GOVERNMENT OF KARNATAKA

FICCI

$1 TRILLION ECONOMY
KARNATAKA'S VISION

Roadmap for accelerated growth in the coming decade

13

Education

After China and the United States,[iii] India is likely to surpass the $10 trillion GDP threshold by 2023. India's population advantage, its rapidly expanding consumption patterns, open markets, and technological edge make up its strength. India is a diverse country, with varying growth and development trends across its different states, which stands in stark contrast to the national picture.[87]

Karnataka is among the top five states in India and has demonstrated strong growth over the years. Its per capita state[ii] GDP of INR 3.05 lakhs in financial year 2022 estimated (FY22E) is the highest among these top five states. A standout feature of the state economy is that it had the highest share of services[ii] at 66.1 percent of gross state valued added (GSVA) in FY22E – the highest among all states. This is a product of its robust IT services industry and other formal employment in the country. Karnataka constitutes less than 5 percent of the national population but contributed 8.7 percent[ii] to the national GDP in FY22. While Karnataka has certainly done well in the past, now that the COVID-19 crisis has passed, it needs to re-orient its strategies by studying the unique needs and capabilities of its citizens and demographics, and the sectoral composition of its economy.[88]

Karnataka is an economic powerhouse. It is the third-largest state economy in India, at INR 20.5 lakh crore nominal gross state[ii] domestic product (GSDP) in FY22, translating to a per capita GSDP of INR 3.05 lakhs. Karnataka's per capita GSDP is the highest among the top five states and, indeed, one of the highest in the country. The services industries, such as IT, contribute a significant 66 percent to the state economy.

Pai and Holla in 2022 recommended four education-related strategies for Karnataka:

First, education will be vital in maintaining a productive workforce when the population declines. Government must focus its three mutually-independent roles in education—that of policymaker, instituting a competent accreditation agency and regulator independent of government, and restructuring the education department to deliver a higher quality of public education.

Second, higher education is particularly valuable in today's knowledge, economy-led growth era, and specialisation resulting from quality higher education will help keep the economic momentum going.

Third, there is a considerable asymmetry in workforce-to-sector dependence. Forty-one percent of the workforce depends on the agriculture sector, contributing only 14 percent to state GVA. Karnataka may find it advantageous to explore the potential of the agricultural sector by promoting changes in the preservation and manufacture of value-added products. This includes reforming the food-processing sector to support growth in the agricultural sector.

Fourth, to facilitate this anticipated transformation, the education sector must incorporate the relevant knowledge and skills into higher education and vocational programmes. Opportunities must be created in the regions where the production takes place to develop cutting-edge technologies and industries based on agricultural products. Comparatively, 86 percent of the state's GVA is generated by industry and services, which support 59 percent of the population and offer chances for significant growth and employment with higher wages. Consequently, the wage ratio of an agricultural dependent to one in industry and services is incredibly skewed, at 1:2.7:5.1, calling for an immediate rebalancing.[89] In addition, as the state focuses on expanding its manufacturing and other sectors, demand for talent across jobs and geographic areas will grow.

Karnataka may need to set aspirational goals for the coming decade to be a leader in skilled workforce production and reduce the need to depend on other states to fulfil its talent requirements. (Exhibit 99)

Knowledge and innovation—the India Innovation Index

NITI Aayog has developed the India Innovation index in an effort to raise India's position[iii] in the global innovation index. India's 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 about the ranking of states on the India Innovation Index. There is a strong positive correlation between the GDP of the state and the Innovation Index. This demonstrates that increased economic growth fuels increased innovation, and vice versa.

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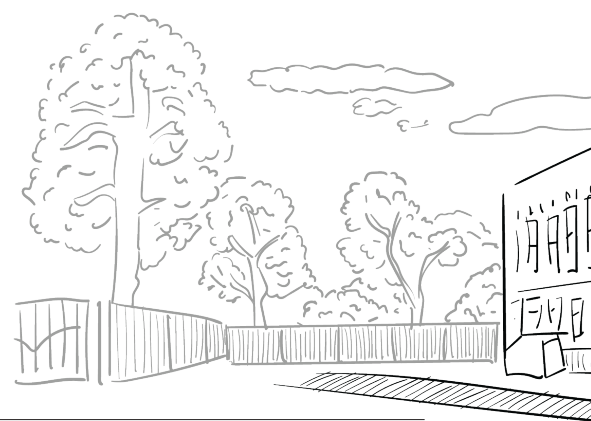
87 Pai and Holla, 2022
88 Pai and Holla, 2022
89 GVA data from MOSPI and Karnataka Economic Survey 2021–22, Workforce data from PLFS

Exhibit 99

Education sector vision[1]

Macroeconomic indicators	From (2021−22)	To (2031−32)
GER (higher education)	32.2	**50**
GER (higher secondary education)	65.24	**100**
% of GDP spend on education (government) (%)	1.5%	**6−7%**[1]
Vocational training availed by children (%)[2]	14.2%	**60%**
Pupil teacher ratio	24	**30**
School Education Quality Index (SEQI) (national rank)	3	**1**
Average annual drop out rate at secondary level	16.25	**8.8**

1. Education committee
2. Aarthika charche, FPI Journal of economics and governance
3. Economic Survey 2021−22; Skill Karnataka 2030

Knowledge output and human capital

When comparing southern states in terms of knowledge output – human capital and knowledge diffusion – Karnataka leads in knowledge diffusion and shares the top position with Andhra Pradesh in knowledge output. However, when the human capital is compared across the southern states, Tamil Nadu leads with 62.8 percent, followed by Kerala with 59.72 percent, and Karnataka is in the third position at 52.27. (Exhibit 100)

While Karnataka leads in K-12 enrolment, it is the higher education gross enrolment ratio (GER), which is at 32.2 percent that lags other southern states – they have GERs of over 35 percent, with Tamil Nadu at 51.4 percent. The decline in enrolment in secondary and higher secondary education must first be corrected, as is the case with the national trend, before Karnataka aspires to obtain a greater enrolment in university education. Higher education and specialisation will increasingly become more important for innovation and knowledge creation. They are both essential for growth that is driven by the knowledge economy over the coming decade and beyond. The state also needs many programmes for vocational training and skills development that can assist in rebalancing the workforce away from an overreliance on agriculture and towards other sectors. As these skills tend to be taught in higher education, this chapter focuses mostly on that level of education in Karnataka ($1 trillion skills development professionals by 2032).

Exhibit 100

Comparison of select innovation indicators across the southern states
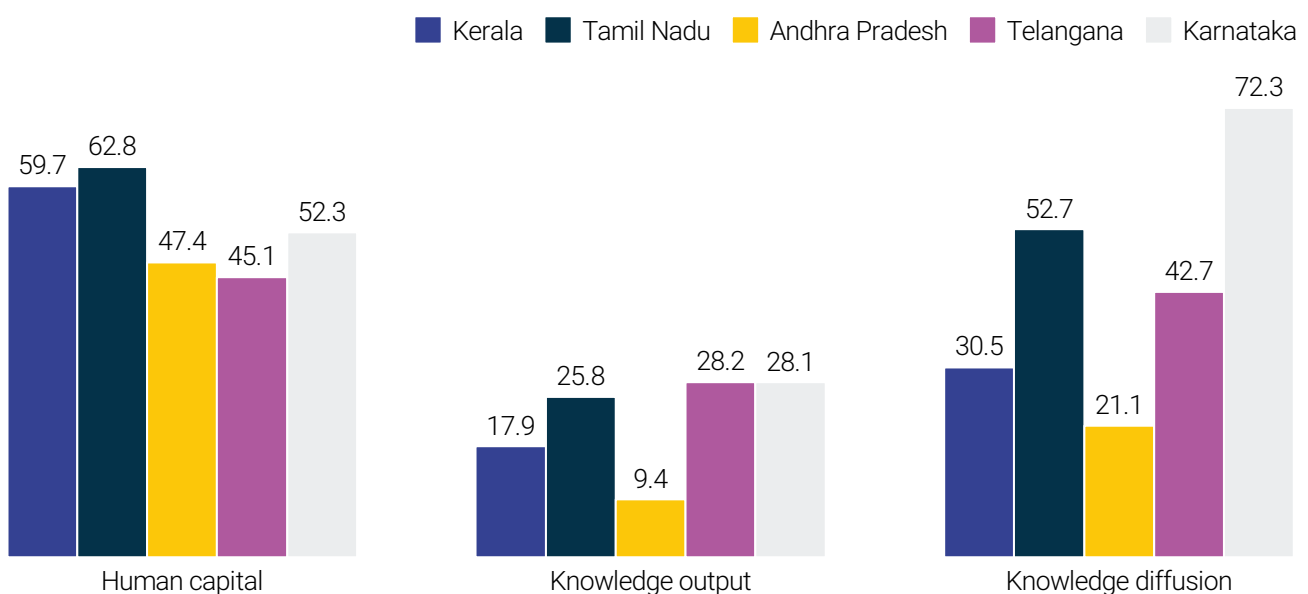
Source: India Innovation Index 2019–20

Historic growth and the current status of K-12 education in Karnataka

GER has always been used as an indicator to measure access to formal education in the absence of the Net Enrolment Ratio (NER). However, the analysis in the following section has been made using the NER. (Exhibit 101)

The southern states have performed better with respect to human development indicators, hence it may be useful to compare the performance of Karnataka with reference to them. Research shows that Karnataka is the only southern state with a 100 percent NER at the lower primary level for both boys and girls. In a sense, this reflects the years of sustained effort to make sure that no child is left behind.

While the NER for India overall at the upper primary level drops by 20 in comparison to the lower primary level, Karnataka has an 89.8 percent NER and Kerala 81.66 percent. This indicates a drop of around 10 percent in the NER at the upper primary level. The declining trend in enrolment continues as one moves to the higher grades of IX and X. The national NER of 50.3 percent paints a bleak picture in showing that almost half of the children in this age group are not part of the formal education system. Karnataka and Kerala, with a GER of 72.31 and 74.13 percent respectively for IX and X, are way above the national average.

Comparing the NER for the higher secondary level for the year 2019–20, Kerala records a high of 62.38 percent against the national NER of 32.3 percent. Karnataka records greater than the national average at 39.78 percent. However, Tamil Nadu fairs better than Karnataka with a NER of 43.36 percent.

It is important to concentrate on getting grade XII students through school, which will require a transition of students from grades VIII, IX, X, and XI. This will help identify which students are eligible for higher education.

According to an analysis of student enrolment in the regular mode for the years 2015–20,[ii] Tamil Nadu has the highest percentage (8.71 percent) among the southern states, followed by Karnataka (6.14 percent). Karnataka has recorded a small but steady rise compared to Tamil Nadu, which has had a slight decline. The enrolment percentage for Andhra Pradesh is 4.77 percent, 3.89 percent for Telangana, and 2.5 percent for Kerala.

As observed earlier, Karnataka trails its southern neighbours in GER for higher education. Enrolment has to be significantly increased so that a well-educated and trained talent pool will be ready to fuel the needs of economic growth. Otherwise, there will be a larger influx of working talent coming from outside Karnataka to meet these needs.

Exhibit 101

NER southern Indian states (2019–20)

U: Upper   **Hr:** Higher

Region	Primary (I–V)			U. Primary (VI–VIII)			Elementary (I–VIII)			Secondary (IX–X)			Hr Secy (XI–XII)		
	Girls	Boys	Overall	Girls	Boys	Overall	Girls	Boys	Overall	Girls	Boys	Overall	Girls	Boys	Overall
Andhra Pradesh	85.7	88.8	87.3	70.6	72.2	71.4	87.7	90.7	89.2	55.2	55.1	55.1	37.2	32.5	34.7
Karnataka	100.0	100.0	100.0	89.5	90.1	89.8	100.0	100.0	100.0	71.5	73.1	72.3	43.4	36.4	39.8
Kerala	90.5	90.7	90.6	81.8	81.7	81.7	93.1	93.4	93.2	74.1	74.0	74.1	65.9	59.0	62.4
Tamilnadu	84.7	84.6	84.6	70.7	72.1	71.4	89.1	89.1	89.1	54.0	55.7	54.9	46.8	40.1	43.4
Telangana	95.0	94.8	94.8	72.9	72.8	72.8	96.0	95.8	95.9	57.2	56.9	57.0	36.1	26.1	30.9
India	92.4	90.5	91.4	71.9	70.4	71.1	91.3	89.7	90.4	50.3	50.6	50.2	33.3	31.4	32.3

Source: NIC School Education Report 2019–20

Despite Karnataka performing well at primary level, in terms of secondary education, it lags considerably. It should be noted that all the education outcomes of enrolment, transition, and retention fall sharply at the secondary and higher secondary levels. Dropout is inextricably linked to these parameters. This can be attributed to several factors including cultural, environmental, school-based, and socioeconomic. NITI Aayog annually ranks and measures the progress of Indian states on different sustainable development goals (SDGs), highlighting their performance and journey towards achieving SDGs, including SDG 4 (Education).

Karnataka is ranked third in the SDG India Index for 2020–21,[i] improving its score from 66 in 2019–20 to 72 in 2020–21. However, there are certain high priority SDGs for Karnataka may require immediate attention, one of them being SDG 4. The performance of Karnataka in this SDG has declined from frontrunner in 2018–19 to performer in 2020–21. The average yearly dropout rate at secondary level (grades IX to X) is one of the key indicators where Karnataka's performance under SDG 4 has repeatedly been a cause for concern. Karnataka's performance on the indicator measuring learning outcomes has also dropped from an achiever and frontrunner to being a performer. It implies that the percentage of students with minimum proficiency level in terms of nationally defined learning outcomes have reduced for grades III, V, VIII, and X.

Accessibility of formal schooling for all, especially for children with special needs (CWSN), is still a significant challenge across a number of taluks. There are 93 taluks in the state that are below the state average in the education development index. Through the Midday Meal scheme (MDM), 53.48 lakh[iii] school-going children are served midday lunches six days a week in government and private aided-schools in the state. The RTE 2009 has been implemented successfully to provide access to quality education for children from impoverished families. Such initiatives with adequate financial support to children can be extended in these 93 taluks specifically.

Karnataka could focus on schemes and programmes that address the poor performing SDG 4 indicators. The actions required are related to increasing enrolment in secondary education, reducing dropouts, providing inclusive education, and increasing mass literacy. The efforts need to be focused on the districts of North Karnataka, especially the Kalyan Karnataka region. This focus, combined with an introduction of skills education at secondary and higher secondary levels, has the potential to transform K-12 education across taluks with innovative models including cluster schools, hub-and-spoke schools, and partnerships with model private and public schools. In addition, the purposeful use of connectivity technology is required to increase access of access by schools in all taluks as that can help prepare towards taking SGDP growth beyond the $1-trillion goal.

Historically, the state, and particularly the capital city of Bengaluru, has pioneered the establishment of science and technology institutions comparable to international standards. The Indian Institute of Science (IISC) and other national research institutions like the National Centre for Biological Sciences (NCBS), Raman Research Institute (RRI), Indian Institute of Astrophysics (IIA), Indian Satellite Research Organisation (ISRO), National Aeronautics Laboratory (NAL), Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), National Law School of India University (NLSIU), Indian Institute of Science, Bengaluru (IIMB), and International Institute of Information Technology, Bengaluru (IIITB), are among the best research and teaching institutions in the country. These institutions have state-of-the-art facilities in terms of laboratories and libraries that are the envy of other universities and institutions in the country. They can be a key pivot for research relationships that could fuel economic growth. (Exhibit 102)

Exhibit 102

Distribution of universities in India and Karnataka by types

India has a total of 135 institutes of national importance with 80 deemed private and 36 deemed public. Karnataka has a total of 69 universities. The distribution of the different types of universities in Karnataka follow the national pattern with 30 state public universities and 18 state private universities. There are 11 private universities and 4 state ones. There are 4 institutes of national importance, 1 central university, and 1 open university in Karnataka.

#	State/UTs	All India	Percentage	Karnataka	Percentage
1	Central University	48	5%	1	1%
2	Central Open University	1	0%		0%
3	Institute of National Importance	135	13%	4	6%
4	State Public University	386	37%	30	43%
5	Institute under State Legislature Act	5	0%		0%
6	State Open University	14	1%	1	1%
7	State Private University	327	31%	18	26%
8	State Private Open University	1	0%		0%
9	Deemed University − Government	36	3%	4	6%
10	Deemed University − Government Aided	10	1%		0%
11	Deemed University − Private	80	8%	11	16%
	Grand total	**1,043**	**100%**	**69**	**100%**

Source: AISHE 2019−20

In addition to the aforementioned universities, Karnataka is renowned for independent and autonomous research and specialised institutions, with more than 25 in the state. These include: the Raman Research Institute; Institute of Social and Economic Change (ISEC)[iii]; National Institute of Advanced Studied (NAIS); and the National Centre for Biological Sciences (NCBS), among other specialised institutions. Among the leading private universities in India, the Manipal Academy of Higher Education, Christ (deemed to be a university), and Azim Premji University are honourable mentions.

These institutions not only contribute to specialised research but also to the larger social development within and outside the state. The form and spectrum of higher education institutions in Karnataka is wide and varied, from independent research institutes to social and scientific research. While Bengaluru has the largest concentration of universities and other eminent higher education institutions, two more knowledge centres are needed in the Mangaluru and Dharwad-Hubbali areas.

Education priorities

The New Education Policy 2020 was a milestone event for the education sector across India. Karnataka was the first state to get off the starting block with its task force report, Implementation Plan – Karnataka National Education Policy 2020. This is a key reference document. The report's suggestions for K12 education could be carefully considered and adjusted to take post-pandemic lessons into account. It is necessary to keep in mind the most recent Annual Status of Education Report (ASER) study, which highlights the frightening decline in fundamental standards following the COVID-19-pandemic hiatus. Additionally, to ensure the state is well poised to develop a skilled workforce for the future while addressing the current challenges, a 360-degree approach can to be adopted, for which six priorities or themes and 34 relevant actions or initiatives have been suggested for the state to consider.

Prepare an educated and skilled workforce for 2032

According to the United Nations' World Population Prospects Database (2012), India will soon have the largest working population in the world. This sizeable workforce will form the backbone of India's economic development over the coming decade and more. To meet Karnataka's goal of achieving a $1 trillion GSDP by 2032, the appropriate quantity and quality of talent needs to be readily available. Higher education will be key to this, as well as driving higher education success on the key drivers of change – expansion, equity, and excellence. Higher education is also vital for aligning the focus on streams of academics and research with the needs of the various sectors that drive the economic engine. Suggested actions for this include:

- Set up grassroots innovation enabling networks (GIEN) to link grassroot innovators, civil society organisations, industry, academia, and public administration. Support the identification, development, validation, recognition, and diffusion of grassroots innovations.

- Leverage the NIAS developed model for identifying and mentoring gifted children to develop a talent pool of skilled professionals.

- Facilitate mobility between VET and mainstream education through a system of credit transfer (included in NEP 2020 as part of the lateral linkages).

- Increase the number of seats for lateral entry substantially to encourage students who opt for vocational or diploma streams, while allowing students who have taken a break in education to re-enter institutions with ease. Re-entering academia with the added advantage of industry experience will simultaneously attract the best talent from across the country.

- Start a vocational training centre in every government HEI in Karnataka by accessing the PMKKY 4.0 fund of the Government of India Skill Development department to prepare and send proposals to the government[iii] (there are 430 government first grade colleges, 102 government polytechnic colleges, 16 government engineering colleges, six VTU engineering colleges and two skill centres). The government of India (GoI)[iii] has agreed to a target of 250 colleges if GoK sends proposals.

- Start compulsory English employability classes in all government higher education institutes to address language barriers to employability and prepare graduates for the job market.

- Push for compulsory registration of every student on the government skills portal. Compulsory registration must be an enhanced central focus to impart skills-based training to students. Skill banks may need to be created to cater to industry demand while improving employability.

Modernise infrastructure

For the conceivable future, government schools will continue to be responsible for the enrolment of a significant chunk of students in schools. Karnataka has an invaluable responsibility to have a strong and effective government school network that will help create the foundation for future talent, contributing to India's economic might. Identifying talent and providing mentoring support is essential to realise the full potential of this critical group of students. NIAS has developed a model for identifying and mentoring gifted children. The state government can leverage this to develop the talent pool in Karnataka. School complexes or clusters can help promote equitable education and continually improve standards across the state. Karnataka can consider moving now from its preliminary work to an action plan with time and goals, with a state-wise transformation anticipated in four to five years. Ways to do this include:

Develop infrastructure to support higher education: There are 3,971 colleges in Karnataka, out of 39,955 colleges in India altogether.[90] Nearly 70 percent (2,793) of these colleges are privately aided. The remaining 30 percent of these colleges are government and government-aided colleges. The role of the private sector in higher education in Karnataka is significant and it may be important to examine the distribution of these institutions across different districts, as well as between professional and general colleges. It is likely that sectoral growth across industries occurs in Karnataka – meaning that a well-dispersed availability of institutions links local talent with industries.

- **Expand colleges and universities** (including professional colleges and universities in underdeveloped districts of Karnataka) Beyond Bengaluru to create a positive impact on enrolment (especially for girls). Additionally, aid those who have graduated to find both education and employment opportunities closer to their place of residence.

- **Optimise the use of the current infrastructure** by running colleges in shift systems and increase student enrolment across multiple courses that are aligned with the emerging needs of the employment market. Among the southern states, Karnataka has the highest number of colleges with 4,047. The student enrolment in colleges in Karnataka is 1,415, which is the highest among the southern states. Karnataka also records the highest number of colleges per lakh population, indicating better access. Among the southern states, Tamil Nadu records the lowest access with 38 colleges per lakh population. (Exhibit 103)

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90 AISHE, 2020

Exhibit 103

Student enrolment across colleges per lakh population in major south Indian states

States	No. of colleges	No. of colleges per lakh population	Average enrolment per college
Karnataka	4,047	59	1,415
Andhra Pradesh	2,750	51	547
Kerala	1,417	48	575
Tamil Nadu	2,610	38	872
Telangana	2,071	53	545

Source: AISHE 2019–20

Increase availability of schools

Karnataka has to reach the number of students who can access schools. They can do this in various ways.

Implement innovative models like cluster schools, hub-and-spoke school models, and private and public school partnerships, along with purposeful use of connectivity technology to increase access by schools in all taluks.

Efforts like Sarva Shiksha Abhiyan (SSA)[iii] have helped ensure near universal access to primary schools, however, it has also led to the development of numerous very small schools, which are economically sub-optimal, increase operational complexity, and negatively impact the teaching-learning process. NEP 2020 envisages the school complexes/ cluster model as a solution to this where one secondary school is grouped with all other schools offering lower grades within a radius of 5–10 kilometres, to achieve greater resource efficiency, improved coordination, leadership, and governance of schools in the cluster.

In Himachal Pradesh, clusters/ complexes[iii] are largely functional at the primary school level, with a cluster for every 5–8 primary schools. While larger clusters exist for secondary schools, they are mostly administrative.

- Each cluster has a CHT (cluster head teacher), who visits the schools in the cluster for review, provides subject-specific and resources support, conducts cluster meetings for curriculum planning, identifying learning gaps, and conducts baseline and end-line surveys, and supports conducting of training for teachers in the cluster.

- For the smaller primary schools, the CHT is the only head for all the schools in the clusters, and structurally, the CHT owns the development needs of all the primary schools in the cluster.

- The autonomy is devolved to the centre head teacher in terms of decision-making for all the schools, limited however to academic tasks only. The clusters are provided with financial, resource support.

In Telangana,[iii] separate school complexes are established for both primary and secondary schools, with ~10–20 schools/cluster in rural areas, with urban clusters being even larger.

- Clusters are given several provisions, like grants to meet expenditures on meetings, school visits, etcetera, and provision of INR 22,000 as School Complex Development Fund

- A cluster resource person (CRP) is appointed for provision of subject-specific academic support to schools. The administrative authority, school supervision, and monitoring in Telangana are devolved to the cluster level, under the cluster head.

- The school complexes undergo regular meetings to discuss issues of drop-outs, conduct discussion meetings on curriculum setting, and address problems faced by teachers.

- Across some well-established complexes, schools share computers, labs, libraries, and implement the concept of twinning of schools to drive complex development.

- The school complex head possesses the authority for salary, leave disbursements, disbursing centre and state provisions to the schools, monitoring the quality of midday meal programmes, teacher profiling and data collection, and organising teacher training programmes and workshops for capacity building. The complex head also plays a crucial role of preparing School Complex Development Plan and its implementation.

Set up schools and rollout initiatives like Midday Meal (MDM), right to education (RTE) across the 93 taluks that are below the state average in the Education Development Index.

Enable accessibility of formal schooling to all, especially children with special Needs (CWSN).

Set up education cities around the Mangaluru, and Dharwad-Hubbali[iii] areas similar to knowledge parks that are being set up in Dubai, for example.

Expand hostel facilities for girls to provide additional encouragement for them to enrol into higher education.

Collocate skilling centres in HEIs by accessing PMKKY 4.0 funds to improve employability of students. Prioritise taluks where the transition rates from higher secondary school to degree courses are low, with an emphasis on girl's education.

Establish a government engineering college in each district in Karnataka to guarantee the development of a workforce that is prepared for the workplace.

Strengthen the existing infrastructure to impart quality education by:

- Enabling ICT and STEM labs access to every school, eventually through the installation of such labs in each school, starting with cluster or hub-and-spoke model schools. Complement this with digital subject content in Kannada and other languages spoken in Karnataka, including English. Establish centres of excellence and skill development centres at all educational centres where technical institutions could provide skill-based training.

- **Establishing Atal Tinkering Labs (ATL):** To encourage learning through experimentation, innovation, and outcome-oriented imagination, ATLs need to be set up in cluster and hub-and-spoke model schools across the state. The ATLs could be complemented with NIAS advanced learning centres to provide onsite support for the advanced learners in grades V to X, offering three-to-four hour weekend sessions.

- Establish a well-stocked library with access to digital content at every school, starting with cluster schools and hub-and-spoke model, to ensure access while the infrastructure setup is being rolled out.

Tumakuru Digital Library won Urban Development Award[iii] for the Best Digital Project (First in the World to deploy Smart eBooks)

Tumakuru digital library, a part of the Tumakuru smart city, boasts of an e-library with access to many smart books. The library has a collection of e-books, e-journals, business news, magazines, newspapers, and test preparation books and also provides students access to a platform for test assessment. The digital content is available to visitors in a multitude of languages like Kannada, Tamil, Telugu, Malayalam, Hindi, etcetera.

The library houses more than 15,000 e-books (including comics, novels, reference books, literature books from reputed authors, etcetera), access to 60 million journal articles, 400+ newspapers, 200+ magazines, etcetera.

Leverage the advancements in technology and focus on digitisation

Karnataka may need to take advantage of the benefits of technology and focus on digitisation in schools. It could consider the following:

- Begin with digitising cluster and nodal schools to facilitate digital training from highly skilled teachers in urban centres, thereby improving the quality of education (especially for STEM courses). This could then be extended to all schools. Establish PPPs with private firms to make digital content available to higher education institutes across Kannada, including in English. Where feasible, make agreements with nearby states to source content in languages such as Marathi, Telugu, Tamil, Malayalam, and others.

- Engage with edutech players to adopt digital tools such as smart-classroom hardware to improve schools' academic and operational efficiencies, while enabling central access of information for evidence-based decision-making. Access Government of India (GoI) software platforms like Samarth for LMS and ERP, instead of reinventing the wheel. Improve operational efficiency while enabling central access of information for evidence-based decision-making.

- Use technology as an enabler and develop contextualised education resources (such as e-content, audio-visuals, etcetera) and introduce gamification into the curriculum delivery via digital platforms.

- Use the National Knowledge Network facility to enable high-speed, high-quality internet connectivity to every school across the state within three years. This can be achieved by collaborating with and incentivising telecom companies.

- Incentivise private schools to adopt digitisation to improve the quality of education.

Focus on integrated, skill-based education

According to the New Education Policy's clause 4.26, vocational training[iii] should be provided to all students. Students in grades VI through XII may be offered internship opportunities to be exposed to vocational subjects, while Karnataka could consider industrial expansion in line with the SGDP goal.

Karnataka could collaborate with LABOURNET, NTTF, and other organisations that have been leaders in skill development. These organisations are critical to the creation of the vital skilled labour force that can facilitate the transformation in the vocational and skill education.

That state needs to enable reach and sustain near-100 percent graduation levels at higher secondary levels. Additionally, to develop a skilled talent pool in line with industry needs, centres of excellence and skill development centres at all educational centres need to be established. Ideally, the aforementioned centres should work with technical institutions to upskill students and staff.

Vocational and skills education can provide the right platform to enable the 75,000 children school dropouts to become skilled talent. This can be achieved through collaboration with NGOs and focused private sector players. The analysis of rates of return on education indicates that the overall returns to education for regular workers are the highest for diploma (15.9 percent), followed by graduation and above a degree (11.5 percent), and secondary education (10.2 percent).[91] Therefore, there is an urgent need to focus on skill-based technical, professional diploma, and certificate courses tailored to the requirements of the job market.

The state could introduce internship opportunities for students through grade VI to XII to learn vocational subjects (such as farm mechanisation and basic machine operations) keeping the expansion of industry in mind to fulfil the demand for talent. This can ensure that the state's largest industry, agriculture, is modernised, and that individuals have the opportunity to move into fields like post-harvest management.

Karnataka needs to improve the oversight structure for vocational education and training centres (VETs) and facilitate greater industry involvement (for example, the design of courses or conducting trainings) and providing greater alignment with market needs. This could be done by:

- Collaborating with ITI's, private sector, and vocational training centres to design and launch creative and innovative courses. For example, short-duration training courses (15 to 30 days), covering subjects such as machine operations, drone operation, or farm management, which can be used to reskill, upskill, and improve productivity.

- Collaborating with NGOs and focused private sector players to provide vocational and skills education to provide the right platform to enable the about 75,000 school dropout children to become skilled talent.

- Collaborating with LABOURNET, NTTF, and leading skill development organisations to create the necessary skilled labour force that can facilitate the transformation in the vocational and skill education.

Karnataka could promote the co-development of industry-relevant content between academia, HEI-Edtech, or online-education start-ups, leveraging India's strong edutech ecosystem. This then could be disseminated to Indian and global learners to provide necessary upskilling and vocational trainings to bridge students' skills gaps.

NEP-2020 also stresses the importance of weaving skills development and vocational education in the higher education fabric. Apart from the larger human capital benefit, this approach (along with the other steps that would be getting taken under the larger skills development umbrella) can help build the correct talent pool for the state.

Focus on research

Karnataka may need to focus on research, development, and innovation. This can be done by:

Developing and launching the Karnataka R&D Innovation Platform (e-KRDIP) to bring together stakeholders involved in R&D, business, entrepreneurial initiatives and so forth, to ensure that R&D benefits reach all the people and regions that it should. (Particularly, MSMEs and start-ups that depend on external sources of information, knowledge, know-how, technologies, and research partnerships to build their innovative capability and reach their markets.)

Dedicating its focus on the top 100 institutes in the state

- Karnataka can budget for and release large research grants to encourage multi-disciplinary research and applied research; also collaborate with corporates to receive grants under their CSR activities.

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91 Singhari and S. Madheswaran, 2016

- The state can create healthy competition through collaborative research by providing ample opportunities for collaboration by organising conferences, workshops, research fellowships for international travel and stay, and vice versa.

- It can also consider setting up a multi-disciplinary panel of experts to govern the allocation of research grants to increase the pool of high-quality scientists and professionals across diverse fields.

Focusing on developing 100 to 200 institutes into teaching and research institutions.

- This can be done by establishing a mechanism of mentoring by the top 100 universities and colleges to help these institutions become future centres of quality research and teaching.

- Recently retired professors could also be used for mentoring and to advise on research.

Setting up and developing research infrastructure, such as:

- Interdisciplinary research centres (IRCs) to encourage and facilitate long-term interdisciplinary research environments in higher education institutes (HEIs). IRCs enable institutional priority area development and structural development.

- Regional research consortium (RRC) to fund research collaborations between regional HEIs; this will help synergise their research strengths to solve regional or societal problems, as well as aid in engaging inter- and intra-institutional research teams to undertake interdisciplinary research.

- Innovation and entrepreneurship management research centres (IEMRC) to fund research projects seeking to understand and resolve the unique challenges that individuals, organisations, and partnerships face in undertaking systematic innovation in the Indian context.

- Collaborative research centres (CRC) in HEIs to enable them to connect and work with industries, MSMEs, and start-ups in the region. These will also provide an ongoing long-term platform for collaboration between different STI stakeholders to improve industrial research and innovation.

- Small business technology enabling centres (SBTECs): This can select HEIs to meet SMEs' R&D needs. Additionally, they can help the engaged HEI faculty to improve knowledge regarding their field's practical aspects, develop networks, and share experiences.

Expand faculty and develop programmes

Karnataka could set up an independent teachers' academy at state level through a public-private partnership model to address recruitment, foundation and induction training, periodic capacity building, performance assessment, professional development, ethics, research, and database management.

It could also develop long-term, sustainable teacher recruitment and development plans and implement them over the coming 12 months. The state could build the ICT skills and capabilities of existing and new teachers, with periodic assessments (such as once every two years, made mandatory like the continuing medical education programme for medical practitioners). It could also collaborate and partner with industry leaders and global institutions to train teachers on global practices.

Finally, the compensation and compensation structure of teachers could be updated to attract and retain quality talent.

Incorporation of multi-disciplinary bodies

- The creation of a non-operational group preferably outside the existing administration, to act as a nodal group for overseeing the achievement of the recommended goals and initiatives that focus on improving the infrastructure and quality of education.

- Education Analytics Division under the Department of Education to focus on the collection of school data, student statistics, and market research activity to assess Karnataka's education performance at primary, secondary, higher secondary, and research level. Evidence-based interventions in schools at GP and taluk level may be required to reduce inequality among different populations. Karnataka is focusing on evidence-based policies by pooling and analysing the data at taluk and GP level. This has been extremely useful in locating specific taluks and villages that require interventions. Data analytics has helped to discover correlations among the variables to find populations groups that require urgent attention in the hope of reducing inequality among different populations. This could be systematised, with data being published with high frequency and transparency. Similar data needs to be generated and analysed at higher educational level to facilitate efficient planning and implementation.

- **Centre of learning for international students:** The state may need to create the environment for attracting international students by providing appropriate accommodation within the campus or nearby, as well as matching India's curriculum to international standards and transforming the assessment systems to capture diverse student learning. The NEP 2020 has also emphasised the need to focus on the internationalisation of higher education. Indian students have traditionally travelled abroad for higher education, and it has been observed that there is a steady increase of students from African countries and the Middle East. Examining the share of the foreign students who come to India for higher studies, nearly one-third of them studied in Karnataka in 2015 to 2016.[i] However, for the year 2019 to 2020, the percentage dropped to about one-fifth. One of the prime reasons could be the COVID-19 pandemic. More importantly, however, it might be the lack of essential facilities like hostels on campus, and the discrepancy between the present curriculum and pedagogical methods compared to those used elsewhere. It would be beneficial to tackle the aforementioned difficulties in India, and notably in Karnataka, which has a number of professional and general institutions. Karnataka could then recruit students from other countries as an attractive destination for higher education. As a result, it's important to foster an atmosphere that can draw in international students by offering suitable housing on or near campus, aligning the curriculum with international standards, and changing assessment methods to better reflect the learning of diverse student populations. (Exhibit 104)

- Establish a SWAT team with a dedicated focus on increasing enrolment in secondary education, reducing school dropouts, providing inclusive education, and increasing mass literacy in districts of North Karnataka, especially in the Kalyan Karnataka region.

- **Prepare for the impact of emerging technologies:** Establish a committee of industry and academic leaders to build system capabilities to prepare students, teachers, and schools for the emerging transformation from generative AI. Additionally, work needs to be done for Karnataka to become a leader in embracing and integrating this transformation (for example, identifying what are the technologies and impact towards which it needs to work).

Exhibit 104

State-wise distribution of foreign students in India and southern states

Year	All India	Karnataka	%	Andhra Pradesh	%	Kerala	%	Tamil Nadu	%	Telangana	%
2015–16	45,424	14,398	31.7	1,787	3.93	133	0.29	5,377	11.84	3,032	6.67
2016–17	47,575	13,050	27.43	2,341	4.92	104	0.22	4,889	10.28	3,461	7.27
2017–18	46,144	12,041	26.09	2,092	4.53	136	0.29	3,542	7.68	2,877	6.23
2018–19	47,427	10,023	21.13	1,982	4.18	217	0.46	4,101	8.65	2,020	4.26
2019–20	49,348	10,231	20.73	2,094	4.24	302	0.61	4,461	9.04	2,261	4.58

Source: AISHE 2019–20

Run awareness campaigns

- This could be done by promoting vocational education and jobs as an aspirational profession (accord the prestige and respect to vocational education) and publicising the existing courses and related opportunities.

- Campaigns and roadshows could be developed to encourage private players to adopt government and private-aided schools and provide monetary benefits to schools in terms of improving physical and digital infrastructure and also giving teachers the necessary training.

More institutes of national importance and other eminent institutions can be started and supported, building deep specialisation and subject focus.

The curriculum could be revised at every university in the top three highest enrolment degree courses with industry inputs to improve employability and ensure industry relevance of the skills imparted.

The well-publicised credit transfer is undoubtedly a positive development. But equally crucial to this is developing templates for all courses at the national or state level that have a natural balance of standardisation and flexibility. This applies to higher education institutions of varying quality. The introduction of a rule requiring institutions to grant credits to students for courses taken through Swayam, NPTEL (national programme on technology enhanced learning), and MOOC (massive open online courses) can undoubtedly assist students in reaping the rewards of government initiatives.

The state could ensure fully functional placement cells in all universities and government HEIs with proper industry collaboration to improve the probability of placement for graduating candidates.

Financial and budgetary support:

- The Department of Higher Education's budget could be increased to an annual spending of 2 percent of the GSDP and account for at least 30 percent of the overall education budget. Private higher education institutions can be encouraged to increase spending on faculty development and research. Connections between universities and research institutions must be organically developed to encourage resource sharing and exchange.

  — Create an initial fund by levying a surcharge of 5 percent on excise duty on liquor, which could amount to about INR 500 crore per year[7] to be used for funding educational initiatives.

  — Allow universities to float long-term bonds (more than ten years) to build the necessary laboratories, libraries, and other academic and hostel infrastructure. These bonds can be guaranteed by the state (interest on the bonds could be paid by the universities from their fee collection and internal funds while the principal upon maturity should be paid by the state.) It is possible to allocate INR 5,000 crore in the form of bonds over the coming five years for this use. By doing this, the infrastructure would match that of India's best. The money held in bank deposits by many universities could be used to purchase bonds, thus recycling these funds.[92]

  — Incentivise financial institutions (with interest rate sharing, for example) to reduce the high nominal education interest rates of 10 to 14 percent that deter students to purse education.

  — Set up a dedicated research-focused fund of INR 250 crore in FY 2023 and possibly INR 500 crore by 2025 and, thereafter, INR 1,000 crore a year by 2030. The funds could be made available to public and private universities on a competitive basis for STEM and social sciences research.

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92   Karnataka Higher Education Vision Document, 2012

Execution oversight and enablement: suggestions

Establishing a framework for oversight and facilitation is just as crucial as declaring goals and outlining tactics to achieve them. Suggestions are detailed below.

- A non-operational group could be established, preferably as an independent entity, which operates outside current government departments, each of which has its own mandate. This group will serve a nodal establishment to oversee the attainment of these goals.

- This group could have a dedicated staff that is directly accountable to external stakeholders, including the state monitoring authority to realise this goal (if created) or to the CM's office, academia, industry (as well as directly through industry bodies such as FICCI, CII, BCCI, and other such bodies across the state).

- It can have an operating CEO together with other officers and staff, and a governing board that meets monthly.

- It can be data-driven and technology-based.

- It could be highly transparent with data and publish dashboards and information for public consumption. It could also be upfront with additional data for specific stakeholders including the Government of Karnataka, institutions, employers, civic groups as needed, and so forth.

- It could engage with respective ministries, trade bodies, enterprises, on the one hand, and with institutions on the other, with the specific objective of continually monitoring talent demand across various streams of specialisation and enabling institutions to ramp up capacity and capability in those areas.

- It could publish an annual position paper on talent availability and Karnataka's preparedness for the future.

- To provide insights and understanding of the existing talent capital as well as the emerging pipeline, the group can act as a connection with international bodies and entities, and closely collaborate with the relevant industry and trade development sections of the Karnataka government. In essence, it can offer some form of talent-capital promotion and development services.

- It can provide a forum for promoting and advancing cross-disciplinary research cooperation. Instead of replicating what each institution would be doing, the goal is to make research collaborations more manageable as a whole.

- Sufficient budget may need to be allocated for operation of this unit.

- Ten years after being established, the group's needs, objectives, constitution, and accountability can be reviewed, and a decision taken whether it can continue in its current form or not.

References

i   Karnataka economic survey

ii   GDP performance and value forecast

iii Education committee