Champion Services Sector Scheme: Construction & Related Engineering Services

Government of Karnataka

pwc

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List of Abbreviations

AAGR	Average Annual Growth Rate
APAC	Asia Pacific
CAGR	Compound Annual Growth Rate
C&RE	Construction and Related Engineering
CSSS	Champion Services Sector Scheme
EoDB	Ease of Doing Business
EPC	Engineering, Production and Construction
EU	Europe
EXIM	Exports / Imports
FDI	Foreign Direct Investment
FY	Financial Year
GDP	Gross Domestic Product
GoI	Government of India
GoK	Government of Karnataka
GSDP	Gross State Domestic Product
GSVA	Gross State Value Added
GVA	Gross Value Added
INR	Indian Rupee
IoT	Internet of Things
IT & ITeS	Information Technology & Information Technology enabled Services
IWT	Inland Water Transport
K-TECH	Karnataka Innovation and Technology Society
LATAM	Latin America
LEADS	Logistics Ease Across Different States
MoSPI	Ministry of Statistics and Programme Implementation
NHAI	National Highway Authority of India
NMPT	New Mangalore Port Trust
O&M	Operations and Maintenance
PMU	Project Management Unit
PPP	Public Private Partnership
PWD	Public Works Department
RERA	Real Estate Regulatory Authority
SDEL	Skill Development, Entrepreneurship and Livelihood Department
TIES	Trade Infrastructure for Export Scheme
UK	United Kingdom
USD	United States Dollar
VTPC	Visvesvaraya Trade Promotion Centre

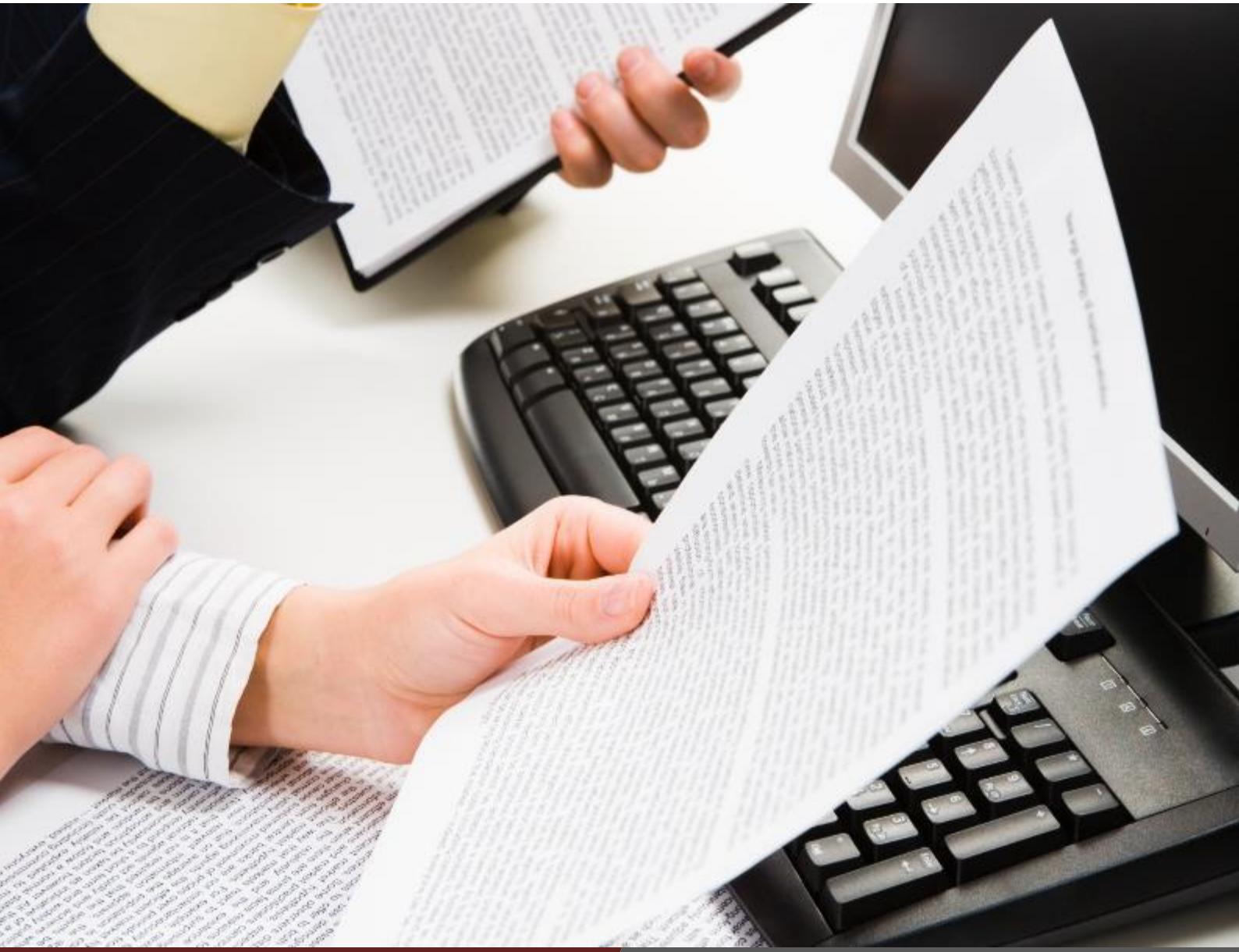
Preface

With the objective to make India a USD 5 trillion economy, Government of India, in year 2018 announced the Champion Services Sector Scheme (CSSS) with thrust to 12 identified sectors. Aligning with the objective, Government of Karnataka constituted a High-Power Committee for the promotion of Service activities in the State vide Govt. Order No.CI 159 SPI 2018, Bengaluru dated 05.09.2018. The 1st High Power Committee meeting under the Chief Secretary, identified Six (6) Champion Services for the the State and Sectoral expert groups were constituted with respective departments of Karnataka. Department of Commerce & Industries was nominated as the nodal department for coordinating the efforts of individual departments. Visvesvaraya Trade Promotion Centre (VTPC) under the aegis of the Department of Commerce & Industries, was identified to coordinate the formulation of the sector specific reports by engaging consultants. Price WaterHouseCoopers (PwC) was engaged as Knowledge Partners for the study and to draw up the action plan and coordinate with respective line departments for the exercise.

The following Sectoral expert groups, along with the respective nodal departments were formulated vide the G.O pertaining to the subject:

Sl.No	Sectoral Expert Group	Chairperson	Nodal Department
1.	Health & Wellness Services	Additional Chief Secretary to Govt., Medical Education Department	Medical Education
2.	Education Services	Principal Secretary to Govt., Higher Education Department	Higher Education
3.	Media & Entertainment Services	Secretary to Govt., Information and Publicity	Information and Publicity Dept.
4.	Remittances & Emigration Services	Secretary to Govt., Skill Development Department	Skill development
5.	Construction & Related Engineering Services	Additional Chief Secretary to Govt., Urban Development Department, Co-chaired by Secretary to Govt., Housing Department	Urban Development Department
6.	Transport & Logistics Services	Principal Secretary to Govt., Commerce & Industries Department	Commerce & Industries Department

This Report is a culmination of the efforts in charting a sector specific Strategy/Scheme for the Construction and Related Engineering Services Sector in the State. The report has taken into consideration inputs and feedback from stakeholders in the sector space besides, the views of nodal department.



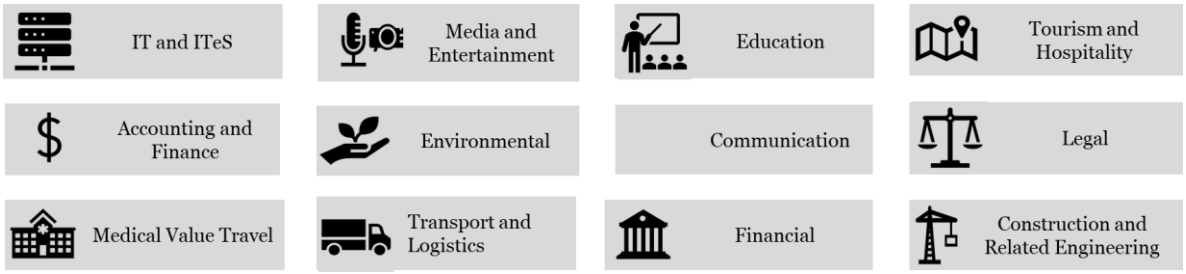
Executive Summary

Executive Summary

The Champion Services Sector Scheme (CSSS) was launched with an objective to give focussed attention to Services Sectors thereby promoting Gross Domestic Product (GDP) growth, creating more jobs and promotion of exports to the global markets.

The CSSS was approved by the Government of India (GoI) in February 2018 to give a boost to various services sectors in the Country. Government of India has set a target to increase India's share in global services exports to 4.2% (from 3.3% in 2015) and increase the services sector's share in Gross Value Added (GVA) to 60% by 2022. The Government of India has identified twelve champion sectors under the Champion Services Sector Scheme as represented in **figure 1**:

Figure 1: Twelve Champion Services Sectors



Source: Department of Commerce, Government of India, 2018

The CSSS will focus on implementing reforms in each of these sectors based on the following 5 pillars:

1. ***New Processes***: to improve Ease of Doing Business (EoDB)
2. ***New Infrastructure***: to strengthen physical and digital connectivity
3. ***New Sector***: to identify untapped sectors for value addition
4. ***New Mindset***: to change the official mindset from issuing/approving authority to partnering in business
5. ***New Standards***: to strengthen export competitiveness of various service sectors

The CSSS program entails the implementation of a focussed action plan for each of the identified sectors to promote growth of the sectors. A dedicated fund of Rs. 5000 Crores has been approved under the CSSS for implementing the recommendations approved under the program.

The Government of Karnataka has identified six champion sectors out of the twelve identified sectors as part of the CSSS with the goal to boost the state's position in these sectors. This document pertains to the sector development strategy in the Construction and Related Engineering sector.

The global Construction and Related Engineering services sector (C&RE) is expected to grow at $4 Trillion per annum against the supply growing at $2.7 Trillion annually.[1]

The size of the global C&RE is expected to reach $17.5 Trillion by 2030 in terms of market size with a projected CAGR of ~3.96%. Asia Pacific (APAC) region continues to dominate the global C&RE industry with an astonishing ~70% share in total.

Indian C&RE accounted for 8.2% of India's GDP and is expected to grow at an average of 7.1% each year till 2025[2]

The C&RE sector in India has a great potential to grow exponentially in the next 5 years with the overall change in demographics, policy reforms, climatic conditions, per capita income and urbanization.

However, in India, only ~9% of the GDP is spent on C&RE in comparison to ~10% globally. India's performance in construction sector is studied through Case studies. The study focused on understanding the bottlenecks and challenges that hamper the growth of construction and thereby developing the strategy for the growth of the sector.

Indian real estate is expected to reach a market size of $ 650 billion by 2025 and surpass $850 billion by 2028 driven by emerging asset classes such as affordable housing and co-working spaces at a CAGR of 19.5%[3].

Karnataka continues to be a key player nationally in C&RE, with a significant contribution of 7.9% of total GDP and is 4th among the top GDP contributors.

Karnataka is also the leading state in terms of software & service exports ranking first in the Country in 2018-19. The share of service exports of Karnataka in the National total is around 40%.

….. resulting in Karnataka state becoming the top 4 States in India in terms of merchandise exports, amounting to about INR 1.25 lakh crore

[1] India Services, 2019
[2] Study Team Analysis
[3] Indian Real Estate and Construction: Consolidating for Growth, KPMG

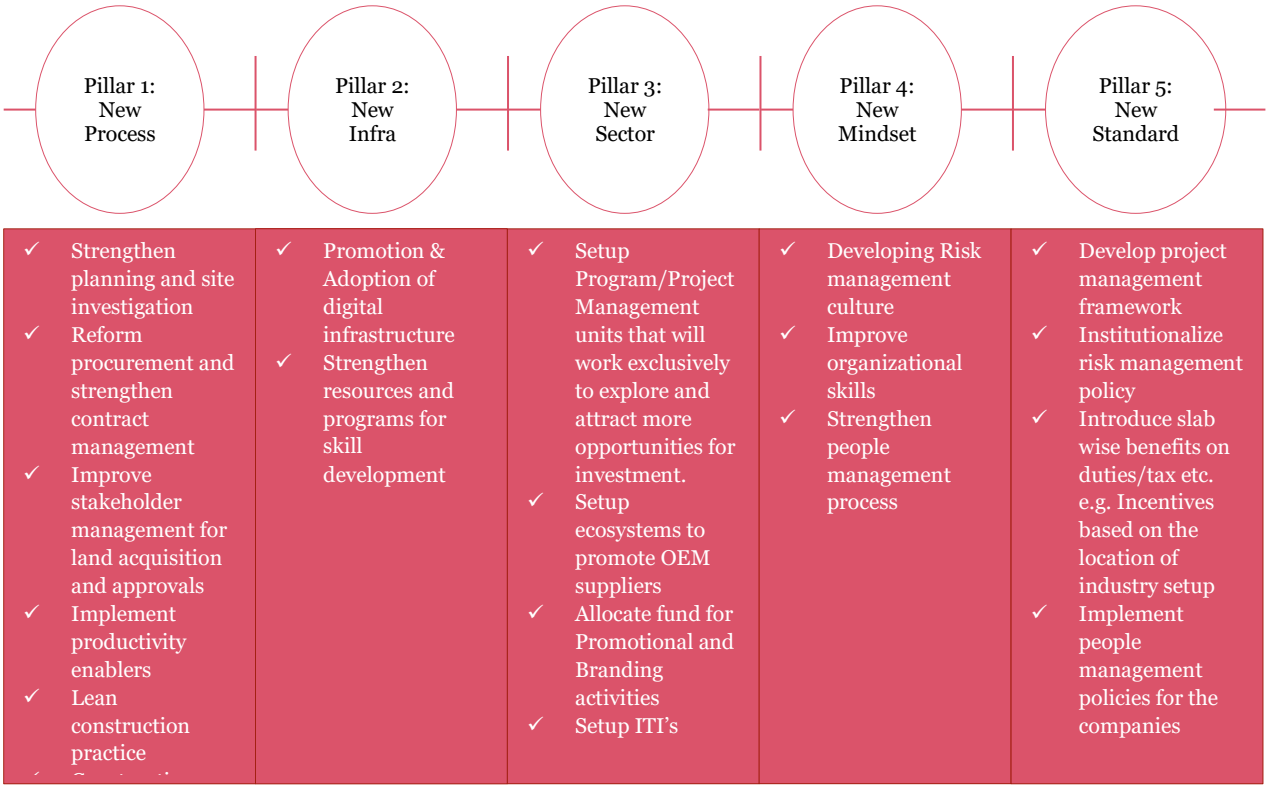
in 2018-19. The contribution of industrial sector in Karnataka is 22% of the state's GDP[4].

However, there are few operational & policy issues and bottlenecks which are hindering the growth of the C&RE in Karnataka. A comprehensive evaluation of the parameters for ease of doing business for the state and the infrastructure index has been performed to understand the hindrance to Karnataka's growth vis-à-vis other states and globally. As per the LEADS ranking the state of Karnataka has slipped from fourth rank in 2018 to seventh rank in 2019 after the downgrade in infrastructure parameters which aids the transportation of goods.

Benchmarking analysis, high-level labour cost analysis, and the construction project's time and cost overrun root cause analysis have been undertaken for each sub-sector. The stakeholder consultations conducted by the study team has revealed that structural changes, technological interventions, skill development and and policy reforms would fire the growth of C&RE sector in Karnataka.

The study identifies key interventions needed across the value chain, which have the potential to drive the growth of the C&RE. To achieve the industry potential, the following interventions have been identified - in line with the five pillars of the Champion Services Sector Scheme – as represented in **figure 2**.

Figure 2: Summary of strategic interventions



Source: Study Team Analysis

[4] Economic Survey of Karnataka, FY 2019

It is very important that implementation of the Strategic interventions happen in a holistic and focussed manner because there are interventions whose success is dependent on different Departments of the State.

1. Introduction

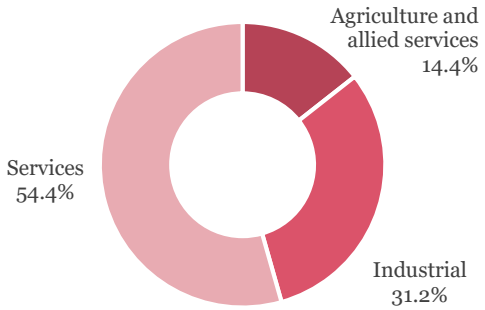
1 Introduction

Services sector is a key driver for India's economic growth

India is one of the fastest growing economies in the world. The Country recorded Gross Domestic Product (GDP) growth of 6.8% in FY 2018-19 against 7.2% in FY 2017-18[5]. A burgeoning service sector is a key driver for India's economic growth.

Unlike other countries where economic growth has led to a shift from agriculture to industries, in India there has been a shift from agriculture to the service sector. The sector was the largest contributor to GDP (54%) as depicted in **figure 3**. The sector also accounted for more than 60% of Foreign Direct Investment (FDI) inflows and 30% of India's exports in 2018-2019.

Figure 3: Sectoral share in GVA (FY 2018-19)

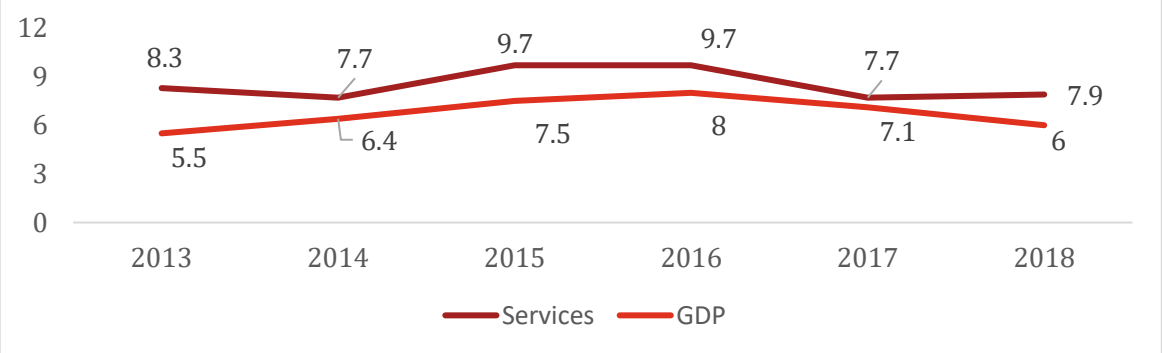


Source: Economic Survey of India, FY 2019

Despite its largest share, India's services sector has not generated jobs in proportion to its share in the economy. The share of services sector in employment was 34 per cent in 2017, which is significantly lesser that its share in GVA.

Importance of the sector can be gauged by the high rate of growth recorded by the sector which has been ramping up the overall rate of growth of the Indian economy over the last decade as represented in **figure 4** below. India has set an ambitious target of becoming a USD 5 trillion economy by 2025. Recognizing the importance of service sector, Government of India has set a sub-target of USD 3 trillion for Services sector.

Figure 4: GDP and Sectoral GVA Growth (%)



Source: Challenges, Issues & Policy Suggestions, Working Paper No. 2 / 2017- Department of Economic Affairs - Ministry of Finance, Government of India

[5] The Central Statistics Office, (CSO), The Ministry of Statistics and Programme Implementation, GoI, 2018-19

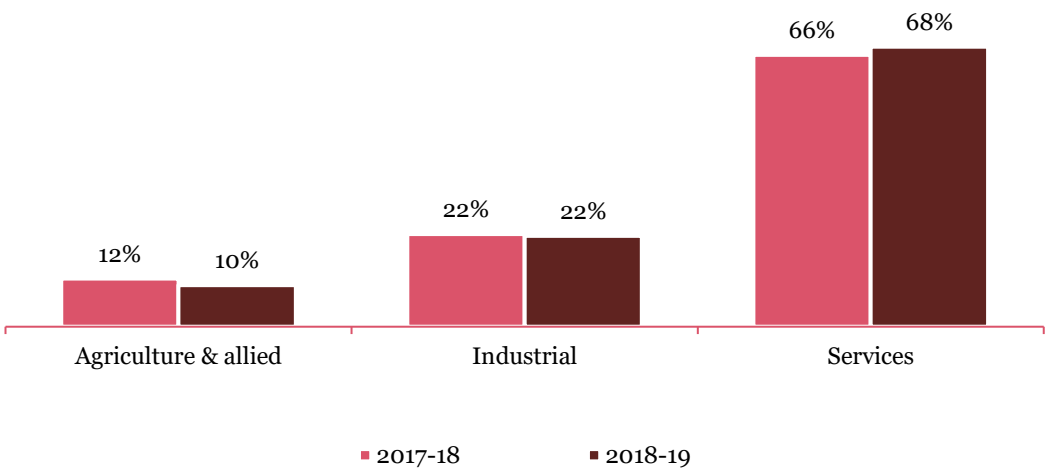
Champion Services Sector Scheme (CSSS) was launched with an objective to give focussed attention to Services Sectors thereby promoting Gross Domestic Product (GDP) growth, creating more jobs and promotion of exports to the global markets

The Champion Services Sector Scheme (CSSS) was approved by the Government of India (GoI) in February 2018 to give a boost to various services sectors in the Country. The Government of India has set a target to increase India's share in global services exports to 4.2% (from 3.3% in 2015) and increase the services sector's share in GVA to 60% by 2022. The Government of India has identified twelve services under the Champion Services scheme. The objective of the CSSS is to increase the competitiveness of the identified service sectors in India thereby promoting GDP growth, employment generation and exports. The CSSS will focus on implementing reforms in each of these sectors based on the 5 pillars mentioned in the earlier section.

Objective of the Study

The services sector in Karnataka plays an important role in its economy and contributes ~68% of the state's Gross State Domestic Product (GSDP). Its share grew marginally from 65.9% in FY 2017-18 to 67.8% in FY 2018-19, while there was a marginal decline in the share of agriculture and industry sectors as represented in **figure 5**. Services sector in Karnataka registered an annual average growth rate of 10.5% in the last four to five years (2015-2019).

Figure 5: Sectoral share in Karnataka's GSDP (FY 2018-19)



Source: Economic Survey of Karnataka, FY 2019

To further boost the service sector in Karnataka, the Government of Karnataka (GoK) has decided to leverage the Champion Services Sector Scheme launched by the GoI to promote the services sector in Karnataka. The State Government has identified six sectors to be promoted under the CSSS to further strengthen Karnataka's position in Services. These include:

i. Transport and Logistics
ii. Media and Entertainment
iii. Education Services
iv. Health and Wellness

v. Infrastructure and Construction
vi. Remittances and Immigration

The Government of Karnataka (GoK) intends to formulate an Action Plan for each of these sectors to make Karnataka a leader in these sectors not only within India but also globally, which would strengthen India's position in the market for services.

GoK intends to develop a strategy for nurturing the Construction & Related Engineering(C&RE) Services in Karnataka. As part of the GoK's mandate of industrial development in the state, it has appointed PricewaterhouseCoopers Pvt. Ltd. ("Study Team") for formulating strategy and action plan for development of Construction & Related Engineering Services in Karnataka. The objective of the study are as follows:

- To prepare a strategy and action plan for development of Construction & Related Engineering Services Sector (C&RE) in Karnataka
- Recommend strategic interventions that can enhance the competitiveness of Karnataka's C&RE.

Coverage of the report

This report discusses the current scenario of C&RE in the state of Karnataka, vis-à-vis the global and national scenario of India. Subsequently, major issues impeding the growth of the sector in the state has also been discussed. The study team has attempted to align the proposed strategy with key objectives mentioned in the previous section. The **figure 6** details out the approach for the study.

Figure 6: Approach for the study

Market Assessment	Competitive Assessment	Sector Development Strategy	Implementation and funding plan
• Review historical growth trends for key sub segments • Review Karnataka's presence on national value chain and the state's competitive advantages	• Undertake Stakeholder consultations within the Industry (Urban development, Real estate associations, raw material manufacturing companies and government). • Evaluate the industry scenario using case study method. • Assess presence of key enablers. • Identification of key issues and bottlenecks impeding growth of industry	• Propose strategic interventions through a four-pronged strategy to address issues and bottlenecks identified in the construction and related engineering services sector in the state.	• Propose implementation mechanism and funding requirement for each of the interventions • Summarize the total funding proposed for all the interventions under the Champion Service Sector Scheme.

Source: Study team analysis

Chapter 2 – Market assessment: This chapter will cover local, national and global scenario of C&RE. Review of historical growth trends – global and national in terms of key segments such as Real estate (Residential and Commercial) and Infrastrucutre development, review of industrial growth and potential, employment etc., review of Karnataka's presence in national value chain in terms of Gross Value Added through the C&RE shall be identified.

Chapter 3 – Sector specific analysis: This chapter will assess Karnataka's position in the national value chain. Case studies have been used to understand the bottlenecks and challenges involved in the sector. The benchmarking of C&RE in Karnataka will be done vis-a-vis other states. Additionally, key enablers for success of the industry shall be identified.

Chapter 4 – Sector Development Strategy: This chapter proposes the strategic interventions to resolve the issues and bottlenecks pertaining to the C&RE in Karnataka. The strategy will be aligned with the five pillars identified for transformation.

Chapter 5 –Implementation and Funding plan: The chapter proposes implementation mechanism and funding requirement for each of the interventions stated in chapter 4. Summary of the total funding proposed for implementing all the interventions under the Champion Services Sector Scheme for Construction and Related Engineering Services sector in Karnataka is presented here.

Methodology for study

A combination of primary and secondary sources has been used at different stages of the study. Firstly, the global industry and national trends and scenario for the C&RE have been assessed.

Detailed stakeholder consultations were undertaken across Karnataka. Stakeholders across the value chain were met including experts on urban development, raw materials manufacturing companies, associations, and government institutions.

Detailed methodology and key findings have been detailed out further in the forthcoming sections.

3. Construction and Related Engineering Services Sector

2 Construction and Related Engineering Services Sector perspective

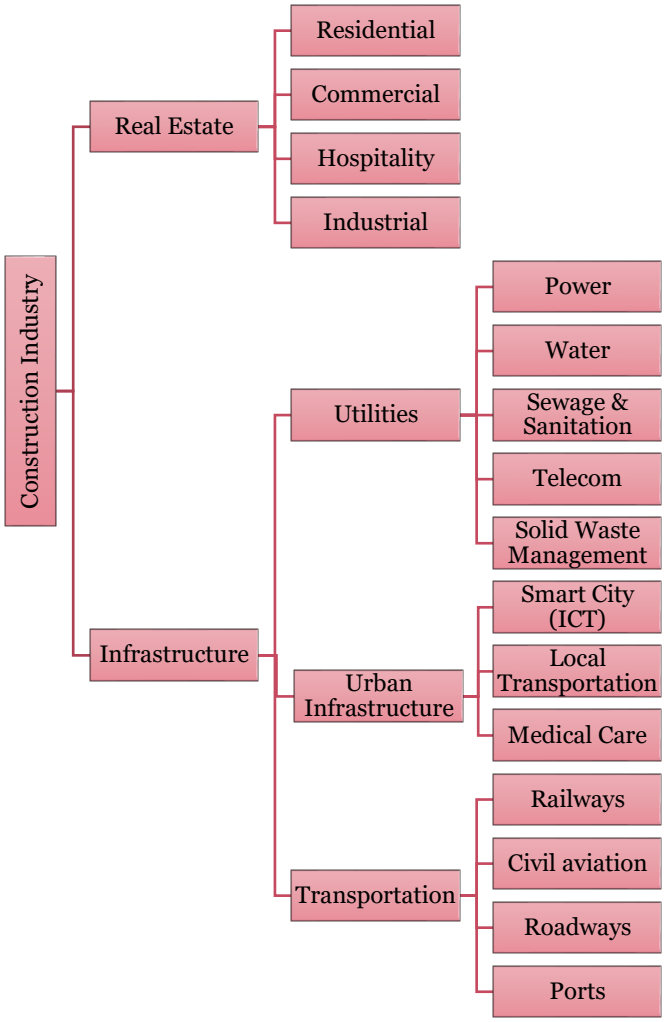
The demographic shifts, economic evolution in countries, rapid urbanization, varying climatic conditions and technological breakthroughs drive the demand and the size of the Construction and Related Engineering Services Sector.

As per the World Trade Organization, Construction and Related Engineering services sector comprises "construction work for buildings and civil engineering, installation and assembly work, building completion and finishing work."[6] The sector, thus consists of all the companies that are responsible for the production of power, construction of buildings and highways, railways, airports, development of smart cities, and creation of urban infrastructure.

The construction sector through the development of infrastructure affects economic growth in two central ways. It directly boosts economic activity through the construction of new and upgraded infrastructure, which boosts demand for goods and services and creates jobs. More fundamentally, it contributes to the creation of assets that underpins the productivity of an economy by influencing the ease, time and cost of moving goods and services. Activities under the Construction and Related Engineering services can be broadly categorized into two segments- Real Estate and Infrastrucutre.

[6] World Trade Organization. Retrieved from https://www.wto.org/english/tratop_e/serv_e/construction_e/construction_e.htm

Figure 7: Construction and Related Engineering services sector domains



As per the Global Infrastructure Outlook 2017 published by Oxford Economics, the estimated global infrastructure investment requirement is $94 trillion during the period 2016 to 2040. Out of this envisaged infrastructure investment, ~50% is required in Asia alone (with China, India and Japan being major contributors) with roads and electricity sub-sectors constituting ~67% of these investment needs. It is estimated that while the demand for infrastructure is growing at about $4 trillion per annum, the supply is growing at only $2.7 trillion annually, leading to a deficit of $1-1.5 trillion on a per annum basis[7]. It is estimated that India would need to spend $4.51 trillion on infrastructure by 2030 to realise the vision of a $5 trillion economy by 2025, and to continue on a growth trajectory until 2030.

Currently, the overall size of Construction & Related Engineering Services market is estimated to be approximately $11 trillion.[8] Based on these trends, the total size of the market is expected to reach $17.5 trillion by 2030, at an average annual growth rate of 3.9%, accounting for 14.7% of global GDP. Cumulative volume of construction will reach $212 trillion over the period to 2030, with $77.8 trillion in Asian emerging economies.

[7] Report of the task force, National Infrastructure pipeline, 2020.
[8] PwC Analysis 2019, Global Construction Perspectives & Oxford Economics 2017.

China will emerge on top, accounting for over a fourth of all construction activity world-wide. However, India will be the fastest growing construction market in the world. Eight global construction markets (China, US, India, Indonesia, UK, Mexico, Canada and Nigeria – ranks in order of contribution to global growth) will account for 70% of all global growth in construction to 2030. China, USA and India, accounting for over a third of the world's population and economic output, will together contribute 57% or $4.55 trillion to the growth of the sector.[9]

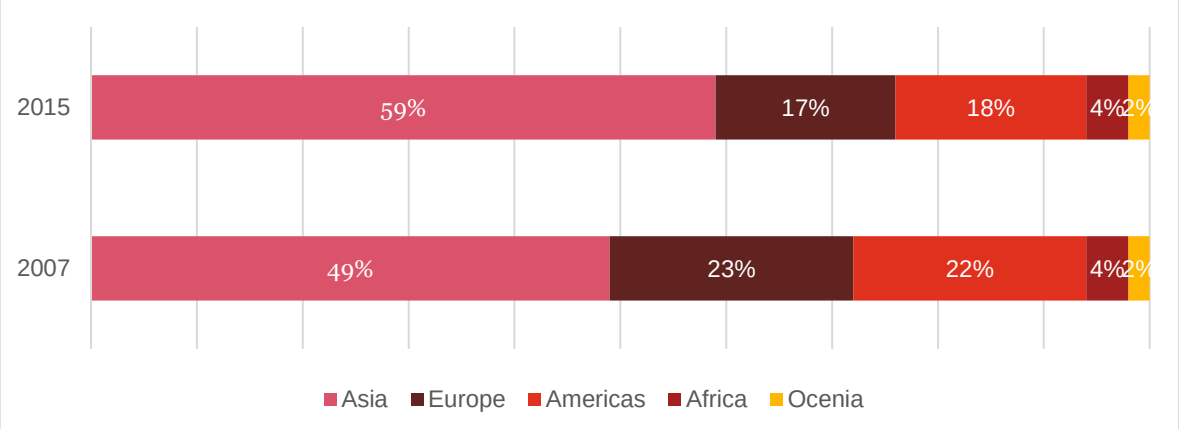
Global Real Estate

The overall size of the global real estate market was estimated to be $6.8 trillion in 2018, and is expected to reach 8.6 trillion by 2026, at CAGR of 2.8%[10]. Asia-Pacific was the largest region in the global real estate market, accounting for 39% of the market in 2018. Western Europe was the second largest region accounting for 24% of the global real estate market. Africa was the smallest region in the global real estate market; however, its demand is expected to rise steadily in the coming years.

Global Infrastructure

Globally, public infrastructure segment, accounted for $2.3 trillion in 2015, up from $1.8 trillion in 2007, with an average annual growth rate of 2.9%[11]. This growth rate of around 3% has remained constant over the past decade, owing to the long-term nature of urban development projects. Based on these values, the market size of the segment can be found to be 2.5 trillion in 2019[12]. The total investment during this period represents 12% of total global investment over the period. Over the past decade, a major share of global investment in urban development has taken place in Asia.

Figure 8: Regional share of global urban development investment between 2007 and 2015



Source: Global Infrastructure Outlook 2017

[9] Global Construction 2030- A Global Forecast for the Construction Industry to 2030. Global Construction Perspectives and Oxford Economics 2015

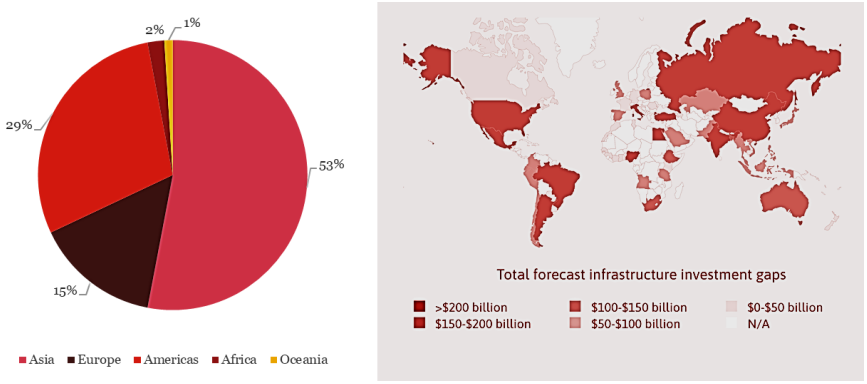
[10] Real Estate Market Outlook 2026. Allied Market Research 2019, Retrieved from https://www.alliedmarketresearch.com/real-estate-market-A06029

[11] Global Infrastructure Outlook 2017.

[12] PwC Analysis 2019.

On comparing the current trend in infrastructure spending to the projected demand for infrastructure in 2030, Mckinsey Global Institute projects a cumulative investment gap of $1-1.5 trillion on a per annum basis, globally across the period from 2016 to 2030. The size of the gap triples if we consider the additional investment required to meet the UN Sustainable Development Goals.

Figure 9: Regional Share of Infrastructure Investment Gap in 2030

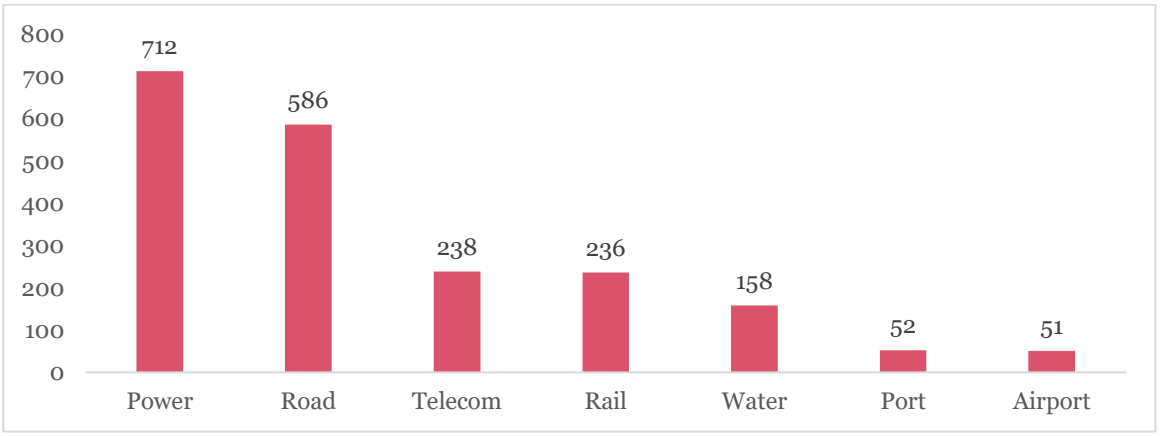


Source: Global Infrastructure Outlook, Oxford economics

In line with past and current trends, almost two-thirds (60%) of this investment will be required in emerging economies in Asia and Africa. India, along with USA, China, Brazil and Russia, will emerge as one of the top five markets to encounter this gap.

Among the subsegments, global public infrastructure spending is currently dominated by two sectors- power and roads, which together account for approximately two-thirds of total global spending within the segment. Telecom and railway have each contributed approximately 12%, and similar amount comes from water, ports and airports, together.

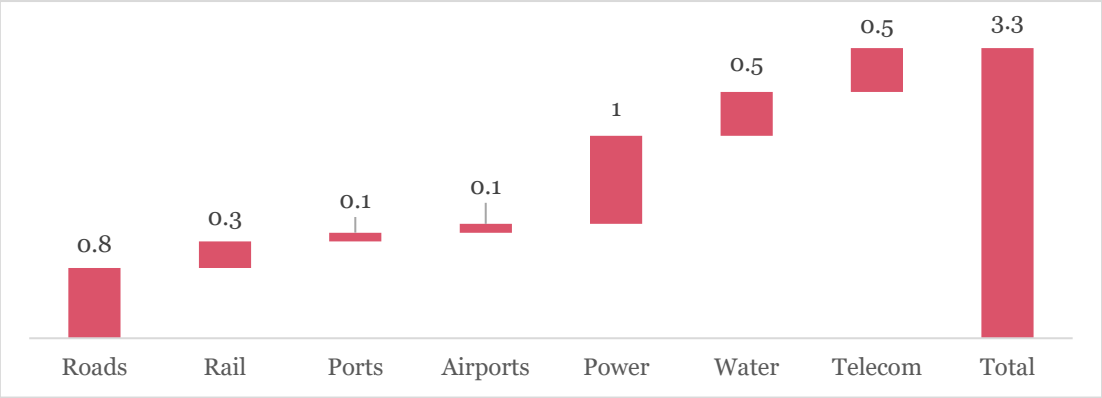
Figure 10: Average Annual Investment in Urban Development Segment (by sub-sector) 2007-2015



Source: Global Infrastructure Outlook, Oxford economics

During 2016-2030, roads and power sub-sectors will continue to require majority investment share, followed by telecom, water, rail, ports and airports, respectively. The demand in the telecom sub-segment is also expected to steadily increase during this period.

Figure 11: Average Annual Infrastructure Investment Need 2016-2030 by sub-sector ($ trillions)

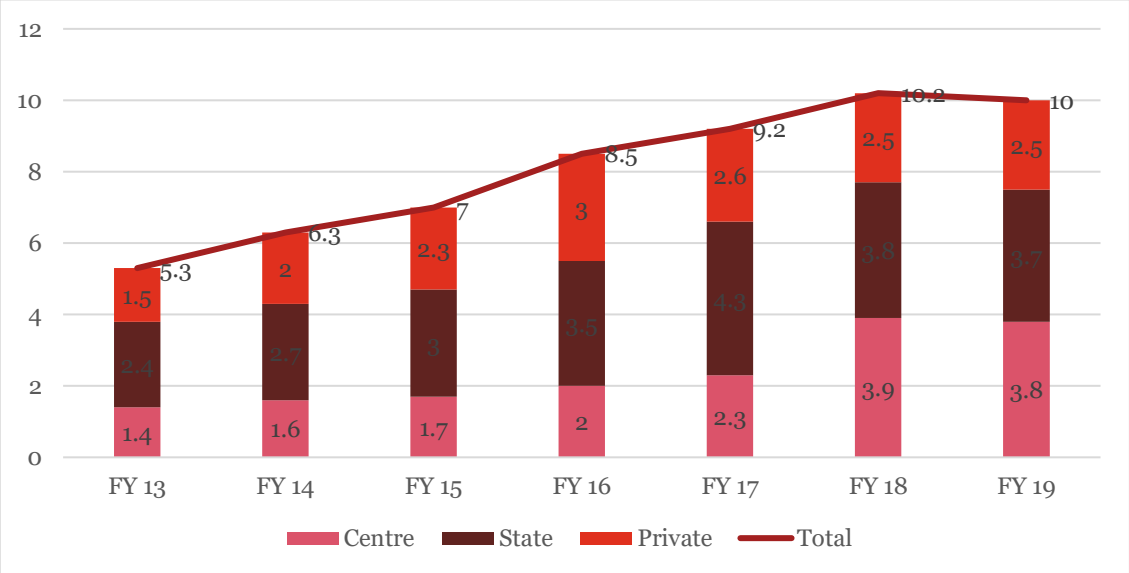


Source: Mckinsey Global Institute

By 2025, Construction market in India is expected to emerge as the 3rd largest globally and the construction output is expected to grow on an average of 7.1% each year[13].

Construction and related engineering accounted for 8.2% of India's GDP in 2019, as against 11% in 2018[14]. Infrastructure investment in India during fiscals 2008 to 2017 was estimated at ~Rs 60 Lakh Crore ($1.1 trillion average exchange rate of respective years). India's infrastructure investment for fiscals 2018 and 2019 stood at ~Rs 10.2 lakh crore and ~Rs 10 lakh crore respectively. During the above period, infrastructure investment was predominantly made by the public sector (i.e. Centre and state governments with a share of ~70%), while the share of private sector was ~30% (the share of private sector during last two years was ~25%). The trend in India's infrastructure investment since fiscal 2013 is highlighted in **Figure 12**[15].

Figure 12: India's Infrastructure trend since fiscal 2013 (Rs Lakh Crore)



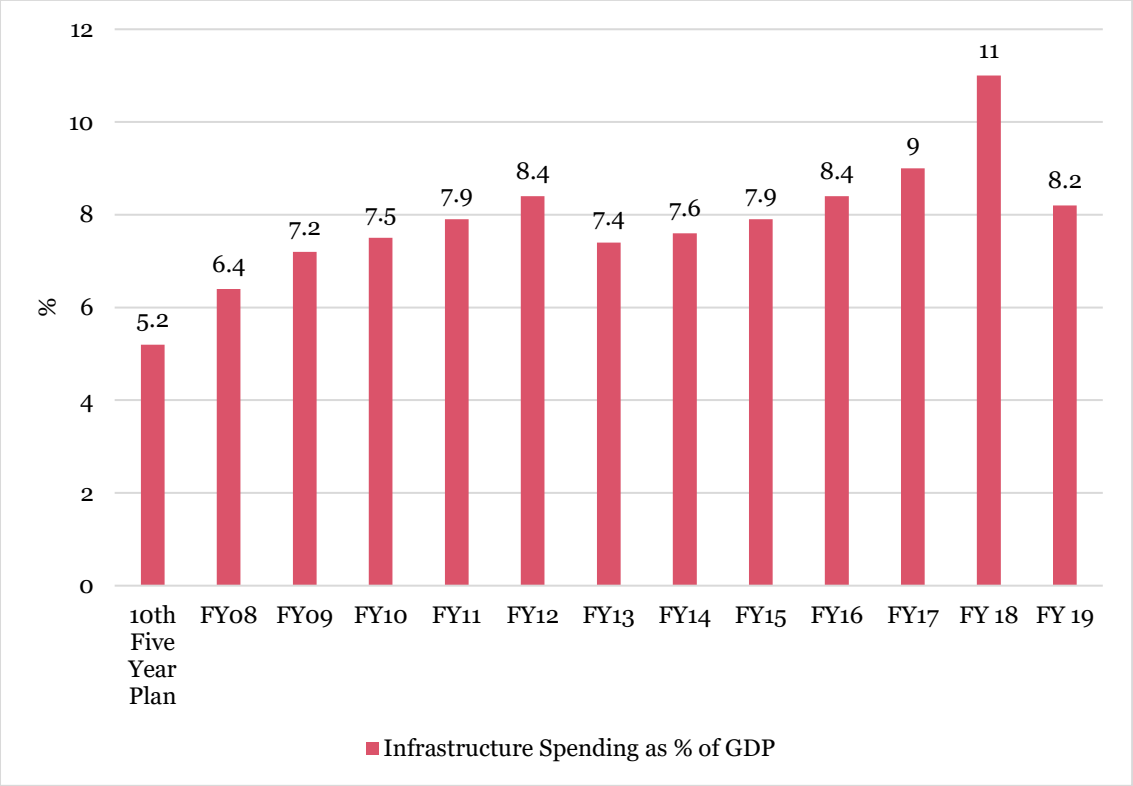
[13] FDI Finance, Construction sector

[14] Economic Survey of India 2019-20. Retrieved from https://www.indiabudget.gov.in/economicsurvey/doc/vol2chapter/echap08_vol2.pdf

[R]Report of the taskforce National Infrastructure pipeline (NIP), 2020

Source: Report of the Task force National Infrastructure Pipeline,2020

Figure 13: Infrastructure spending as percentage of GDP



Source: Economic Survey of India, 2019-20

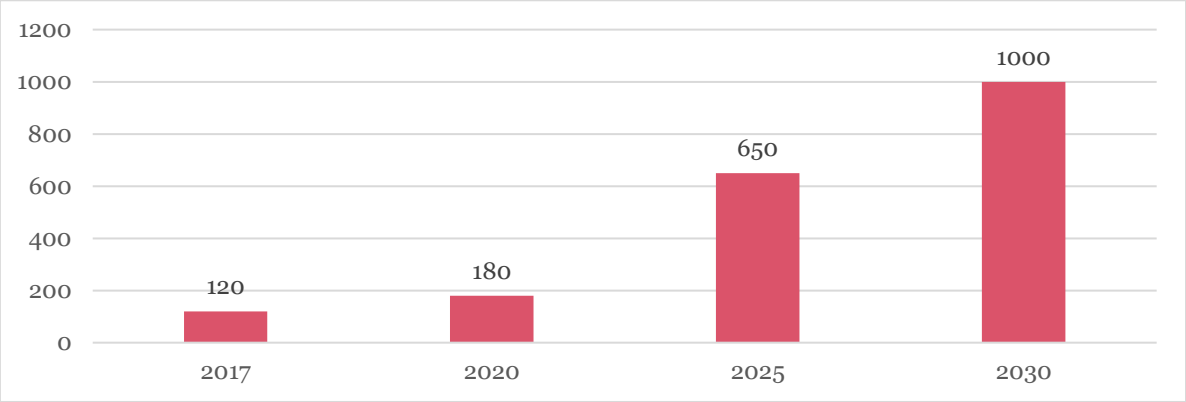
As the infrastructure created by the Construction and Engineering sector is responsible for the growth of other sectors and India's overall development, it remains central to helping India achieve its target of $5 trillion economy by 2025. Recognizing the sector's importance, Government of India is now focussing on the development of Construction and Engineering services through policies such as open National Infrastructure Pipeline, FDI norms, a large budgetary allocation, Smart cities mission, etc. India has become a large market for Construction and Engineering sector-related activities

Real Estate in India

The Real estate segment in India is expected to reach a market size of $ 650 billion by 2025 and surpass $850 billion by 2028 driven by emerging asset classes such as affordable housing and co-working spaces, from $120 billion in 2017 at a CAGR of 19.5 %[16](Refer to **Figure 14)**. Increasing share of real estate in the GDP would be supported by increasing industrial activity, improving income level and urbanisation. As by products of this growth, the average early contribution of ~6% to Indian GDP is anticipated to almost double by 2025 while generating employment opportunities for over 66 million people.

16 Indian Real Estate and Construction: Consolidating for Growth, KPMG

Figure 14: Market size of real estate segment in India (US$ billion)



Currently 80% of the real estate segment's contribution comes from the residential real estate sub-sector. Despite India already having one of the largest housing markets in the world, it will need to build 170 million houses over the next fifteen years to meet the needs of its growing and rapidly urbanising population. This amounts to approximately 31,000 new houses a day in the period from 2016-2030[17].

The Pradhan Mantri Awas Yojana- Urban (PMAY-U) was launched to provide affordable housing with basic amenities to all eligible urban poor. It has been allotted a funding of $6.7 billion. Under the scheme, a demand for 10 million houses has been registered, and over 6000 houses are under construction[18].

Majority of the future growth within the real estate segment will arise as consequence of sharp increase in demand within the commercial real-estate sector. The growth of this sub-sector is fuelled by the rapid growth of services sectors like IT-BPO, pharma, engineering and manufacturing besides demand from MNCs.

The commercial real estate sector is expected to become more efficient after the introduction of the Real Estate Investment Trust (REIT). The office space currently stands at a vacancy rate of 13.1%, which is considered to be a natural vacancy rate.

Table 1: Office Space Growth for India in 2019

Parameter	*2018*	*Change (YoY)*	*H1 2018*	*H1 2019*	*Change (YoY)*
New completions mn sq m (mn sq ft)	3.7 (39.3)	15%	1.7 (18.2)	2.2 (23.9)	31%
Transactions mn sq m (mn sq ft)	4.4 (47.6)	11%	2.0 (21.8)	2.6 (27.4)	26%
Vacancy (%)	13.1%	-	12.7%	12.7%	

17 Bridging Global Infrastructure Gap, Mckinsey Global Institute. 2015
18 Economic Survey of India, 2019-20

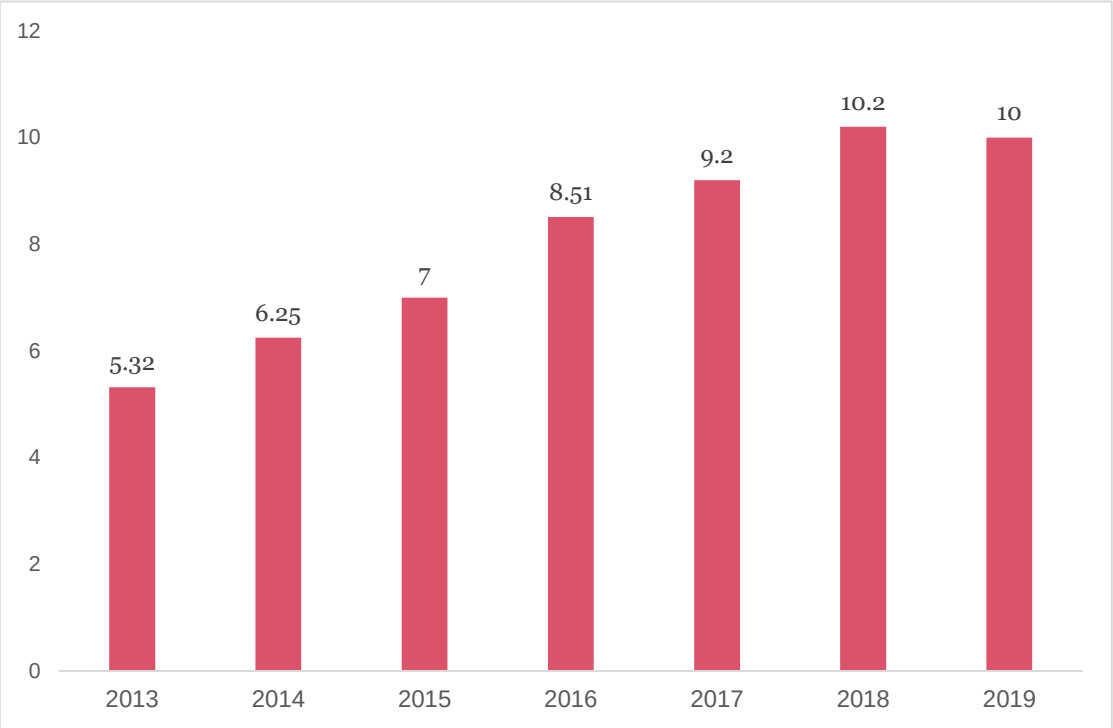
The retail segement is expected to remain steady in the medium to long term with a strong supply pipeline and stout absorption. Grade A retail completed stock shall cross over 100 million sq. ft by 2022.

During Q1 2020, office gross absorption across the top seven cities namely Bangalore, Pune, Delhi-NCR etc. grew marginally by 4% to 12.2 million sq. ft[19].Bengaluru accounted for about 30% of the total gross absorption, followed by Pune and Delhi-NCR with a 18% and 15% share respectively. Bengaluru saw leasing of 3.7 million sq ft while in Delhi-NCR, the gross absorption rose 21% year-on-year to 1.8 million sq ft[20].

India Infrastructure

According to Ministry of Economic Affairs, Infrastructure investment in India during fiscals 2008 to 2017 was estimated to be $1 trillion. Urban development represents the most significant piece in realizing India's $5 trillion economy dream and will thus require an investment of approximately $850 billion by 2030.

Figure 15: India's Urban Development Investment trend: 2013-2019



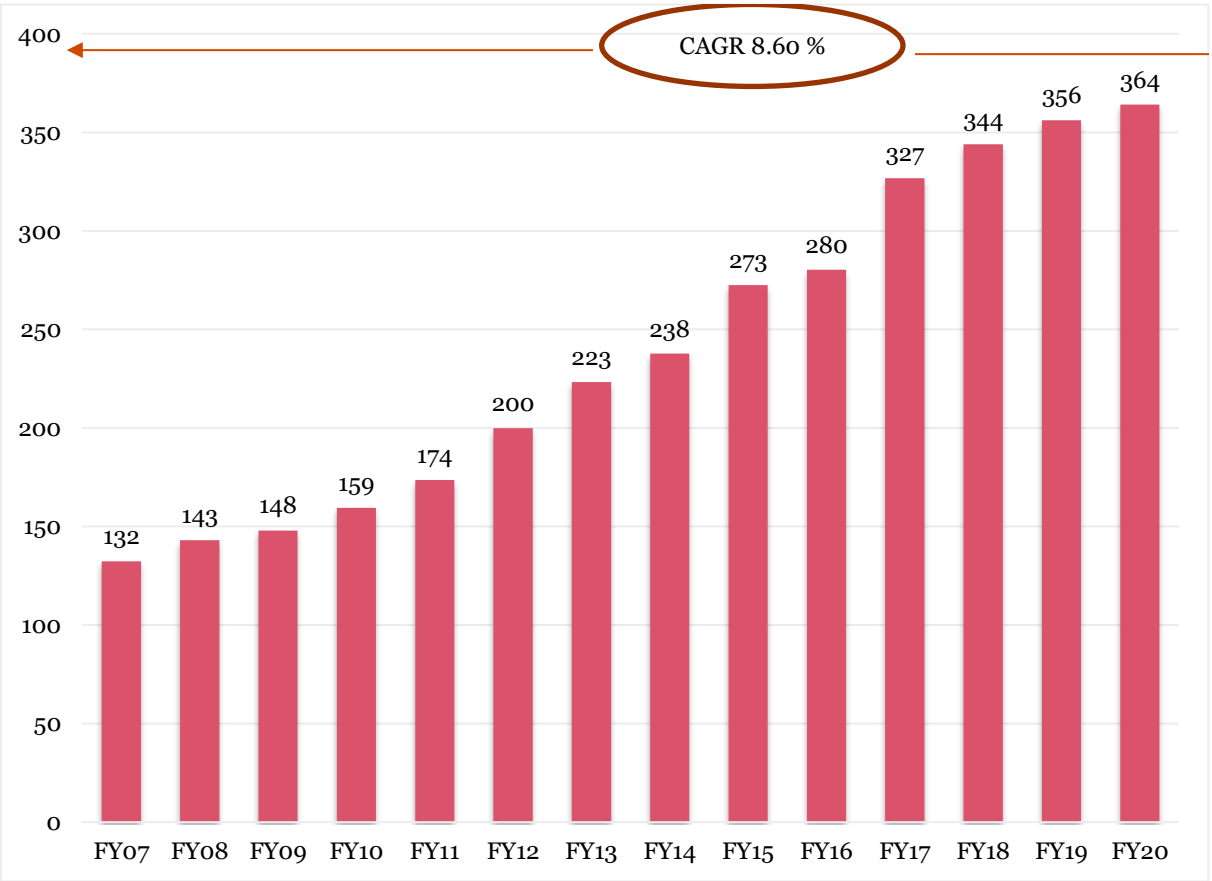
[19] Report - Colliers International,2020
[20] Knight Frank Research, India Real Estate, Residential and Office, 2020

Power

India is also the 3rd largest consumer of power after China and USA. Currently, India consumes around 1,550 terawatts[21] hour of power which is expected to increase by almost 22.5 % and reach around 1,900 terawatts hour by 2022. India ranks 76th in the Energy Transition Index published by the World Economic Forum (WEF). As on March 2019, 26.02 million households have been electrified under the Saubhagya Scheme.

Globally, India ranks 5th in terms of total installed capacity. In 2019, the installed capacity increased to 364 GW[22] since 2007, with a CAGR of 8.6%. It is estimated that around 1 Lakh circuit km transmission line and 2 Lakh MVA transformation capacity is required for the planned installed generation capacity of 388 GW by 2022[23]. The Indian energy sector is expected to offer investment opportunities worth US$ 300 billion over the next 10 years[24].

Figure 16: Installed Power Generation Capacity in India (GW)



Source: Central Electricity Authority (2020)

Roads

The length of India's road network was about 59.64 lakh km in 2018, with total length of National Highways at 1.32 lakh km. Under the Bharatmala Pariyojana, an umbrella program in the highways sector, the highway network in India is expected to grow by

[G]Growth of Electricity Sector in India from 1947-2019. Retrieved from http://www.cea.nic.in/reports/others/planning/pdm/growth_2019.pdf

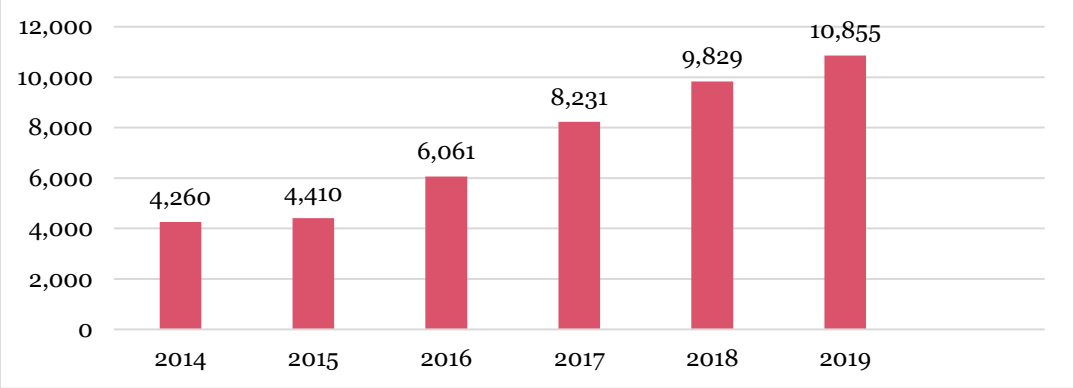
[22] Economic Survey of India, 2019-20

[23] Draft National Electricity Plan, Volume II, Government of India, Ministry of Power, CEA, December 2016

[24] Infrastructure Market Assessment Report, Indian Brand Equity Foundation. 2020.

another 65,000 km by 2022[25] with an asking rate of 46km/day (Assuming calendar year 2022) and all villages are envisioned to be connected via a road network under Pradhan Mantri Gram Yojana by 2020. **Figure 17** shows the length of highways constructed from 2014 to 2019.

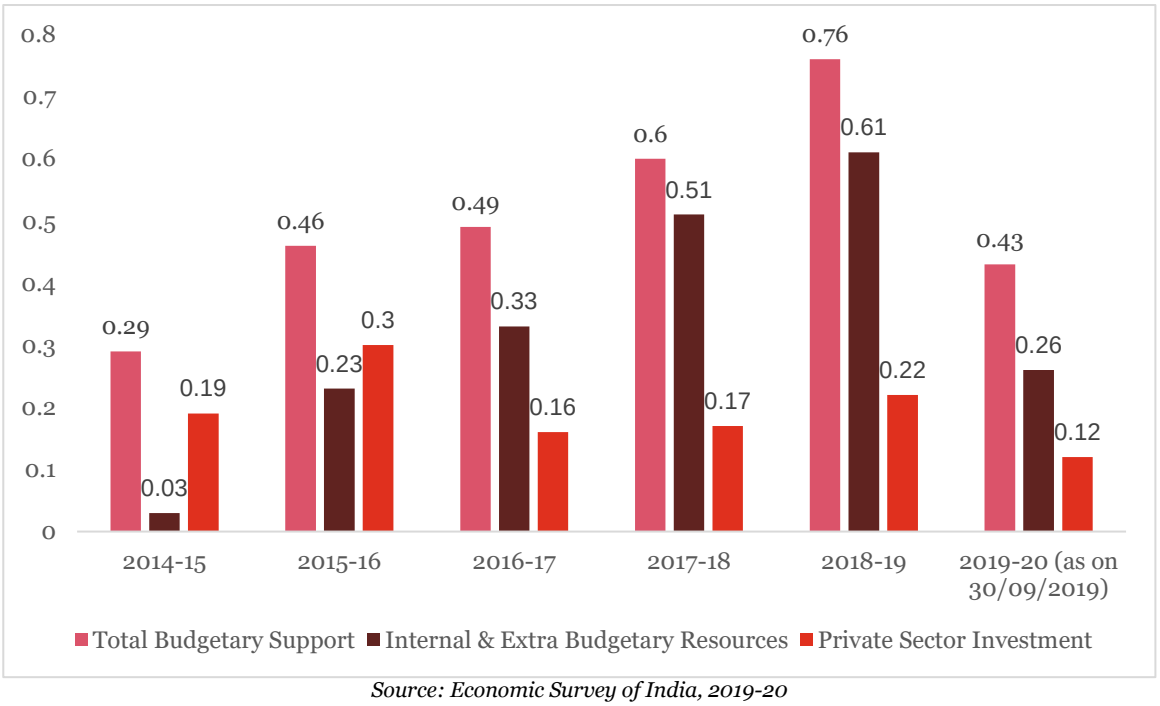
Figure 17: Highway Construction in India in kilometres



Source: Year End Review 2019- Ministry of Road Transport & Highways

Total investment in the Roads and Highway sector has gone up more than three times in five-year period of 2014-15 to 2018- 19, and 257 PPP projects are underway.[26]

Figure 18: Investment in Road Sector (INR lakh crore)



Source: Economic Survey of India, 2019-20

Moreover, funds worth approximately INR 36,700 crore have been allocated to National Highways Authority of India, while an amount of around INR 20,000 crore has been

[25] Bharatmala Pariyojana. Retrieved from https://www.india.gov.in/spotlight/bharatmala-pariyojana-stepping-stone-towards-new-india

[26] www.PPPIndia.gov.in

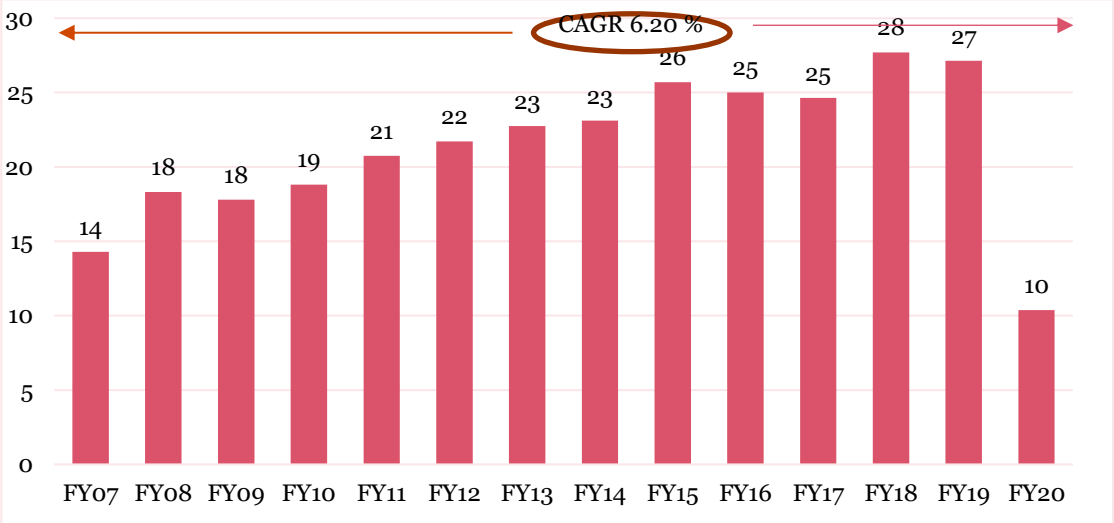
allocated for Pradhan Mantri Gram Sadak Yojana. Lastly, National Highway Programme is also being restructured to increase length and capacity, to form a National Highway Grid, using a financeable model[27].

Railways

Indian Railways with over 68,000 route kms is the third largest network in the world under single management[28]. During the year 2018-19, Indian Railways carried 120 crore tonnes of freight and 840 crore passengers making it the world's largest passenger carrier and 4th largest freight carrier.

Revenue growth has been strong over the years. Indian Railways' registered a rise in revenue at a CAGR of 6.20 % during 2018-19, to touch $27.3 billion in 2019[29]. The Indian Railways received allocation of INR 1.60 lakh crore under Union Budget 2019-20[30]. The Sub-Sector will require investment of Rs 35.3 trillion (US$ 545.26 billion) by 2032 for capacity addition and modernisation.

Figure 19:Railways - Gross revenue trends over the years ($ billion)



The major growth drivers for the Indian railways are;

1. **Rise of demand for urban mass transportation**
   Indian urban population is expected to reach 600 million by 2030.

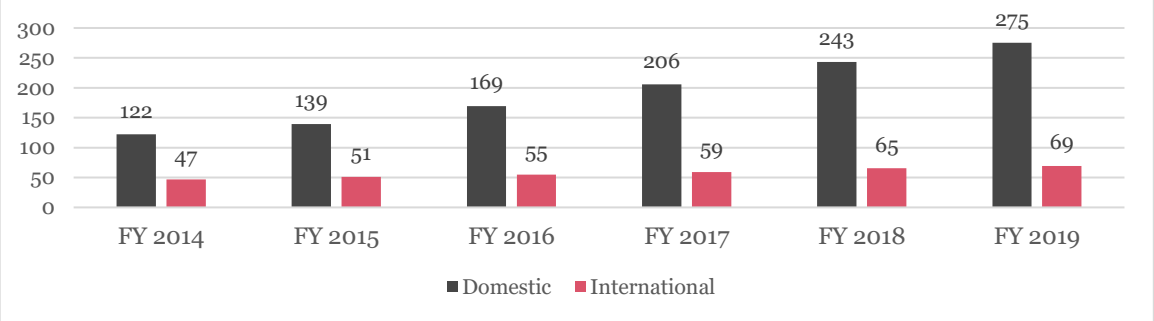
2. **Growth of freight traffic**
   Growing industrialization calls for more freight terminals. As per the report of Project Management institute, the increased investments for freight terminals will lead to increase in the freight traffic at a CAGR of 5.4% till 2022.

[27]Ministry of Road Transport & Highways, 2019. Retrieved from https://pib.gov.in/Pressreleaseshare.aspx?PRID=1577503
[28] Economic Survey of India, 2019-20
[29]Infrastructure Market Assessment Report, Indian Brand Equity Foundation. 2020.
[30] Union Budget 19-20

Civil aviation

India is the third largest domestic market for civil aviation in the world, following US and China. India has 136 commercially managed airports by Airports Authority of India (AAI) and 6 under Public- Private Partnerships (PPP). The number of domestic air passengers in India have increased at a CAGR of 17.6%, from 122.3 million in FY 2014 to 275.22 million in FY 2019. **Figure 20** shows the number of air passengers from FY 2014 to FY 2019.

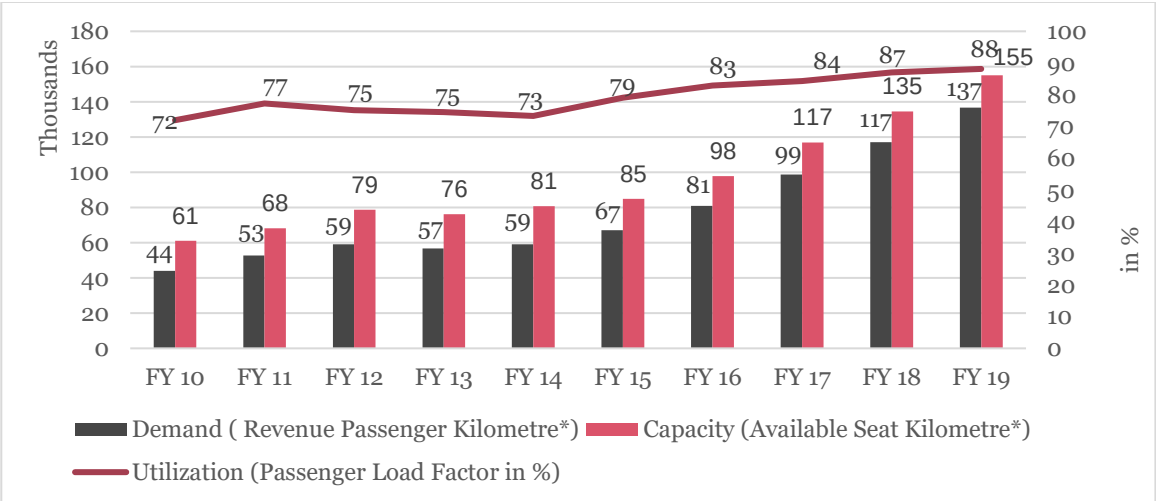
Figure 20: Aviation - Passenger Traffic (in millions)



Source: www.statista.com/passengers-boarded-by-type-by-indian-air-carriers (2020)

India is also the fastest growing domestic aviation market in the world. Both capacity and demand for domestic flights have been growing at a consistent rate since 2010. However, the demand is growing at a higher rate as compared to supply. The increase in demand has thus resulted in higher overall utilization (passenger load factor) which is the highest among the top 7 aviation markets in the world. **Figure 21** shows the demand, capacity and utilization of Indian domestic fights. To ease the strain on existing airport capacities, 100 more airports are to be made operational by FY 2023-24.

Figure 21: Aviation Sector- Domestic Demand, Capacity and Utilization (thousands)



Source: Directorate General of Civil Aviation (2020)

Ports and Water Services

India's major ports currently have an installed capacity of 1,514.09 MTPA (million tons per annum) and handled traffic of 699.09 MT during 2018-19. The sub-sector has in recent years received a boost in efficiency, as a result of efforts by the government. The Average turnaround time in 2018-19 improved to 59.51 Hrs. as against 64.43 Hrs. in 2017-18. The Average Output Per Ship Berthday increased from 15,333 Tonnes in 2017-18 to 16541 Tonnes in 2018-19.

India's water services sector, along with power and housing, plays a crucial role in determining India's success with respect to the Sustainable Development Goals (SDGs). Currently, 20% of the population lacks clean drinking water and 40% lacks basic sanitation[31].

In an effort to ensure water security in India, Government of India has launched the Jal Jeevan Mission. It has been allotted a funding of INR 11,500 crore in 2019-20, up from INR 10,000 crore in 2018-19[32]. The mission includes the Nal se Jal scheme. the Namame Gange Mission, River Interlinking, and Pradhan Mantri Krishi Sanchai Yojana. Bank of America Merrill Lynch estimates that India needs to pump in $270 billion (about ₹18.5 trillion) over the next 5-15 years to meet its ambitions of piped water supply to all homes by 2024, cleaning the Ganga, interlinking rivers to redirect water to water-scarce regions and irrigation projects.

Growth Drivers

1. Strong trade growth – Trade through ports would be propelled by the growth in sectors such as petroleum refineries, textiles and garments, consumer electronics, iron-ore and automobiles.
2. Untapped inland water ways – Cost of transporting goods using roads cost INR 2-3 per ton whereas through waterways it would cost only INR 0.2-0.3 per ton. Among the total logistics cost, transportation cost accounts for 55% expense.

Infrastructure contribution to India's service sector

The **Table 2**[33] illustrates the percentage share of various sectors under the services sector in the gross value added to India. The share of construction stood at 8% in 2015 but reduced in 2016. In 2019, the services sector contributed to 55% of the GVA from 52.9% in 2016.

Table 2: Share and Growth of India's Services Sector (GVA at basic prices)

	Share (Per Cent)		Growth (Per Cent)	
	2015-16	**2015-16**	**2016-17**	**2017-18**
Total Services	52.9	9.7	7.7	8.3
Trade, repair, hotels and restaurants	11.4	11.2	7.8	8.7
Trade & repair services	10.4	10.9	--	--
Hotels & restaurants	1	14.4	--	--

[31] Ministry of Economic Affairs, 2019.
[32] Union Budget 2019-20.
[33] Chapter 9, The Hindu, service sector budget analysis.

Transport, storage, communication & services related to broadcasting	7	9.3	--	--
Railways	**0.8**	7	**--**	**--**
Road transport	**3.2**	**6.7**	**--**	**-**
Air transport	**0.2**	**16.8**	**--**	**--**
Financial services	5.8	6.8	5.7	7.3
Real estate, ownership of dwelling & professional services	**15.3**	**12.5**	**--**	**--**
Public Administration and defence & Others	13.4	6.9	11.3	9.4
Construction	**8.1**	**5**	**1.7**	**3.6**
Total Services (including Construction)	*61*	*9.1*	*6.9*	*7.7*
TOTAL GVA at basic prices	*100*	*7.9*	*6.6*	*6.1*
GDP Market Prices (Constant Prices) Y-o-Y	*8*	*7.1*	*6.5*	

FDI Equity inflows

Construction development and related infrastructure activites attracts 9% of total FDI Equity inflows[34]. Owing to the growth prospects of the Indian economy, the inflow would continue to increase and will be a major contributor to India's GDP.

Table 3: FDI inflows to India in construction sector till 2020

Sector	2017-18	2018-19	2019-20	Cumulative inflows	% age to total inflows (In terms of US$)
SERVICES SECTOR **	43,249	63,909	55,429	471,730	17%
Construction Development: Townships, housing, built-up infrastructure and construction-development projects	3,472	1,503	4,350	129,964	5%
Construction (Infrastructure) Activities	17,571	15,927	14,510	108,383	4%

***Services sector includes Financial, Banking, Insurance, Non-Financial / Business, Outsourcing, R&D, Courier, Tech. Testing and Analysis*

Cumulative FDI equity inflows (from April 2000 to March 2020)

India aims to achieve an aspirational target of USD 200 billion for engineering exports by 2025, more than two-fold from actual exports during 2019-20.

Construction and Engineering Services' contribution towards India's exports is quite significant. As shown in **Figure 22**, exports of construction services from India have increased two times from FY12 to FY18 from USD 1004 million to USD 2256 million. Many

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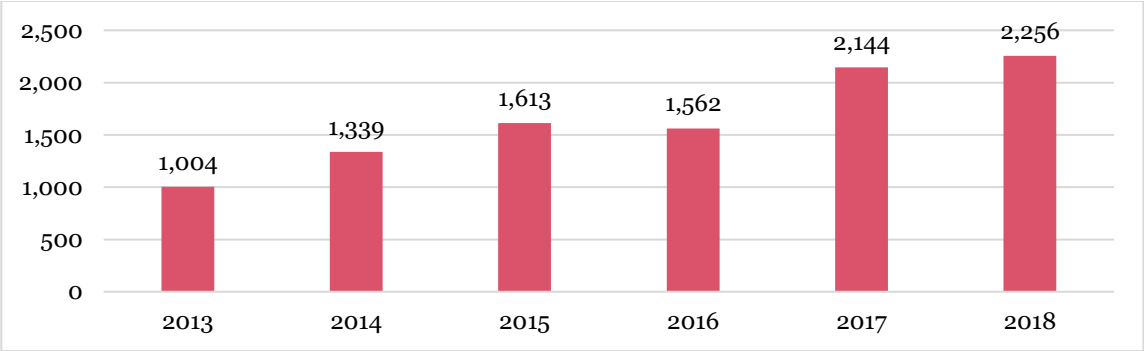
Indian construction companies such as L&T, Engineers India, Gammon India, etc.,[35] have established a strong presence around the world and are significantly contributing towards the balance of payments and receipts.

Figure 22: Construction & Engineering Services exports from India (USD million)



Source: Reserve Bank of India 2019.

The correlation between infrastructure investment and economic growth for India is very high; correlation of investments in inland, road, rail and airport infrastructure to GDP are higher than 0.90[36].

In the current scenario, India ranks 70th on the Infrastructure pillar as per the World Economic Forum's Global Competitiveness Report, significantly behind China which ranks 36th; within infrastructure India fares worse in Utility Infrastructure ranked at 103rd versus Transport Infrastructure where it ranks 28th. In utilities significant strides need to be made to improve electricity and water supply to make India a truly competitive investment destination.

Table 4: Infrastructure ranking of India versus China in Global Competitiveness Report 2019

Infrastructure Ranking in Global Competitiveness Report 2019	India	China
Road connectivity	72	10
Quality of road infrastructure	48	45
Railroad density	39	61
Efficiency of train services	30	24
Airport connectivity	4	2
Efficiency of transport services	59	66
Liner shipping connectivity	25	1
Efficiency of seaport services	49	52
Electricity access	105	2
Electricity supply quality	108	18
Exposure to unsafe drinking water	106	74
Reliability of water supply	96	68

[35] www.indiaservices.in/construction

[36] Economic survey 2019

India jumped to 63rd position for ease of doing business in 2020. On comparison to India's peer nations such as China, Brazil and Indonesia, the time taken to register property and enforcement of contracts take way more time and effort than other nations. This is hindering the infrastructure development of the nation. Policy changes and digitzation could enable and improve the registration and contract enforcement period.

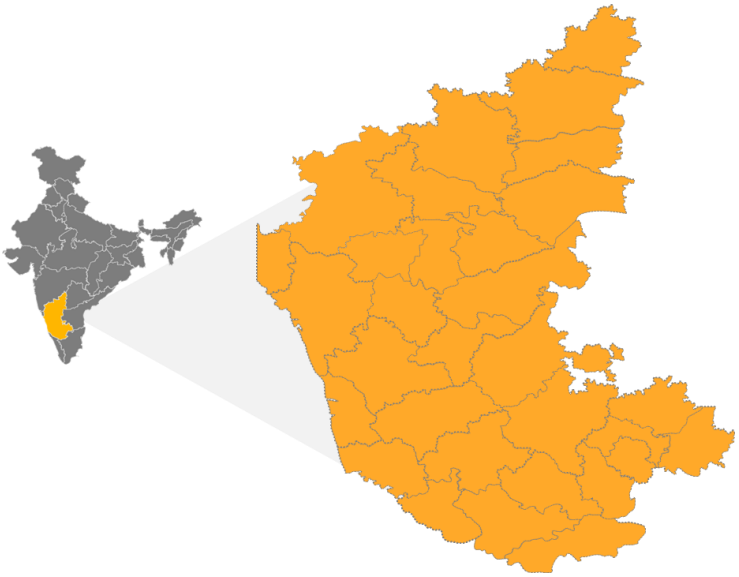
Table 5: Ease of doing business comparison of India with peer nations

	India	China	Brazil	Indonesia
Starting a Business				
Number of Procedures	10	4	11	11
Time – No. of days	17/18*	9	17	13
Cost (% of income per capita)	5.3/9.3*	1.1	4.2	5.7
Registering your Property				
Number of Procedures	**9**	4	14	6
Time – No. of days	**49/68***	9	31	31
Cost (% of property value)	**8.1/7.4***	4.6	3.6	8.3
Paying Taxes				
Number of Payments	10/12*	7	10	26
Time – hours per year	250/254*	138	1,501	191
Total tax payable (% of gross profits)	49.7#	59.2	65.1	30.1
Enforcing Contracts				
Time – No. of days	**1,445**	496	801	403
Cost (% of debt)	**31**	16.2	22	70.3
Overall Doing Business Rank	63	31	124	73

Source: World Bank Doing Business Report, 2020

**: Denotes values for Delhi/ Mumbai as these are the two centres covered by World Bank for India.*
#: Before India reduced its Corporate tax rate from 30 to 25 per cent.

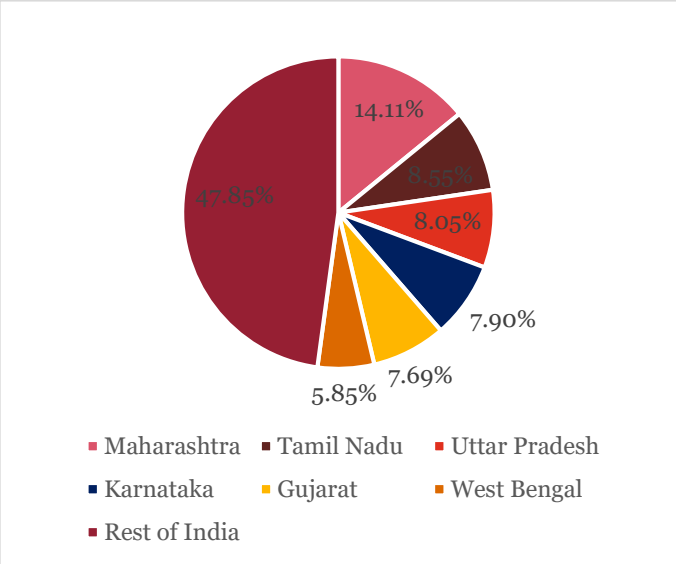
The State of Karnataka is home to many large-scale industries across major sectors including automobile, agricultural products, aerospace, biotech, pharmaceuticals and retail.



Karnataka has always been a major exporter of commodities like coffee, spices, silk, cashew nuts, handicrafts and agarbathies historically. In the last two decades, the State has witnessed a gradual shift from the above traditional commodities and today, Karnataka is one of the major player in the export of electronic and computer software, engineering goods, readymade garments, petrochemicals, gems and jewellery, agro and food processing products, chemicals, minerals and ores, marine products, etc.

Karnataka has carved out a niche for itself in the global marketplace as the knowledge and technology capital of the Country. The State has made rapid and spectacular strides in the new economy. Information technology, biotechnology and research and development institutions have enhanced Karnataka's achievements at national and global levels. Karnataka accounts for more than one third of electronics and computer software exports from the country.

Figure 23: State wise GDP distribution[37]



Karnataka holds 7.9% of India's overall GDP and is 4th among the top contributors of India's GDP. Six Indian states contribute more than 50% to India's GDP.

Karnataka ranks 8th in "Ease of Business" among the Indian states as per RBI data on Mar 2019.

The industry sector (comprising mining & quarrying, manufacturing, construction and electricity, gas & water supply) is expected to grow by 4.8% in 2019-20 against a growth of

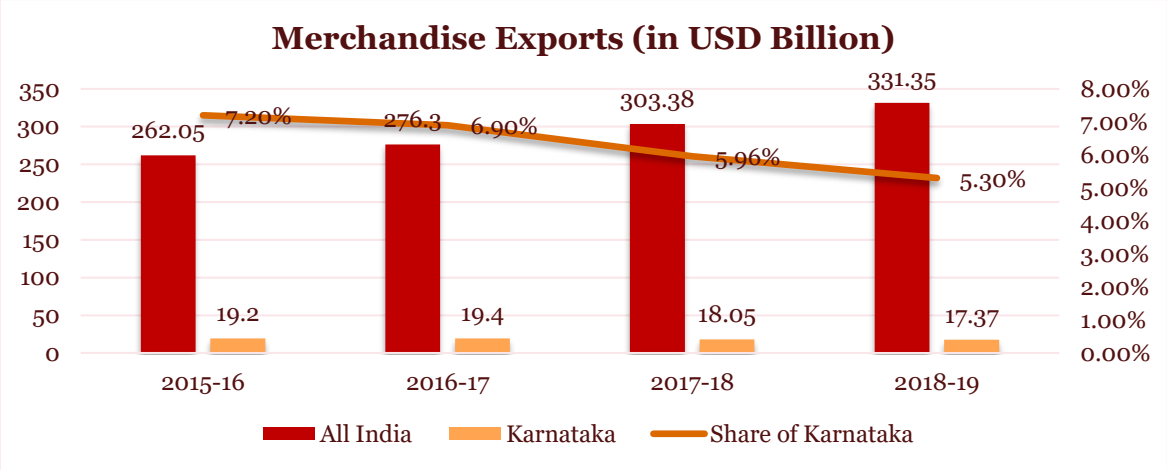
[37] Ministry of statistics and programme implementation, 2020

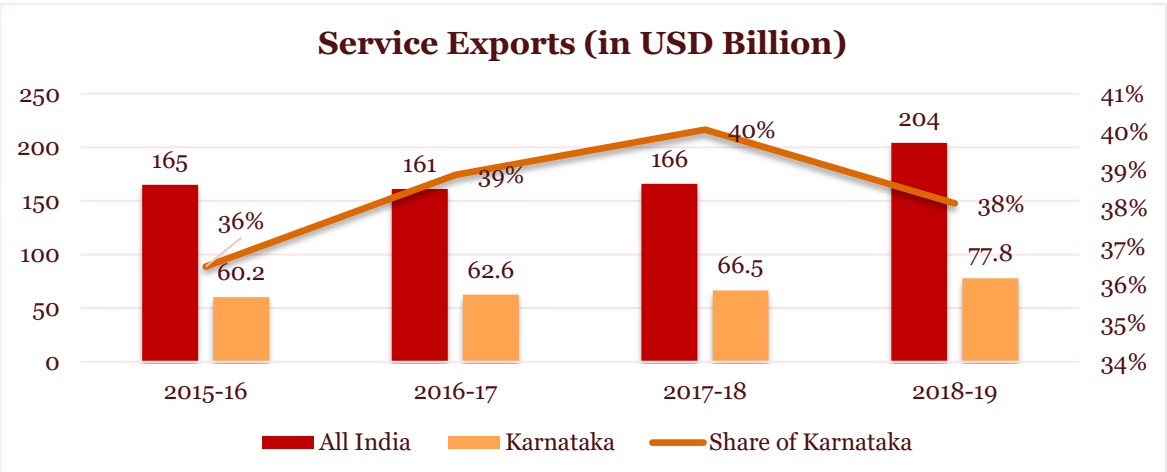
5.6 % during 2018-19. Services sector is expected to grow by 7.9% during 2019-20 compared to growth of 9.8% during 2018-19. Services sector is a major contributor of overall GSDP of the state as the share of private corporate sector to this sector is significantly higher compared to other sectors. In 2019-20, other services sector (Education, Health and other remaining services) with 11.2%, Real Estate, Professional Services & Ownership of Dwellings with 8.6%, Public Administration with 8.0%, Trade and Repair Services with 6.5% growth are the major contributors of services sector to achieve the overall economic growth rate of the State.

Export is considered an engine of economic growth in the wake of liberalization and structural reforms in the economy. A sustained growth in exports is dependent on adequate and reliable infrastructure.

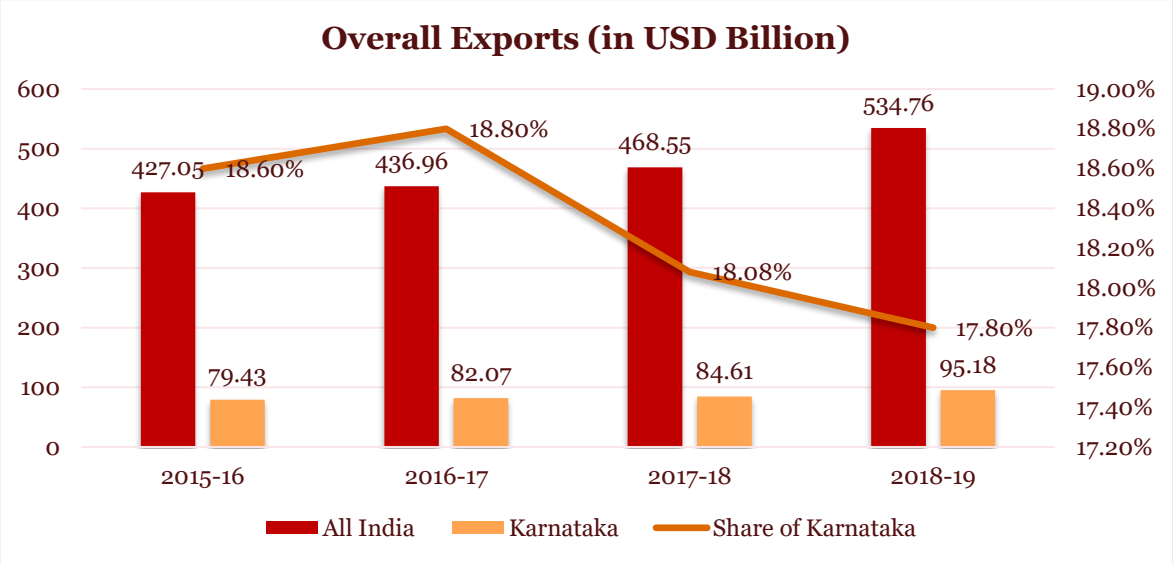
Proper infrastructure will ensure reduction in the transaction cost of exports, thereby making exports internationally competitive. The transaction costs in India are much higher at 14%[38] as compared to global standards at 8%-10% and a part of the reason is attributed to bottlenecks in infrastructure for exports.

Figure 24: Export Performance of Karnataka (2015-2019)





[38] https://economictimes.indiatimes.com/industry/transportation/shipping-/-transport/index-to-measure-logistics-costs-of-key-export-sectors-on-the-cards/articleshow/71486010.cms?from=mdr



Source: Economic Survey of Karnataka (2019-20), DGCIS, Kolkata, RBI, - NASSCOM & ESC

In the year 2019-20, Karnataka emerged as one of the top 4 States in India along with Tamil Nadu, Maharashtra and Gujarat in merchandise exports, amounting to about USD 12.97 Bn during the period in April to December, 2019-20 as set out in **Table 6**. During the same period, Karnataka's growth in merchanidize exports rose by 2.92% as compared to April to December, 2018-19[39].

The key reasons for industrial development were the State's proactive approach, reasonably well-connected infrastructure and proximity to various consumption centres in the southern region.

Table 6: Summary of Merchandize exports for the period April to December 2019-20 as compared to April to December of 2018-19 (Value in US Bn $)

State	2018-19 (Apr-Dec)	2019-20 (Apr-Dec)	% growth	Sectors with positive growth
All India	244.08	239.00	-2.08%	Ore & Minerals
Karnataka	**12.60**	**12.97**	**2.92%**	**Engineering**
Tamil Nadu	22.42	22.88	2.00%	Engineering, Automobile
Maharashtra	53.96	49.94	-7.45%	Chemicals & Allied Products
Gujarat	48.29	50.56	4.70%	Gems & Jewellery
Andhra Pradesh	9.43	10.69	13.30%	Pharma, Spices, Marine
Telangana	5.26	5.52	4.79%	Pharma
Uttar Pradesh	11.96	12.82	7.2%	Mobile phones and Apparels including Carpets

Source-DGCIS. Kolkata

[39] In 2018-19, Karnataka's overall Merchandise exports value was USD 17.37 billion

Karnataka's Ecosystem Advantage – Talent, Innovation Culture and Infrastructure

As India made rapid strides in the technological services sector, Bengaluru has emerged as the technological capital of India. Bengaluru has emerged as the growth frontier for India offering a new growth paradigm to the country's key sectors such as information technology, biotechnology, pharmaceuticals, manufacturing and services. Bengaluru has transformed itself into India's "Silicon Valley" from a "Pensioner's paradise" and has become the hub of research and innovation. As per a recent Innovation Report by Niti Aayog, Karnataka has been ranked as the 'most innovative State' in the country.

Talent and Labour Force

Bengaluru was ranked first on the 'Best place to live and work' by Mercer. The labour force participation rate for persons aged 15 years and above according to Economic Survey of Karnataka 2019-20, is 56.2% with 77.5% in urban locations being part of the labour force. More than 100,000 skilled engineers and Ph. D holders graduate in Karnataka in every year[40].

Table 7: Labour Force Participation Rate for Persons Aged 15 Years and above (in Percentage)

State	Rural			Urban			Urban & Rural		
	Male	Female	Person	Male	Female	Person	Male	Female	Person
Andhra Pradesh	82.4	59	70.9	67.9	22.2	44.9	78.5	48.8	63.8
Gujarat	79.1	25.4	53.3	71.5	10.3	42.1	76.4	20	49.3
Karnataka	79.3	38.1	59.3	74.3	26.5	50.8	77.5	33.9	56.2
Kerala	72.6	31.9	51.2	70.5	30.9	49.6	71.7	31.4	50.5
Maharashtra	76.5	46.9	61.9	64.4	12.9	39.8	71.5	33.4	53
Tamil Nadu	81.2	55.2	68.2	69.1	25	46.8	75.8	41.5	58.5
Telangana	72.3	53.7	63	70.2	26.7	49.1	71.5	44.5	58.1
All India	78	31.7	55.8	69.1	16.6	43.7	75.5	27.4	52.4

Table 8: Gender Distribution across Levels of Education in India and major Southern States (2017-18)

	Ph. D		Postgraduate		Undergraduate		Diploma	
	M	F	M	F	M	F	M	F
Andhra Pradesh	4007 (63.71)	2282 (36.29)	120479 (54.94)	98817 (45.06)	711831 (55.17)	578322 (44.86)	100939 (60.37)	66275 (39.63)
Karnataka	9103 (64.15)	5087 (35.85)	96827 (46.27)	112435 (53.73)	733767 (48.82)	769158 (51.18)	122296 (61.13)	77766 (38.87)
Kerala	2256 (38.17)	3655 (61.83)	39873 (33.23)	80106 (66.77)	397008 (45.31)	479224 (54.69)	36299 (54.02)	30897 (45.98)
Tamil Nadu	16267 (54.63)	13511 (45.37)	175012 (39.88)	263874 (60.12)	1189690 (47.74)	1302087 (52.26)	321101 (82.82)	66605 (17.18)
Telangana	3252 (66.58)	1632 (33.42)	91044 (46.74)	103754 (53.26)	555992 (51.51)	523346 (48.49)	78198 (61.09)	49810 (38.91)
All India	92570 (57.35)	688424 (2.65)	1891071 (45.96)	2223239 (54.04)	15052304 (51.88)	13964046 (48.12)	1838217 (67.88)	869717 (32.12)

[40] Economic Survey of Karnataka, 2019-20

Innovation Culture

Benguluru was ranked second on the Global startup Ecosystem Growth Index by Compass. The culture of innovation and growth is visible from the budding startups and the companies in the growth stage. Karnataka have seen growth in technology (and related sectors), with the state now home to over 3,500 tech companies. Additionally, Karnataka was the first state to roll out a full fledged multi sector startup policy in the country. The policy aims to set up 20,000 technology startups in the state by 2020. Technology Business incubators are set up in collaborations with strong R&D focus to tap innovations and technologies.

Infrastructural improvements driving sectoral growth

Karnataka is the largest software exporter in India Exports of electronics and computer software and other services sector constitute the largest share in the State's exports. Its share was of the order of 39% in 2017-18. More than 80% of fortune 500 companies have their outsourcing operations in Karnataka.

Key Sectors Powering Karnataka

IT/ITES

- Karnataka is the largest software exporter in India
- Expected to be the largest IT cluster globally by end of 2020, employing around 2 million people
- 80% (400) of Fortune 500 companies have their outsourcing operations in Karnataka
- Aims to set up 20,000 technology start-ups by 2020
- 30% of India's start-ups are from Bengaluru

Biotechnology

- Bengaluru is India's top biotech hub, with a revenue of USD 1.18 bn (2013-14)
- The Bengaluru Bio Innovation Centre has 25 fully furnished labs to promote innovation-driven R&D start-ups
- Hosts more than 60% of the country's total biotechnology units
- Karnataka accounts for one-third of the country's biotech exports
- Karnataka has the highest biotech R&D expenditure in south India (third in the country)

Aerospace & Defence

- State produces a quarter of India's aircraft and spacecraft
- Accounts for 65% of the country's aerospace exports
- Belgaum is India's first operational aerospace SEZ
- Home to the Indian Space Research Organization (ISRO)

Automobile & components

- Home to 7 major OEMs and 50+ auto component manufacturers
- 4th largest automobile manufacturing state in India
- Accounts for 8.5% of the national automobile production
- More than 14 million registered vehicles in the state

Heavy Engineering & Machine tools

- Country's second largest producer of special purpose machinery and heavy electrical machinery
- Leading state in the machine tools industry; Bengaluru alone produces 60% (in terms of value) of the machine tools in the country

In addition, the state was ranked seven (down by 3 positions since 2017) among 22 states on Logistics Ease Across Different States (LEADS) Index in 2019, based on parameters such as infrastructure, services, timelines, track and trace, competitiveness of pricing and safety of cargo.

Table 9: LEADS Index ranking of Karnataka on various parameters

Key Parameter	Coverage	Score	Position
Availability of logistics Infrastructure	• Road network • Rail network Ports, airports, dry ports • Warehouses/cold storages	3.51	7
Quality of logistics infrastructure	• Road network • Rail network • Ports, airports, dry ports Warehouses/cold storages	3.44	7
Quality of logistics services provided by service providers	• Haulage by different modes • Handling and storage of cargo Freight forwarding • Customs broking	3.49	6
Ease of arranging logistics at competitive rates	Shipment prices include those for transportation, handling, storage, value added services	3.29	4
Timeliness of cargo delivery	• Unscheduled stoppages during transit • Average detention at borders • Documentary compliance check	3.42	7
Ease of track and trace	Real time information availability when cargo is in transit, in storage, awaiting regulatory approval, etc.	3.51	2
Safety/Security of cargo movement	Loss/ damage of cargo: • During transit • Handling at terminals • During inspection	3.50	3
State facilitation and coordination	• Law and order • City restrictions • Trade and transporter union • Labour laws	2.98	8
Efficiency of regulatory processes	• Customs • PGAs • GST • RTOs / Traffic Police	3.15	7

Investments in infrastructure are at the core of developing a strong logistics ecosystem, which in turn facilitates trade. The importance of logistics infrastructure is further validated by the fact that there is a strong dependency of economic development on investment in

transportation and logistics infrastructure. Karnataka may have to develop the logistics infrastructure to drive the economic growth.

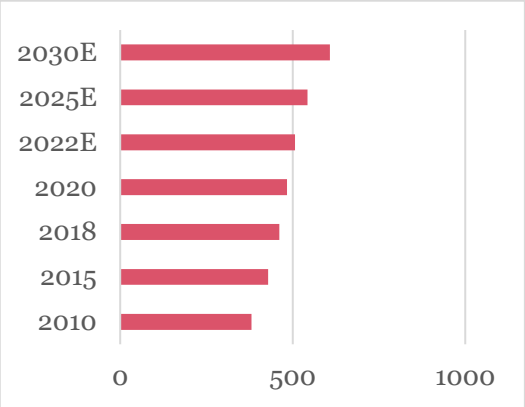
Growth Drivers for the sector in India

Given the fundamental need for the sector by all and Government's increased focus towards providing "Housing for All", existing Demand Supply Gap and affordable housing would further accentuate the signfiicance of the Real Estate sector in India

1. ***Rapid Urbanisation – Need of smart cities and Urban growth centres***

The urban population is anticipated to reach 600 million by 2030[41] (**Figure 25**). The concentration of population would lead to land and house scarcities and crowded transit, alongside the elementary facilites such as water, power and house rental market.

Figure 25: Urban Population in India (In Millions)



PMAY Status Analysis	
Houses to be built under the scheme by 2022	2 Crore
Houses Completed till June, 2020	34.23 Lakhs
Remaining houses to be built by 2022	1.6 Crore

It is estimated that the real GDP of Indian megacities will, on average, double by 2030. While these urban growth centres offer immense potential for investment growth and employment, their rapid growth also poses infrastructure challenges which will need to be resolved through proactive policy action. Further, successful implementation of the Smart Cities Mission will also enable the growth of other urban growth centres in India easing the pressure on existing megacities.

2. ***Shortage of Affordable houses***

The Ministry of Housing projected a shortage of 19 million houses with almost 99% of the shortage coming from economically weaker sections and lower income groups.

3. ***Growth of disposable income among lower strata***

Adding to the upsurge in the urban residents, there is an enlargement of the middle class which would eventually lead to increased demand for housing with basic and better facilities.

[41] United Nations Urban Population by country, 1950-2050

4. ***Access to Credit***

Government Subsidy Schemes:

a. Credit Linked Subsidy Scheme (CLSS)
   The schemes such as credit linked subsidy schemes ensure availability of credit for low cost housing buyers.
b. Affordable Housing in Partnership (AHP)
c. Beneficiary led construction or enhancement (BLC)

5. ***Growth of Co-working spaces***

a. **Growing startup eco system**
   India is currently holding the 3rd position after US and China on the number of startups registered. As 72% of the startup owners are under 35 years of age, they prefer cost effective coworking space which provides a better opportunity for their business ventures.

b. **Cost benefit compared to conventional offices**
   - 5-15% standard saving per seat compared to standard lease
   - 50% reduction in coworking cost per seat compared to conventional leasing agreement
   - 15-25% savings on real estate and office maintenance cost.

c. **Focus from government**
   Government support for coworking space is evident from the introduction of first government owned coworking space for startups in Mangaluru, with a sustainable revenue model for the facility designed to accommodate 100 people.

6. ***Gaining momentum for warehousing and retail realty***

a. **GST**
   The uniform tax regime ushered in by the introduction of GST is leading to consolidation in larger warehouses to help attain benefits from economies of scale.
b. **Growth of Organised Retail**
   Growth in various sectors can augment the need of warehouses, thereby driving growth. For example, high growth in the e-commerce segment would be accompanied by an increase in the regional fulfillment centre.

7. ***Growing working age population***

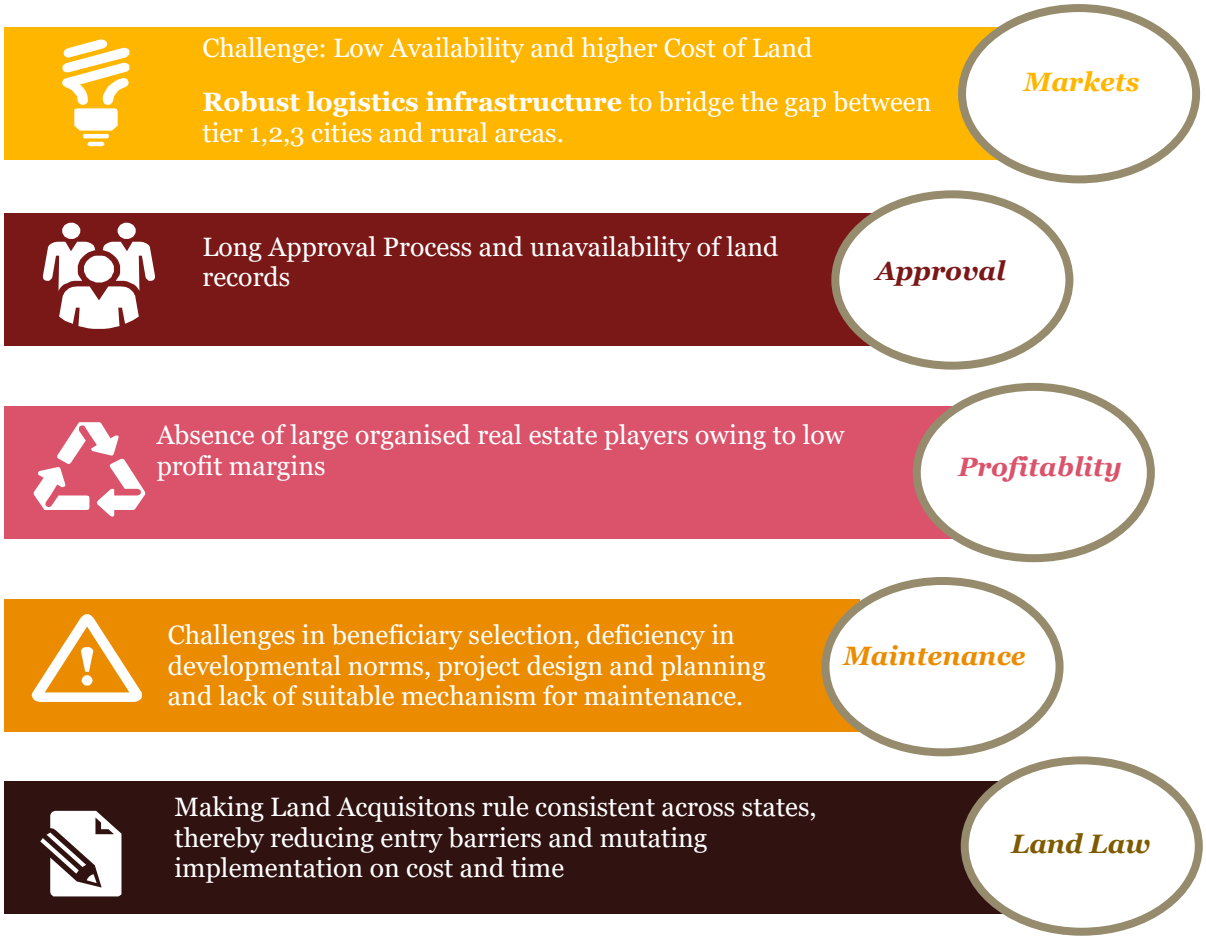
It is expected that the working age population will grow ~1.2x times during 2015-2030 and will reach 1.03 billion (~68%) by 2030. India will have a median age of 31 years versus 43 years for China and 40 years for the US.

8. ***Need for digital infrastructure***

As household consumption accounts for 60% of India's GDP, the varying consumption pattern and the increasing significance of E-commerce underlines the need for establishing digital infrastructure. The digital infrastructure is closely related to the telecommunication infrastructure.

The number of internet users surpassed 690 million in India, though impressive improvement from previous years, still over 50% of India's population remains to be digitally connected.

Critical Success Factors:



3. Sector specific Analysis of Karnataka

3 Sector specific Analysis of Karnataka

As per the Economic Survey of Karnataka (2019-20), the Gross State Domestic Product (GSDP) of Karnataka for the year 2019- 20 highlights that at constant (2011-12) prices the GSDP is to attain a level of INR 12,01,031 crores at a growth of 6.8%.

The key sectors such as of Agriculture, Industry and Services have grown at a sectoral growth rate of 3.9%, 4.8% and 7.9% respectively[42].

The GSVA growth rate of agriculture sector has increased to 3.9% in 2019-20 compared to (-)1.6% in 2018-19. The growth in the industry sector on the other hand has declined at 4.8% in 2019-20 against a growth of 5.6 % during 2018-19. In addition to the above two sectors, Service sector also has declined at 7.9% during 2019-20 compared to growth of 9.8% during 2018-19.

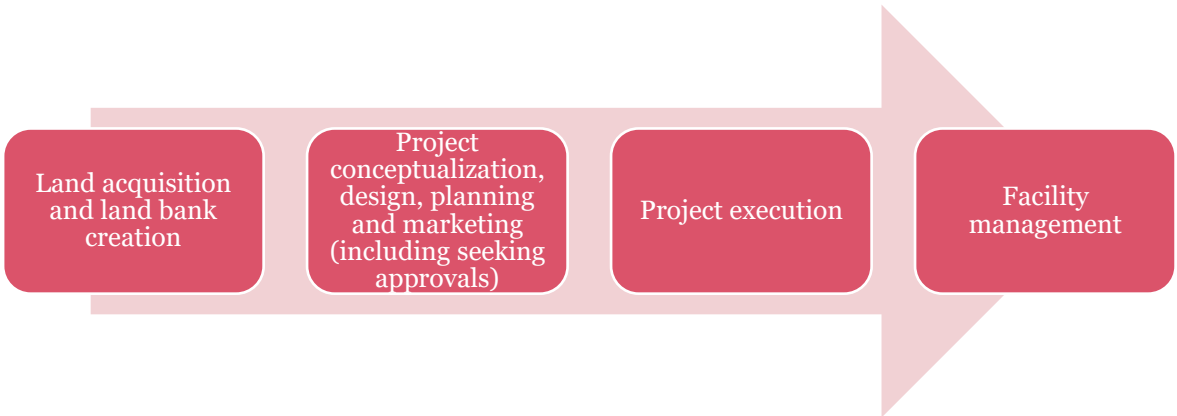
Karnataka government has been a torch bearer for undertaking infrastructure inititiatives among the states in India. The initiatives ensured to provide excellent road, rail, air and port connectivity. To cater to the growing economy, the state government has embarked on several ways to facilitate the power production/ supply.

The construction sector provides wide opportunities for Karnataka state to strengthen the overall economic system and drive the growth. The assessment of the state's strengths and bottlenecks in the sector will be measured on evaluating the sub sector's performance in each process in the construction value chain.

Real Estate

The value chain within the real estate segment can be represented is show as in **Figure 26**.

Figure 26: Value chain within the real estate segment



Residential real estate

[42] Economic Survey of Karnataka 2019-20

Karnataka faces one of the highest rates of urbanization- as a result the demand for housing in cities has grown tremendously. The State government has been proactive in its housing policies and guidelines in order to meet the growing demand. Housing for the poor and downtrodden assumes greater importance both in rural and urban areas in the State.

The snapshot of Karnataka's progress in executing housing projects and providing affordable housing is provided below. The projects are evaluated to understand whether there are any time or cost overruns during project execution.

Table 10: Housing data analysis for Karnataka upto 2019

Scheme Name	Statistics[43] (Rs. In Crores)				Time / Cost overrun
Rural Ashraya/ Basava Vasathi Yojane (Rural Scheme)	Year	Target Houses	Completed Houses	Expenditure	Majorly time overrun
	2016-17	145000	123535	1561.58	
	2017-18	170000	127971	1821.5	
	2018-19	160000	147125	1954.1	
	2019-20 (upto Nov)	50000	52702	491.37	
DR.B.R. Ambedkar Nivasa Yojana (Rural Scheme)	Year	Target Houses	Completed Houses	Expenditure	Initially there were cost overruns but now its is predominantly time overrun
	2016-17	48000	12813	564.69	
	2017-18	90000	95660	1549.56	
	2018-19	102000	58883	1018.25	
	2019-20 (upto Nov)	35000	21763	245.56	
Indira Awas Yojana/ Pradhna Mantri Awas Yojane (Rural Scheme)	Year	Target Houses	Completed Houses	Expenditure	Time overrun
	2016-17	115000	96030	1175.08	
	2017-18	85000	64690	888.64	
	2018-19	44000	56136	669.1	
	2019-20 (upto Nov)	42000	12935	138.87	
Devraj Urs Housing Scheme (Rural Scheme)	Year	Target Houses	Completed Houses	Expenditure	Time overrun
	2016-17	14448	14183	223.25	
	2017-18	15000	15634	171.61	
	2018-19	12000	6783	90.56	
	2019-20 (upto Nov)	3500	2284	33.15	

The data reveals that all the schemes have overrun the time allotted to complete. Similar is the case of urban schemes.

Smart City Mission

[43] Economic Survey of Karnataka, 2019-20

In Karnataka, seven cities have been identified as 'smart cities' under this mission including Belagavi, Hubballi-Dharwad, Mangaluru, Shivamogga, Davanagere, Tumakuru and most recently, Bengaluru. The following Tables[44] showcase projects in various stages of undertaking in these cities. The smart mission covered 100 cities with a project duration of 5 years. The data provided shows that the projects are outrunning in time. The seven smart cities of Karnataka have taken up 559 projects (SCM funded and PPP), out of which 141 projects are completed. 335 projects of INR 5760 crore are ongoing, 45 projects of INR 1575 crore are in tendering stage and DPR for remaining 38 projects of INR 974 crore are under finalization.

Table 11: Projects in Karnataka under Smart City Mission with a cost of less than INR 100 crore

CITY	CUMULATED PROJECT COST (IN INR CRORES)	NO. OF PROJECTS	PROJECT TYPE
Bengaluru	886	33	Smart roads, Market upgradation, integrated mobility solutions, parks and open spaces, medical equipments to hospital
Belagavi	928	109	Smart roads, Smart schools, UG-LT cabling, park development, Lake development, NMT zone development, Heritage park development, MUFs
Hubballi-Dharwad	877	59	Smart roads, smart schools, hospital development, BSUP, Renovation of core market, lake development, park development, bus terminals
Mangaluru	747	43	Smart roads, Smart schools, UGD, Water supply, parks, open spaces
Shivamogga	802	51	Smart roads, Smart schools, UGD, last mile connectivity, heritage walk, park development, stadium development
Davanagere	757	94	Smart roads, Smart schools, SWD, Barrage construction, junction improvement, Trauma care centre
Tumakuru	1081	157	Smart roads, Smart schools, Library development, Smart lounge, park and ring road development, water supply augmentation projects, lake development, heritage buildings renovation

[44] CBRE Research, Powerhouse Karnataka. KUIFDC

Table 12: Projects in Karnataka under Smart City Mission with a cost of more than INR 100 crore

CITY	CUMULATED PROJECT COST (IN INR CRORES)	NO. OF PROJECTS	PROJECT TYPE
Bengaluru	1000	2	Command and control centre, replacement of streetlight with LED
Belagavi	145	1	Multi untility facility centre
Hubballi - Dharwad	190	1	Development of sports complex, facility centre
Mangaluru	823	4	Waterfront development, central market, integrated transport hub, support to 24x7 water supply
Shivamogga	243	2	Riverfront development, canal top solar
Davanagere	120	1	Redevelopment of KSRTC bus stand
Tumakuru	100	1	Integrated bus terminal development

Infrastructure

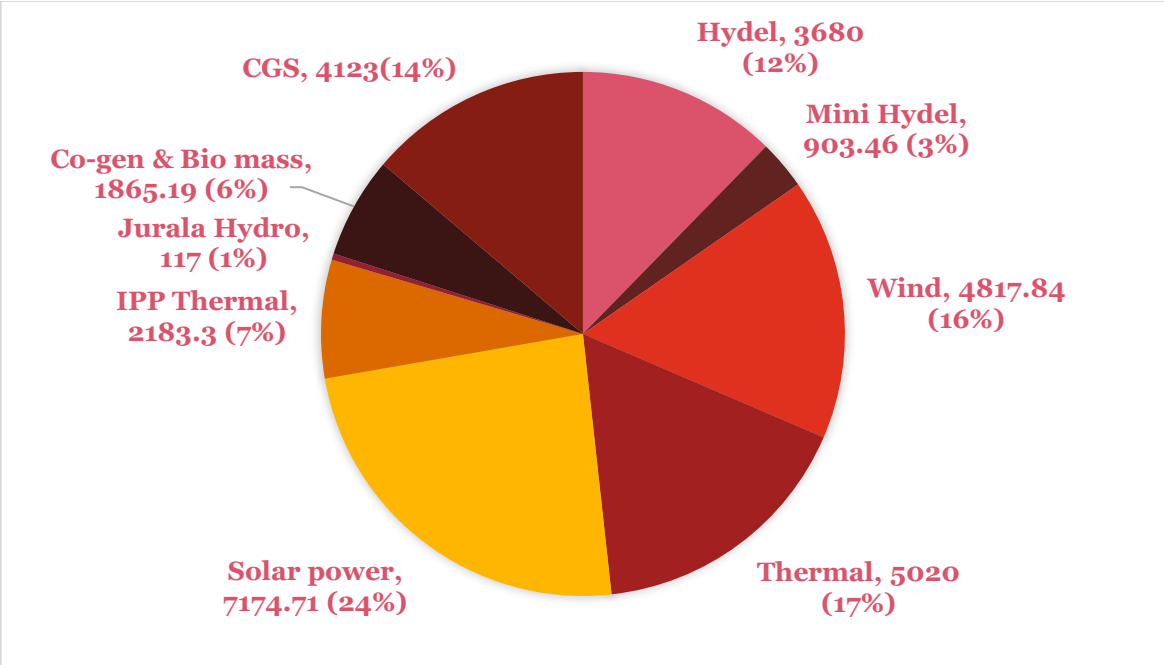
The value chain within the Infrastructure segment can be represented as shown in **Figure 27.**

Figure 27: Value chain within the infrastructure segment

Power

Karnataka State has been experiencing conditions of power shortage because of the ever-growing demand for power influenced by the rapid economic progress. The total installed generation capacity both in the public sector and private sector including the State's share in the Central Generation Station (CGS) up to Nov-2019 is 29884.50MW[45]

Figure 28: Installed capacity of power generation in 2019-20 (Upto Nov-2019)



Towards meeting shortages in electricity supply, Karnataka buys power from neighbouring states, other states and from energy exchanges. The figures below show the trends in estimated gaps in demand and supply for power and energy respectively.

[45] Economic Survey of Karnataka, 2019-20

Figure 29: Gap in Demand for Energy & Supply (in Million Unit)

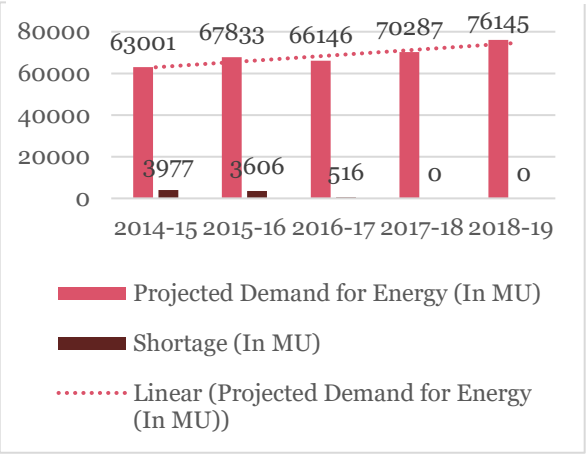
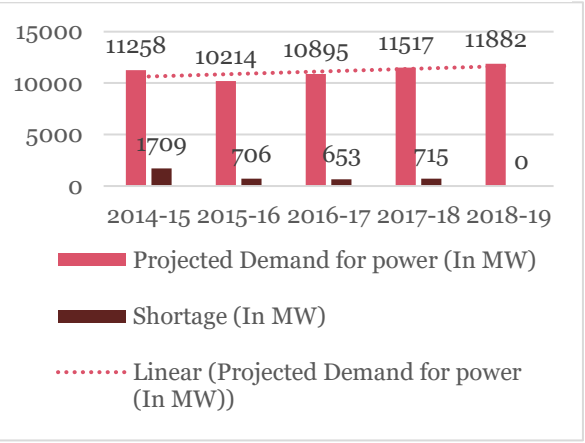


Figure 30: Gap in Demand for Power & Supply (in MW)



Karnataka should attain self sufficiency in the power generation and distribution to cater to the growing energy demands. Presently, Karnataka does experience power shortage and is compensated by buying energy and power from sources external to the state. Recognizing the crucial role of power in achieving economic progress, Karnataka was among the first few Indian states to implement power sector reforms. The state government has been taking various initiatives to implement projects to improve installed capacities for power generation in the public and private domains. More focus shall be given to build renewable sources of energy.

Based on the report of Central Electricity Authority, a transmission project of 220kv or above typically take around 5 to 6 years from concept to commission stage, which is below the global benchmarks. Few of the measures to expedite the power project implementation are:

1. Technology interventions- Real time monitoring, satellite imaging, land records digitization
2. Lean construction methods such as pre-assemble strategy
3. Policy/ regulatory reforms such as single window clearance, active stakeholder management for Right of Way (RoW) management, dedicated authority for resolving RoW and other clearances such as PTCC, forest clearance etc.
4. Provision of land for substation construction during town planning of new sub urban and industrial areas.

Roadways

In Karnataka, the average length of the PWD roads (viz; NH, SH &MDR) per 100 sq km area is 40.07 Km. Among the districts, the road length per 100 sqkm in Mandya district has the highest road length of 69.34 Km and Kalburgi district has the lowest road length of 26.02 Km per 100 sq Km. Further, the road length per 100 sq km in Chamarajanagar, Raichur, Bidar, Chikkaballapura, Vijayapura, Dakshina Kannada, Yadgir, Chikkamagaluru, Chitradurga, Uttara Kannada, Ballari, Bagalakote, Kodagu, & Udupi districts are below the

State average. The details of the road length in the state are given in **Table 13**. The Gwalior -Shivpuri section four lane construction case has been used to understand the causes for the cost and time overrun of the infrastructure implementation. The case has been taken as the terrain and scenarios are similar to that of Karnataka.

Table 13: The Road lengths in Karnataka

Category of Roads	Year	
	2017-18	2018-19
National Highways	6572	7257.63
State Highways	19578	19446
Major District Roads	49909	49552.8
Municipal Roads & Other Roads	40108.71	40108.7
Rural Roads	190862	190862
All Roads	307029.71	307227

CASE STUDY
FOUR LANING OF GWALIOR – SHIVPURI SECTION

The four laning of the existing two lane, 125.3 km long Gwalior-Shivpuri section of NH 3 (old numbering) from km 015+600 (NH 75) to 236+000 (NH 3) in Madhya Pradesh, which is a part of the Agra-Gwalior-Shivpuri-Indore-Mumbai road was taken up as a Public Private Partnership project in 2013 and awarded to an Indian firm on BOT-Toll basis. The project faced delays due to various reasons, especially on account of land acquisition issues and change of scope in the wildlife protected areas of Madhav National Park from 101.85 to 107.35 km (5.5 km) and in the Ghatighan town portion due to Son Bird Sanctuary. The project also faced halts in work due to cashflow issues of the contractor, delay in submission of designs and drawings by the concessionaire for bridges, unrest by locals and delay in mobilization of equipment and manpower at site. The Implementation Agency is yet to hand over 16.10 Ha of RoW to the Concessionaire. There are additional works under change of Scope (CoS), worth approximately INR 227 Cr that have been submitted to the Implementation Agency

166 months time overurn

Root cause of time overrun

1. Land Acquisition and Utility Shifting: Delays in the acquisition of land and shifting of structures in the proposed RoW
2. Scope Creep: There were certain requirements in the wildlife areas that were not proposed in the Detailed Project Report (DPR), prepared by the Consultant, and therefore were absent from the original scope in the tender documents.
3. Demand for additional structures
4. Public unrest
5. Bank Interest Rate inflation that led to interest during Construction

52% cost overrun

Root cause of cost overrun

1. Shifting of utilities
2. Change in Scope
3. Land Acquisition cost

Railways

With a rail network of more than 3,200 km, the state is well connected to other parts of the country. Moreover, to increase rail routes and broad-gauge densities as well as to accelerate the pace of implementation, Karnataka has agreed to take up new railway projects on a 50:50 cost-sharing basis alongside the Union Ministry of Railway[46].

Railway Projects

170 km	Munirabad – Mehaboobnagar Status: Partially completed, Land acquisition in Progress
199 km	Tumakuru – Davanagare Status: Partially completed, Land acquisition in Progress
103 km	Tumakuru - Rayadurga Status: Land acquisition in Progress
144 km	Bagalkot – Kudachi Status: Partially completed, Land handed over to railways
46 km	Chikkamagalur - Sakaleshpura Status: Land acquisition in Progress
253 km	Gadag - Wadi Status: Land acquisition in Progress
103 km	Shivamogga – Shikaripura - Ranebennur Status: Land acquisition stage
factory	Kolar Coach factory Status: Awaiting report approval from railways

Phase 1 Metro services in Bengaluru has been completed and commercial operations have commenced. Phase-2 works are programmed to complete in stages from August-2020 and entire work is programmed to complete by June-2024. The major bottle necks for the construction have been identified.

Root cause of time overrun

1. Inadequate Allocation of Funds
2. Price Escalation
3. Change in Scope
4. Land Acquisition

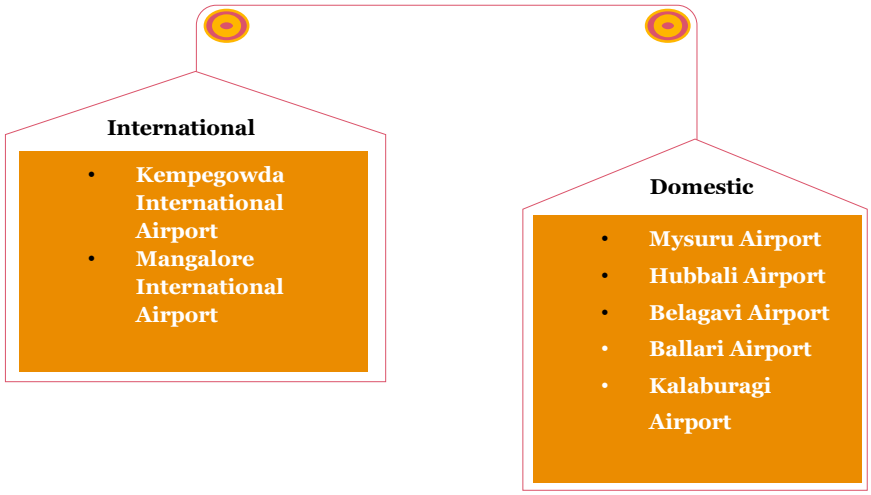
Root cause of cost overrun

1. Inadequate Allocation of Funds
2. Price Escalation
3. Change in Scope
4. Land Acquisition cost

[46] Economic Survey of Karnataka, 2017-18

Civil Aviation

The state has four key domestic airports and two international airports:



The Kalaburagi airport was planned to commence commercial operations by the end of 2018. It opened for commercial operations afte missing multiple deadlines. There are two more upcoming airports in Karnataka at Shivamogga and Hassan. Both the airports are in land acquisition stage. Construction of the airports faced multiple hurdles in each of its implementation stages. A thorough analysis listed out the root causes of the infrastructure implementation.

Root cause of time overrun

1. Local protests during execution
2. Weak labour/material management
3. Project pre-planning and execution inadequacies
4. Land acquisition and local agitation at project initiation
5. Shorter working window (climate)

Root cause of cost overrun

1. Price escalation
2. Engineering inadequacies (escalation in civil and electrical works) and scope change/addition
3. Rehabilitation and compensation cost

Ports

Karnataka has a 300-km-long coastline, with only one major port (Mangalore) and 12 minor ports. The state government is now planning to improve infrastructure facilities by developing minor ports and has formulated the Karnataka Minor Port Development Policy 2014 (KMPDP 2014). As part of KMPDP 2014, the process for development of Honnavar, Belekeri and Pavinakurve Ports on PPP Mode has been initiated.

The New Mangalore Port has handled 31.09 MMT during the period from April – December 2018 as against 31.01 MMT during the same period in the previous year, registering growth of 2.89%[47].

During the period from April – December 2018, total 99,856 TEUs i.e. 15.06 lakh tonnes of containerized cargo was handled as against 81 503 TEUs i.e. 12.29 lakh in the similar period previous year registering a growth of 23%[48].

It has been identified that development of infrastructure alone will not bring monetary benefits to the state. The proper utilization of the infrastructure can only be achieved through development in the auxillary domains. An integrated approach of technology, policy reforms and infrastructure would bring operational as well as economical benefits.

Labour cost competitiveness in Karnataka:

Table 14: Comparison of labour costs in Karnataka with respect to other states in India

	UP	Tamil Nadu	Maharashtra	Karnataka	Gujarat	Andhra Pradesh
Labour (avg. cost/day) INR/Day	1,444	1,727	1,166	1,492	841	748
Productivity (GVA/Employee) Rs. Lakh	10.1	13.8	9.6	12.1	6.1	3
Labour Costs (incl. productivity)	1,502	1,009	1,411	1,483	1,722	1,420
Productivity ratio (VA by output)	17.00%	27.40%	20.50%	24.60%	15.50%	20.30%

Source: Annual Survey of Industries 2016, Ministry of Statistics and Programme Implementation, Study Team Analysis
Source: https://www.ceicdata.com/en/china/electricity-price, https://www.statista.com/statistics/744071/manufacturing-labor-costs-per-hour-china-vietnam-mexico/, https://vietnamnews.vn/economy/418630/average-electricity-price-rises-to-0076-per-kwk.html#zAauBQugiEwcBOh4.97

Note: Average working day is taken for 8 hours.

It can be seen from the **Table 14** above that unit labour cost in Karnataka is amongst the highest when compared to other competing states. However, upon adjusting these costs to the productivity of the region, it can be seen that only Tamil Nadu has lower adjusted labour costs, indicating that the state is amongst the productive states in the country.

[47] New Mangalore Port Trust, Retrieved from January 2019 press release
[48] New Mangalore Port Trust, Retrieved from January 2019 press release

Construction & Related Engineering services - Challenges

Based on the analysis of each subsector in Construction and related engineering services, the study team was able to plot different challenges faced by the sector in the organizational as well as economic front. Overcoming the identified challenges would bring the growth and efficiency required by the state to cater to the growing demand. The strategy should address the issues identified and prepare a comprehensive plan to mitigate the challenges in short term as well as in long term.

Cause for Operational Challenges:

Railways

1. Lack of coordination with project management team
2. Contractual disputes and claims
3. Lack of schedule management
4. Project budget released in tranches

Power

1. Inadequate/baselining of planning
2. Delay in regulatory approvals
3. Delay in land/site handover and local agitation
4. Claims and disputes

Roads and Highways

1. Delay in regulatory approvals
2. Delay in land/site handover and local agitation
3. Claims and disputes
4. Suboptimal DPR

Urban Development

1. Underground utility detection
2. Shifting of utilities
3. Traffic diversion
4. Project implementation in densely populated area
5. Labour management after COVID-19

Ports

1. Delay in regulatory approvals
2. Delay in decision making (floating tenders, contract finalization)
3. Contractual disputes

Civil Aviation

1. Inadequate baselining/ lack of planning
2. Delay in land/site handover and local agitation
3. Lack of adequate contractor assessment
4. Geological surprises

Causes for financial Challenges:

Railways

1. High cost of land acquisition
2. Escalation in labour costs/ ineffective utilization of labour
3. Escalation of material price beyond projection
4. Lack of risk management

Power

1. High cost of land acquisition
2. Lack of risk management
3. Weak contract administration and claim management

Roads and Highways

1. High cost of land acquisition
2. Lack of risk management
3. Suboptimal DPR

Urban Development

1. Unavailability of skilled resource
2. Design changes or iterations
3. Scope creep
4. Long gestation period for planning
5. High cost of land acquisition

Ports

1. Scope creep
2. Sub optimal DPR
3. Escalation of material price beyond projection
4. Contractual disputes due to poor framing of contract documents

Civil Aviation

1. Sub optimal DPR
2. Escalation of material price beyond projection
3. Escalation in labour costs/ ineffective utilization of labour

4. Sector Development Strategy

4 Sector Development Strategy

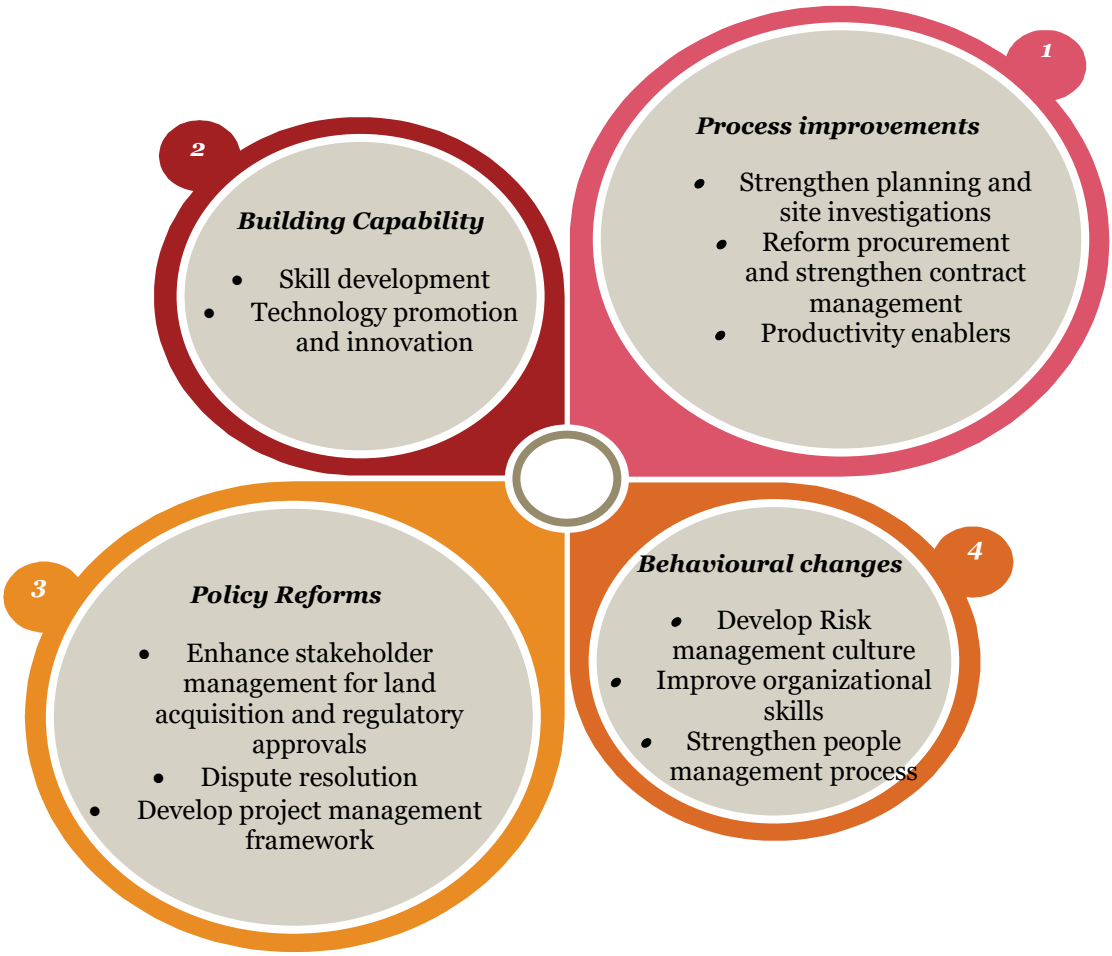
Strategic Interventions:

Based on the research and analysis, mentioned in the previous sections, the study team has assessed some of the key impediments faced by the players in the Construction and Related Engineering services sector in Karnataka. The State is unable to realize its potential to the fullest owing to multiple reasons stated in above sections.

To increase the competitiveness of Karnataka and overall efficacy and performance vis-à-vis other leading States in the Country and globally, the following interventions have been identified through the study - in line with the five pillars of the Champion Services Sector Scheme.

Guided by the strategic interventions as represented in Figure 2 of the report, the study team proposes to implement a four-pronged strategy that will significantly improve the C&RE as set out in **figure 31** below:

Figure 31: Four-pronged strategy for Champion Services Sector (Construction and Related Engineering Service)



Source: Study Team Analysis

Process improvements

An institutional level intervention shall be undertaken to improve the processes involved in this sector. Each process in the value chain should be improved to overcome the challenges identified.

Strengthen planning and site investigations

A project success is dependent on the accuracy of the planning and scoping of the work. It involves extracting the site data and preparing the critical information to identify the risks, estimate the cost and prepare the work plan.

1. **Develop stage gated project delivery process**

   Stage gated project would convert a project to multiple modules of small projects. This approach would ensure that each stage is completed before stepping to the next. Stage wise auditing and approval process improves the transparency and reduces the risk. Milestones based payments, incentive and penalites can augment the efficiency in execution of the projects.

2. **Leveraging technology**

   The technological interventions shall be made to improve the collection, accuracy and collection of the data. Mobile mapping and geo-spatial analysis are few of such technological aids. Usage of technology reduces the cost and helps in reducing the survey errors and improves the quality of DPR.

   Use of advanced tools/technology such as schedule analytics, Primavera, and Building Information Modelling for improved visualization, integration amongst stakeholders and forecasting should be mandated in contracts. Application of such tools will streamline the planning process.

3. **Detailed definition of scope of work**

   At the bidding stage, scope of work should be well defined and include sufficient information to limit the scope of change orders and risks
   - Basic design to be complete and mature
   - All mandatory codes such as KPIs and design basis are pre-defined in the bid
   - Shareholder agreement and state support agreement shall be included in the contract

4. **Tendering improvements**

   The criteria in the tender document should support firms with better utilization of technology.

5. **Iterative design review**

   The agency shall intitally do a benchmarking study in the preliminary research. The design shall be reviewed periodically to avoid any potential risk. The agency shall do the study iteratively to incorporate the changing conditions. The design, workplan and cost estimation should factor in the risks, cost of delay and the opportunity loss.

6. **Agility and collaboration in the planning stage**

   The iterative planning and integrated approach improve the delivery of the quality and timelines of construction project. Contractual methods for incentivizing contractors and consultants for collaborative planning should be considered. A realistic target can be set through the incentive mechanism.

Reform procurement and strengthen contract management

1. **Customized contracting strategy**

   The contracting strategy should be decided carefully acknowledging various factors involved in executing the contract and the project. For example, in many cases, it has been seen that EPC/turnkey contracts are better for accountability and execution where the contractor has strong experience and knowhow on designing and building such projects.

2. **Deployment of effective bidding methods**

   Lowest cost-based bidding may not be effective in identifying a suitable and qualified bidder. A two-stage bidding process would help in shortlisting bidders with proven track record and thereby obtaining most competitive financial proposal from the shortlisted bidders. Usage of Internationally accepted bid formats such as average bid method (its variances), most economically advantageous tender, negotiated bidding, alliance and relational contracts can be considered to obtain suitable bidders.

3. **Building contract management and monitoring capacity**

   Achieving the capability would require capacity building for contract administration and claims management. Contract administration by a professional contract administrator including timely contract correspondence, documentation, compliance tracking and highlighting risk areas are needed to ensure minimal scope of disputes.

4. **Incorporate contingency/ flexibility in contract for various scenarios**

   Many of the factors in the contract such as scope, stakeholders, design, procurement etc., are inherently variable as most of the projects tend to extend for multiple years.

Productivity enablers

1. **Deploying lean construction practices**

   Contractors may adopt system such as the Last Planner®System for lean work structuring and production control at site level and the agencies should facilitate and monitor its implementation. The Last Planner®System advocates involving site

foreman/site supervisor (the last planner) in screening the upcoming assignments from the master schedule and accordingly planning the weekly work.

2. **Removing waste and variability from site operations**

   Deploying a production controller will help to identify the sources of waste and variability, clearing of waste and thereby improving the efficiency and utilization of the resources.

Behavioural changes

Developing Risk management culture

1. **Institutionalize a risk management policy**
   The policy should demand risk assessment and documentation through out the project. Consultants and the implementing agencies should mandatorily follow the policies. The policy should incorporate a risk assessment framework which elaborates the differentiation and impact of strategic, operational and executional risks.
2. A committee could be set up to monitor and evaluate the follow up of risk management culture among the Service Providers.

Improve organizational skills

Empower the employees through delegating responsibilities. The processes and practices shall be deployed such that the decision making is undertaken at the right place. Technology can be used to connect with employee in real time.

Strengthen people management process

Performance based evaluation shall be undertaken to objectively measure and incentivse the employees to develop innovative and effective methods.

Building capability

Skill development

1. Skill Gap assessment
2. Set up institutional tie ups
   This would provide easy access to training curriculum, materials and interactive knowledge sharing sessions, and would also bring in global leading practices.
3. Arrange training programs
4. Organise peer to peer knowledge sharing programs

Technology promotion and innovation

1. Usage of Unmanned Aerial Vehicles (UAV)
2. Dashboards and mobile technology for real time monitoring

3. Internet of Things
   Implementing Smart Sites digital solution using IoT to centrally connect Man-Machine-Material and monitor them on real time basis can identify wastes in resource utilization and drive value by enhancing productivity and efficiency.
4. Building Information modelling
   BIM (Building Information Modelling), a 3D model-based process improves visualization, facilitates constructability reviews, provides a multi-dimensional planning and monitoring mechanism, and brings all key stakeholders on a common platform. If deployed effectively, it helps in cost reduction over project lifecycle and improves multidisciplinary collaboration during execution.
5. Data Analytics
   a. Extraction of meaningful insights
   b. Prediction of potential risky events and undertaking necessary safety measures
6. Embracing the next generation technologies such as Blockchain, 3D printing also would augment the prospects of the sector.

Policy Reforms

Enhance stakeholder management for land acquisition and regulatory approvals

1. **Develop stakeholder management plan**
   The stakeholders of most construction work would be land losers, government, local leaders, implementation agency and contractors, and community.
   A standard operating procedure for each scenario should be developed to navigate and smooth operation of land acquisition, right of way, responding to agitations etc.

2. **Link project sanctioning and awarding with regulatory processes**
   Many projects are taken up, approved and awarded by implementing agencies with insufficient progress in these regulatory processes. This typically leads to multiple problems such as incorrect baselining of cost, time, unavailability of fronts for contractors leading to idling resources etc. Hence, a guideline is needed that a project budget can be arrived and approved by the Ministry only after sufficient understanding of costs and time involved for land acquisition/utility shifting or avoiding potential agitations. Further, awarding of a project may be taken up only after significant percentage of land has been acquired. Karnataka government has inititated the online single portal approval system for projects as part of the EoDB efforts. The sanctioning of the projects must be linked with the regulatory process.

3. **Implement social cost benefit analysis for projects**
   The study should properly list the benefits gained through the project. It should be made public and necessary measures should be taken to reach this information to all the stakeholders.

4. **Digitization of land records and workflow for land acquisition**
   Blockchain implementation can be explored. The initiative undertaken by GoK as part of EoDb, online information on availability of land shall be promoted.

5. **Develop a database to share the market rate of the land**

Dispute resolution

1. **Encourage mediation, conciliation and arbitration to avoid litigation**
   All contracts need to be equipped with relevant clauses allowing any dispute to go through these processes of resolution before being taken to the court of law. The online grievance system present in the E-biz portal of Department of Commerce & Industries shall be given more focus and it shall encourage and expedite the grievance redressal process. The grievances obtained through the portal shall be addressed in stipulated time period with proper guidance for the service sector employees.

2. **Incubate pool of SMEs for arbitration**
   The pool of SMEs may be incubated by Arbitration council/Institutions for arbitration. They have to be well qualified in the respective domain to handle the arbitration.

Develop project management framework

A standard project management framework would not cater to all the scenarios. There are few aspects to be covered while developing the project management framework.

- The board has the overall responsibility for governance of effective project management processes.
- The project business case is supported by relevant and realistic information that provides a reliable basis for making authorization decisions; a statement of requirement which sets down the boundaries (e.g. time, cost and performance), project constraints, dependencies, and the interfaces with other projects.
- All projects have an approved plan containing authorization points, at which the business case is reviewed and approved; decisions made at authorization points are recorded and communicated.
- Disciplined governance arrangements, supported by appropriate methods and controls, are applied throughout the project life cycle.
- The detailed project governance arrangement for each project phase is prepared before the phase starts and focusses on the specific needs of the project for that phase.
- Stakeholders and their roles are identified for different phases of the project.
- Criteria for reporting project status and protocols for escalating risks and issues to levels required by the organization are clearly defined. A formal reporting structure and feedback mechanism is in place prior to project initiation.
- The organization fosters a culture of improvement and internal disclosure of project information.
- Project stakeholders are engaged at a level that correspond with their importance in the organization and in turn fosters trust.
- The board (or its delegated agent) decides when independent scrutiny of projects and independent project management systems are required and implements such scrutiny accordingly.
- Post project evaluations are carried out for example benefits tracking and realization assurance, lessons learnt to name a few.

5. Implementation and Funding Plan

5 Implementation and Funding Plan

The objective of the report was to prepare an Action Plan for Construction and Related Engineering Services for Karnataka under the Champion Services Sector Scheme. In the previous sections, the study team has analyzed the global, national and regional demand in the C&RE, the issues pertaining to the sector in the State and the sector development strategy with action points drawn.

In this section we have explored the implementation mechanism and funding requirement for each of the interventions under the proposed action plan. For each of the interventions, the **table 15** below summarizes the responsible agency for implementing the suggested intervention and the funding requirement for the same. The table also aligns each of the proposed interventions with the champion service pillars.

Table 15: Implementation and Funding Plan

S. No	Action	Champion Services Pillar	Proposed Funding	Implementing Agency
Process improvements				
1	*Strengthen planning and site investigations*	*New Infrastructure*	*~ INR 15 crores (lumpsum[49])*	*Infrastructure Development Department, NHAI, Department of Commerce & Industries*
2	*Productivity enablers*	*New Infrastructure*	*~ INR 100 Lakhs (lumpsum[50])*	*Department of Commerce & Industries/ Department of IT BT*
Skill Development and PMU				
3	*Building capability* *Skill development of the workers*	*New Mindset*	*~ INR 25 Crores (lumpsum[51])*	*Department of Commerce & Industries/Department of IT BT*

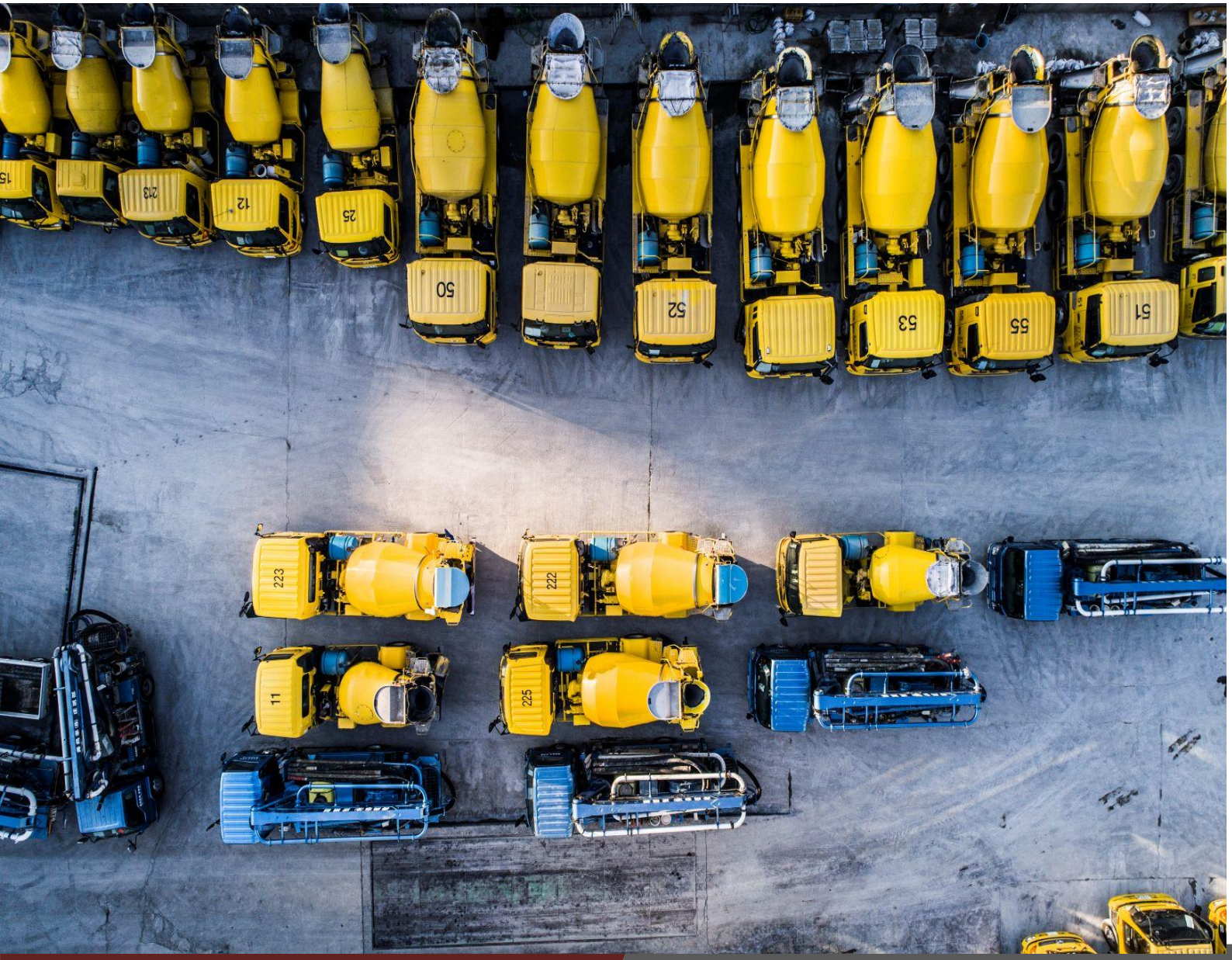
[49] Detailed cost, feasibility analysis needs to be conducted by the State
[50] Detailed cost, feasibility analysis needs to be conducted by the State
[51] Detailed cost, feasibility analysis needs to be conducted by the State

S. No	Action	Champion Services Pillar	Proposed Funding	Implementing Agency
4	*Promoting adoption of digital mentioned in the recommendations*	*New Sector*	*INR 25 Crores*	*Department of Commerce & Industries*
5	*PMU setup*	*New Sector*	*NA*	*Department of Commerce & Industries*
6	*Setup ecosystem for OEM suppliers (Auxillary systems)*	*New Sector*	*INR 25 Crores*	*Department of Commerce & Industries*
Policy Reforms				
7	*Enhance stakeholder management for land acquisition and regulatory approvals*	*New Process*	*NA*	*Department of Commerce & Industries*
8	*Dispute resolution*	*New Sector/ New Standard*	*NA*	*Department of Commerce & Industries/ Department of IT BT*
9	*Develop project management framework*	*New Standard*	*INR 1 Crore*	*Department of Commerce & Industries*
10	*Development of Risk management culture*	*New Mindset*	*INR I crore*	*Department of Commerce & Industries*
11	*Strengthen people management process*	*New Standard*	*INR 5 Crore*	*Department of Commerce & Industries*

Source: Study team analysis

The total funding proposed for implementing all the interventions under the Champion Services Action Plan for Construction and Related engineering services sector in Karnataka is ~ INR 100 Crores.

Going forward, a proposal for the CSSS – C&RE needs to be formulated by the State Nodal Department in the prescribed format mentioned in the Champion Services Sector Guidelines issued by the Government of India. It is suggested that the Department of Commerce and Industries, Government of Karnataka engage a Project Monitoring Unit (PMU) to provide support for executing the select proposed interventions. This will ensure strategic interventions suggested are implemented in a holistic, timely and orderly manner.



6. Annexure

6 Annexure

Stakeholder Consultations

Table 16: Details of stakeholder consultations

Sr. No.	Date	Person Met	Designation & Department	Key Discussion Points
Meetings Conducted				
1	08.08.2019	Mr. Atul Nalini, IAS	Joint Managing Director (JMD), Karnataka Urban Infrastructure Development & Finance Corporation (Member Convenor)	• Brief details of the CSS Scheme, the proposed approach for development of Action Plan and the way forward. • JMD sought the CSS guidelines in order to further the discussions. The same was sent on 14th August 2019
2	19.10.2019	Anil Nayak	CEO, CREDAI	• Brief details of the CSS Scheme, the proposed approach for development of Action Plan and the way forward • He discussed the impact of different central level decisions on RERA, Demonetisation, etc. on Real estate sector • Being a Real Estate industry association, it was informed they take up any issues / problems with the Government directly

3	16.10.2019	Ashok Matolia	Deputy Manager, India FoodPark	• Brief details of the CSS Scheme, the proposed approach for development of Action Plan and the way forward • He highlighted the lack of semi-skilled workers in the State. • Recommended skill development centres