT labs	17.50
	National Achievement Survey (NAS) Scores (Class X)	39.01
Investment	Expenditure on higher and technical education	1851701.24
	Expenditure on research and development (State government)	0.05
	Expenditure on science, technology and environment	0.0023
	FDI inflow	1.36
	Venture capital deals	0.44
Knowledge Workers	Knowledge-intensive employment	17.46
	NGOs involved in knowledge intensive areas	0.44
	Private R&D units	0.31
	State funded R&D units	0.13
Business Environment	Ease of doing business ranking	3.00
	Online services transactions	13654.90
	Internet subscribers	65.15
	Incubator centres	0.13
	Common facility centres	0.00
	Cluster Strength	47.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.80
	Cyber crime police stations	0.01
	Pendency of court cases	2.05
Knowledge Output	Grassroot innovations	16.00
	Patent applications filed	2.97
	Trademark applications filed	28.77
	Presence of startups	0.01
	Industrial Design applications filed	0.40
	New businesses registered	0.02
	Publications	47.49
Knowledge Diffusion	ICT exports	8.29
	High and medium high-tech manufacturing entities	0.00030
	Geographical Indications (GI) registered	15.00
	Citations	45.65

Tripura

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	6.15
	Enrolment in engineering and technology	414.97
	Colleges connected through NMEICT	38.50
	Higher education institutions with NAAC grade A and above	2.08
	Pupil teacher ratio - Higher education	33.00
	Schools with ICT labs	33.20
	National Achievement Survey (NAS) Scores (Class X)	33.68
Investment	Expenditure on higher and technical education	5395050.21
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.01
	FDI inflow	0.0019
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.14
	NGOs involved in knowledge intensive areas	1.03
	Private R&D units	0.00
	State funded R&D units	0.08
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	1711.70
	Internet subscribers	51.99
	Incubator centres	0.03
	Common facility centres	0.00
	Cluster Strength	6.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.60
	Cyber crime police stations	0.00
	Pendency of court cases	1.35
Knowledge Output	Grassroot innovations	83.00
	Patent applications filed	0.24
	Trademark applications filed	1.88
	Presence of startups	0.0027
	Industrial Design applications filed	0.00
	New businesses registered	0.0033
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	1.00
	Citations	0.00

Uttarakhand

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	46.22
	Enrolment in engineering and technology	2181.41
	Colleges connected through NMEICT	15.20
	Higher education institutions with NAAC grade A and above	0.47
	Pupil teacher ratio - Higher education	27.00
	Schools with ICT labs	15.20
	National Achievement Survey (NAS) Scores (Class X)	38.77
Investment	Expenditure on higher and technical education	5728077.94
	Expenditure on research and development (State government)	0.16
	Expenditure on science, technology and environment	0.02
	FDI inflow	0.05
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	20.82
	NGOs involved in knowledge intensive areas	1.05
	Private R&D units	0.24
	State funded R&D units	0.22
Business Environment	Ease of doing business ranking	11.00
	Online services transactions	2947.20
	Internet subscribers	38.58
	Incubator centres	0.04
	Common facility centres	0.00
	Cluster Strength	53.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.40
	Cyber crime police stations	0.01
	Pendency of court cases	1.69
Knowledge Output	Grassroot innovations	82.00
	Patent applications filed	1.54
	Trademark applications filed	24.45
	Presence of startups	0.0047
	Industrial Design applications filed	0.20
	New businesses registered	0.01
	Publications	59.95
Knowledge Diffusion	ICT exports	0.07
	High and medium high-tech manufacturing entities	0.000067
	Geographical Indications (GI) registered	2.00
	Citations	58.17

Uttar Pradesh

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	9.57
	Enrolment in engineering and technology	919.01
	Colleges connected through NMEICT	18.40
	Higher education institutions with NAAC grade A and above	0.50
	Pupil teacher ratio - Higher education	46.00
	Schools with ICT labs	29.10
	National Achievement Survey (NAS) Scores (Class X)	0.00
Investment	Expenditure on higher and technical education	2353410.86
	Expenditure on research and development (State government)	0.04
	Expenditure on science, technology and environment	0.01
	FDI inflow	0.21
	Venture capital deals	0.44
Knowledge Workers	Knowledge-intensive employment	8.39
	NGOs involved in knowledge intensive areas	0.78
	Private R&D units	0.09
	State funded R&D units	0.02
Business Environment	Ease of doing business ranking	2.00
	Online services transactions	2204.50
	Internet subscribers	38.58
	Incubator centres	0.02
	Common facility centres	0.02
	Cluster Strength	123.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	2.60
	Cyber crime police stations	0.001
	Pendency of court cases	14.00
Knowledge Output	Grassroot innovations	9.00
	Patent applications filed	0.49
	Trademark applications filed	12.03
	Presence of startups	0.01
	Industrial Design applications filed	0.23
	New businesses registered	0.01
	Publications	62.26
Knowledge Diffusion	ICT exports	1.63
	High and medium high-tech manufacturing entities	0.000072
	Geographical Indications (GI) registered	27.00
	Citations	63.34

West Bengal

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	12.85
	Enrolment in engineering and technology	717.83
	Colleges connected through NMEICT	15.00
	Higher education institutions with NAAC grade A and above	3.71
	Pupil teacher ratio - Higher education	35.00
	Schools with ICT labs	22.00
	National Achievement Survey (NAS) Scores (Class X)	0.00
Investment	Expenditure on higher and technical education	733405.08
	Expenditure on research and development (State government)	0.04
	Expenditure on science, technology and environment	0.01
	FDI inflow	0.41
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	6.22
	NGOs involved in knowledge intensive areas	0.68
	Private R&D units	0.24
	State funded R&D units	0.03
Business Environment	Ease of doing business ranking	9.00
	Online services transactions	6382.20
	Internet subscribers	51.10
	Incubator centres	0.01
	Common facility centres	0.07
	Cluster Strength	58.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.40
	Cyber crime police stations	0.01
	Pendency of court cases	12.14
Knowledge Output	Grassroot innovations	11.00
	Patent applications filed	0.58
	Trademark applications filed	11.89
	Presence of startups	0.0044
	Industrial Design applications filed	0.81
	New businesses registered	0.01
	Publications	65.44
Knowledge Diffusion	ICT exports	0.90
	High and medium high-tech manufacturing entities	0.0001
	Geographical Indications (GI) registered	21.00
	Citations	65.52

Andaman & Nicobar Islands

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	17.60
	Enrolment in engineering and technology	1071.36
	Colleges connected through NMEICT	12.50
	Higher education institutions with NAAC grade A and above	14.29
	Pupil teacher ratio - Higher education	25.00
	Schools with ICT labs	21.20
	National Achievement Survey (NAS) Scores (Class X)	39.78
Investment	Expenditure on higher and technical education	51044937.43
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.00
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.00
	NGOs involved in knowledge intensive areas	0.53
	Private R&D units	0.00
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	22.00
	Online services transactions	3567.70
	Internet subscribers	55.12
	Incubator centres	2.36
	Common facility centres	0.00
	Cluster Strength	0.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.00
	Cyber crime police stations	0.00
	Pendency of court cases	0.00
Knowledge Output	Grassroot innovations	276.00
	Patent applications filed	0.53
	Trademark applications filed	9.46
	Presence of startups	0.01
	Industrial Design applications filed	0.00
	New businesses registered	0.0047
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	0.00
	Citations	0.00

Chandigarh

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	81.58
	Enrolment in engineering and technology	1805.94
	Colleges connected through NMEICT	28.00
	Higher education institutions with NAAC grade A and above	40.74
	Pupil teacher ratio - Higher education	28.00
	Schools with ICT labs	59.10
	National Achievement Survey (NAS) Scores (Class X)	42.86
Investment	Expenditure on higher and technical education	19837194.25
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.00
	FDI inflow	0.19
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	24.09
	NGOs involved in knowledge intensive areas	0.19
	Private R&D units	2.27
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	29.00
	Online services transactions	5758.90
	Internet subscribers	55.12
	Incubator centres	0.28
	Common facility centres	0.00
	Cluster Strength	19.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.20
	Cyber crime police stations	0.09
	Pendency of court cases	0.16
Knowledge Output	Grassroot innovations	36.00
	Patent applications filed	7.20
	Trademark applications filed	201.24
	Presence of startups	0.02
	Industrial Design applications filed	1.89
	New businesses registered	0.02
	Publications	34.78
Knowledge Diffusion	ICT exports	2.14
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	0.00
	Citations	45.42

Dadar & Nagar Haveli

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	0.00
	Enrolment in engineering and technology	638.40
	Colleges connected through NMEICT	0.00
	Higher education institutions with NAAC grade A and above	0.00
	Pupil teacher ratio - Higher education	29.00
	Schools with ICT labs	73.30
	National Achievement Survey (NAS) Scores (Class X)	33.32
Investment	Expenditure on higher and technical education	20477109.03
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.00
	FDI inflow	0.63
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	6.87
	NGOs involved in knowledge intensive areas	0.00
	Private R&D units	1.16
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	23.00
	Online services transactions	12747.10
	Internet subscribers	55.12
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	19.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.00
	Cyber crime police stations	0.00
	Pendency of court cases	1.39
Knowledge Output	Grassroot innovations	59.73
	Patent applications filed	0.58
	Trademark applications filed	15.71
	Presence of startups	0.02
	Industrial Design applications filed	2.33
	New businesses registered	0.01
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.0015
	Geographical Indications (GI) registered	1.00
	Citations	0.00

Daman & Diu

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	0.00
	Enrolment in engineering and technology	1481.93
	Colleges connected through NMEICT	30.00
	Higher education institutions with NAAC grade A and above	0.00
	Pupil teacher ratio - Higher education	14.00
	Schools with ICT labs	23.20
	National Achievement Survey (NAS) Scores (Class X)	35.58
Investment	Expenditure on higher and technical education	3648691.80
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.00
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	13.80
	NGOs involved in knowledge intensive areas	0.41
	Private R&D units	0.41
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	18.00
	Online services transactions	12617.70
	Internet subscribers	55.12
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	18.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	0.00
	Cyber crime police stations	0.00
	Pendency of court cases	2.96
Knowledge Output	Grassroot innovations	42.27
	Patent applications filed	0.82
	Trademark applications filed	53.03
	Presence of startups	0.02
	Industrial Design applications filed	40.29
	New businesses registered	0.01
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00089
	Geographical Indications (GI) registered	1.00
	Citations	0.00

Lakshadweep

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	0.00
	Enrolment in engineering and technology	0.00
	Colleges connected through NMEICT	0.00
	Higher education institutions with NAAC grade A and above	0.00
	Pupil teacher ratio - Higher education	12.00
	Schools with ICT labs	86.60
	National Achievement Survey (NAS) Scores (Class X)	35.22
Investment	Expenditure on higher and technical education	10217196.86
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.00
	FDI inflow	1.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	0.00
	NGOs involved in knowledge intensive areas	0.00
	Private R&D units	0.00
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	15.00
	Online services transactions	16303.70
	Internet subscribers	55.12
	Incubator centres	0.00
	Common facility centres	0.00
	Cluster Strength	0.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	3.00
	Cyber crime police stations	0.00
	Pendency of court cases	3.60
Knowledge Output	Grassroot innovations	25.00
	Patent applications filed	0.00
	Trademark applications filed	0.00
	Presence of startups	0.00
	Industrial Design applications filed	0.00
	New businesses registered	0.00
	Publications	0.00
Knowledge Diffusion	ICT exports	0.00
	High and medium high-tech manufacturing entities	0.00
	Geographical Indications (GI) registered	0.00
	Citations	0.00

Puducherry

Pillars	Indicator	Data
Human Capital	Enrolment in PhD	64.27
	Enrolment in engineering and technology	6756.45
	Colleges connected through NMEICT	33.80
	Higher education institutions with NAAC grade A and above	4.76
	Pupil teacher ratio - Higher education	13.00
	Schools with ICT labs	50.20
	National Achievement Survey (NAS) Scores (Class X)	37.07
Investment	Expenditure on higher and technical education	1673754.27
	Expenditure on research and development (State government)	0.00
	Expenditure on science, technology and environment	0.02
	FDI inflow	0.02
	Venture capital deals	0.00
Knowledge Workers	Knowledge-intensive employment	17.09
	NGOs involved in knowledge intensive areas	0.96
	Private R&D units	1.28
	State funded R&D units	0.00
Business Environment	Ease of doing business ranking	27.00
	Online services transactions	3979.50
	Internet subscribers	55.12
	Incubator centres	0.08
	Common facility centres	0.00
	Cluster Strength	18.00
Safety and Legal Environment	Information Technology/ Intellectual Property related acts	1.00
	Cyber crime police stations	0.08
	Pendency of court cases	3.60
Knowledge Output	Grassroot innovations	20.00
	Patent applications filed	4.41
	Trademark applications filed	20.27
	Presence of startups	0.0041
	Industrial Design applications filed	0.08
	New businesses registered	0.01
	Publications	29.66
Knowledge Diffusion	ICT exports	1.04
	High and medium high-tech manufacturing entities	0.000081
	Geographical Indications (GI) registered	2.00
	Citations	30.49

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Sansad Marg, New Delhi, India
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