

GLOBAL MANPOWER

IN THE CONSTRUCTION SECTOR

SEPTEMBER 2022



Construction Skill Development Council of India



ABOUT CONSTRUCTION SKILL DEVELOPMENT COUNCIL OF INDIA

Construction Skill Development Council of India is a 'Non-Profit Organization', registered under Section 8 of the Indian Companies Act 2013.

Construction Skill Development Council of India (CSDCI) has been constituted under the mandate of National Skill Development Corporation (NSDC) which is one of its own Public Private Partnership Organization in India to promote skill development. As an apex 'Sector Skill Council' for the Construction Industry, CSDCI operates under the aegis of National Council for Vocational Education & Training (NCVET), National Skill Development Corporation (NSDC) and the Ministry of Skill Development & Entrepreneurship (MoSDE) to build competencies which nurture employability and facilitate employment opportunities and that which go to build a sustainable economic activity besides making India a 'Skill Capital of the World' as envisioned by our Prime Minister Shri Narendra Modi.

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EXECUTIVE SUMMARY

Globally, construction sector is expected to flourish in this present decade

Global construction sector is expected to grow with a CAGR of 7.1 percent between 2022 and 2030. Residential construction will lead the construction sector in the short term and infrastructure construction will drive the construction sector in the long term. Commercial construction will remain subdued in this decade. Government spending on infrastructure, need for sustainable construction, urbanization and pent-up demand during the pandemic years is expected to drive construction.

Regionally, construction activity will be concentrated in emerging Asian countries and North America

China, USA, Japan, India and Germany are the top 5 construction markets as measured by Gross Value Added in the Construction Sector in 2019. Emerging Asian countries (China, India, Indonesia, Philippines) are expected to experience the highest growth rates in the world, followed by USA and Western European countries (Germany, France and UK). Construction activity in these countries will be driven mostly by infrastructure and residential construction.

Demand for construction workers is increasing worldwide while requiring them to acquire new skills

Growth of the construction sector outpaced growth

of construction workforce in almost all countries of the world during 2015-2019. Meanwhile, innovation in construction materials, processes and digitization is requiring workers to acquire new skills. As a result, demand for workers and some occupations has increased worldwide, however the phenomenon impacts different countries in different ways.

Supply of construction workers is unable to keep pace with evolving demand

Construction workers accounted for 7.7% of the global workforce in 2019. Additionally, labour productivity in the construction sector remains low as the sector has been slow to adopt new technologies. Meanwhile, aging especially in developed countries like Japan and Germany is seriously affecting availability of skilled workers. As a result many countries are adopting strategies like inviting international migrant workers and investing in the TVET sector.

International labour migration has been an important strategy used by various countries to cope with challenging labour supply issues.

Migration patterns show that workers travel to high and upper middle income countries for work. Europe, North America and GCC are the most important destination countries. India is the largest source of migrant workers in the world. Other important source countries are Bangladesh,



Pakistan, Philippines and Vietnam. For Indian workers, GCC and USA are the top migration destinations. Indians migrating to GCC have been traditionally taking up jobs in the construction sector while those moving to the USA are taking up employment in service oriented high skilled occupations.

Many developed countries are liberalizing their labour markets to allow more workers especially in construction sector

Our analysis of a few developed markets shows that Germany, Japan, Australia and the UK are liberalizing their labour markets and inviting specifically skilled workers in many sectors including the construction sectors. These countries have announced a specified skills list or skill shortage list which give preference to workers with skills in these lists while granting work visas. In addition to this, these countries have also opened their TVET sector to foreign students who can acquire skills in the construction sector for gainful employment in future. However barriers related to language skills remain, as both workers and students will be required to have appropriate language proficiency to work and study in these countries. Workers will require additional skills certificates in some occupations (Australia, Japan, Germany and UK) or pass skills exams before receiving work visas (Japan and Germany).

International construction markets are seeing

demand for high skilled as well as trades workers

Developed countries like Australia, Germany, Japan and UK are opening their labour markets for Architects, Civil Engineers, Mechanical Engineers, Electrical Engineers and Structural Engineers. At the same time, workers from specific trades like welders, scaffolders, carpenters, shutterers, electricians, plumbers, bricklayers, painters, tilers, plasterers, HVAC trades workers are being invited to fill open vacancies.

The research identifies six countries where Indian construction workers have the potential to contribute positively

UAE, Saudi Arabia, Qatar, Australia, Germany and Japan have been identified as prospective markets where the Indian construction workforce can make higher contributions through better coordination of activities among nodal bodies internationally. These markets have been selected based on the following parameters (Figure 1);

- Size of the construction sector
- Shortage of workers
- Aging workforce
- Major construction workforce migration corridors

is relatively easier as licenses and certifications are required for only a few trades like scaffolding inspector, riggers etc.






COMPONENTS	QATAR	UNITED ARAB EMIRATES	SAUDI ARABIA	AUSTRALIA	GERMANY	JAPAN
 Construction value added in 2019 (in USD billions)	21	36	41	93	148	239
 Construction labour force in 2019 (in millions)	0.9	1.3	2.3	1.2	2.9	5
 Construction sector projected growth (CAGR) (%)	10.54 (2021-2027)	3.9 (2022-2026)	>5 (2018-2027)	2.4 (2023-2026)	6.3 (2022-2026)	5 (2020-2027)
 Major Construction sub-sectors	Infrastructure, Non-residential & Residential	Commercial, Infrastructure, Residential, Industrial	Industrial, Infrastructure, Commercial and Residential	Engineering Construction & Non-residential	Residential, Commercial & Public Construction	Commercial, Industrial Infrastructure & Energy and utilities
 Major Construction hotspots	Doha and Al Wakrah	Dubai and Abu Dhabi	Riyadh, Makkah, Tabuk, Madinah	Sydney Melbourne	Frankfurt, Stuttgart, Berlin	Tokyo
 Participation in vocational programs 15-24 years (%)	0.6 (2018)	0.5 (2017)	0.3 (2017)	19.9 (2017)	20.6 (2017)	22 (2017)
 Indian diaspora in the country (2020)	0.7 Millions (32%) (Top most)	3.4 Millions (40%) (Top most)	2.5 Millions (19%) (Top most)	0.5 Millions (8%) (Top 4)	0.10 Millions (0.7%) (Top 31)	0.03 Millions (1.3%) (Top 11)
 Other major countries of origin	Bangladesh (12%) Nepal (11%) Pakistan (11%) Egypt (8%)	Bangladesh (12.57) Pakistan (11%) Egypt (10%) Philippines (6%)	Indonesia (12%) Pakistan (11%) Bangladesh (10%) Egypt (7%)	United Kingdom (17%) China (9%) New Zealand (8%) Philippines (4%)	Poland (14%) Turkey (12%) Russian Federation (8%) Kazakhstan (7%) Syria (4%)	China (28%) Republic of Korea (16%) Vietnam (12%) Philippines (9.93%) Brazil (7%)

Fig. 1 | Construction Market in Selected Economies

The research study has further identified economies facing challenges in sourcing construction workforce and how easily India can help alleviate

the situation. Following indicators were studied and the six selected economies were mapped to a two by two matrix (Figure 2).

POTENTIAL FOR INDIAN WORKFORCE TO CONTRIBUTE	CHALLENGES FOR CONSTRUCTION WORKERS
<ul style="list-style-type: none">• Language requirements for work visa• Fees for work permits• Ease of hiring foreign labour• Number of foreign migrant workers	<ul style="list-style-type: none">• Construction or general worker shortages• Aging of the workforce• Nationalisation or Liberalisation of workforce• Maturity of skilling ecosystem

Among these six countries, Australia, Germany and Japan are relatively harder for migrant workers to migrate to due to a large number of requirements related to skills exams (Japan), skill recognition (Germany), licensing (Australia) in addition to

language proficiency. Movement to GCC countries is relatively easier as licenses and certifications are required for only a few trades like scaffolding inspector, riggers etc.

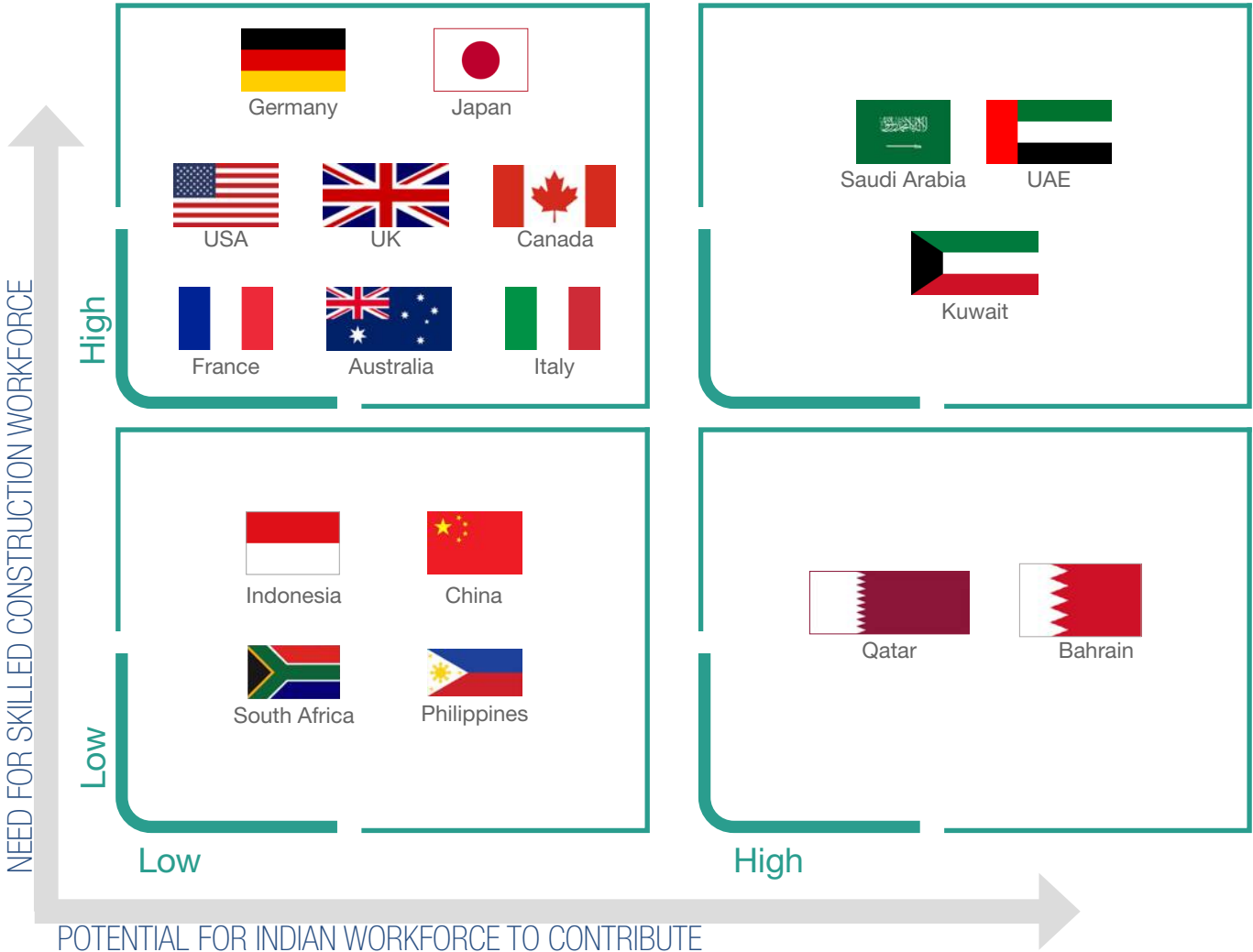


Fig. 2 | Country Matrix

CHAPTER 1

GLOBAL CONSTRUCTION GROWTH OUTLOOK

Construction is a major global industry, accounting for a significant proportion of most countries' Gross Domestic Product (GDP). **The construction sector has been responsible for 13% of the global GDP in 2020.** The aggregate size of the construction market has been valued at USD 4.3 trillion in 2020

(Figure 4)¹. In this section, the report presents an overview of global construction and major world regions driving the growth of the construction sector followed by key trends to look forward to in the future of the construction sector that will have strong implications on the construction workforce.

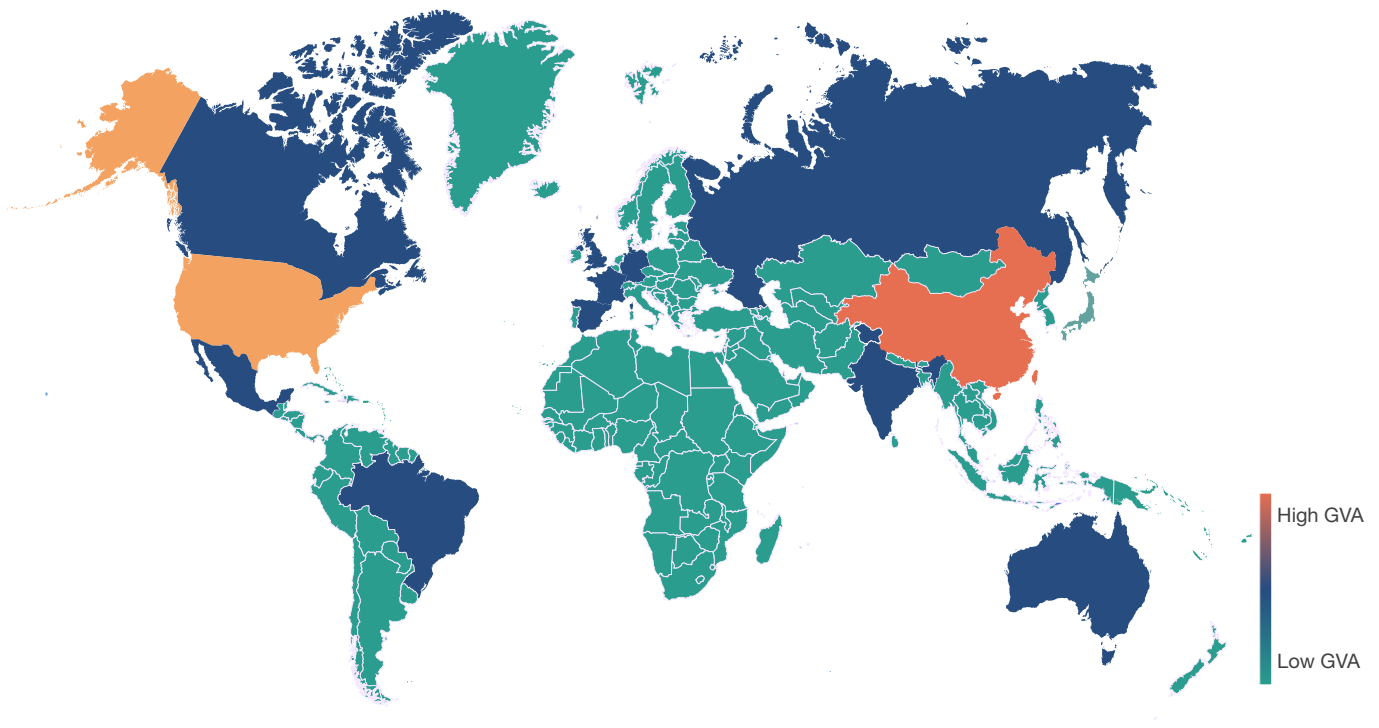


Fig. 3 | Global Construction Sector Value Added

Source: UNCTAD, 2019

1.1 Current Status of Construction and its Sub Sector and Projections

The construction industry is sensitive to fluctuations in the economic outlook. Thus, strong economic growth usually leads to a rapid acceleration of construction activity and vice versa. The total value added by the construction sector saw a decline in 2020 and remained under pressure due to rebounds in COVID-19 while also being adversely impacted by the Russian invasion of Ukraine.

However, construction has been one of the most resilient sectors during the pandemic. Resilience

is also borne out of comparatively low reliance on consumer spending and accommodative levels of public expenditure. **Prospects for global construction remain healthy, with baseline projections suggesting a growth averaging 4.4% between 2020 and 2025 for the sector². Simultaneously, optimistic projection models have suggested a CAGR of 7.3% from 2022 to 2030 (Figure 5)³.** This growth is expected to be largely driven by the residential and infrastructure sectors.

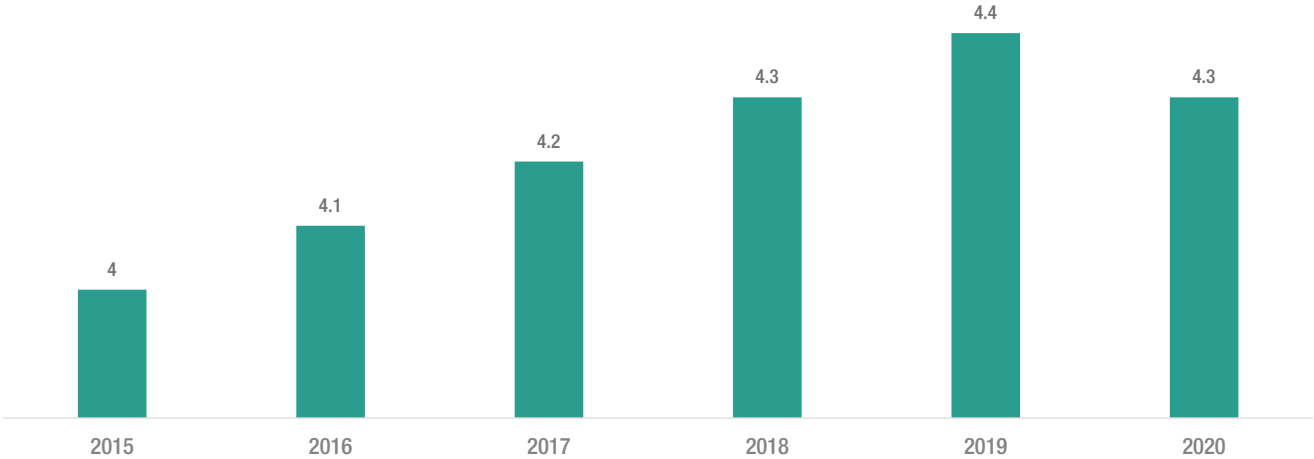


Fig. 4 | Total Value Added by Construction Sector (USD in trillion)
Source: UNCTAD, 2015 - 2020

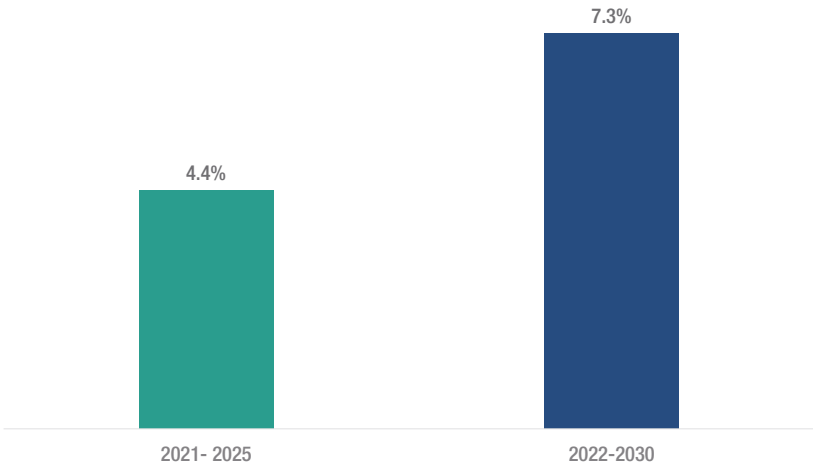


Fig. 5 | Projected Growth Rate for Construction Globally - CAGR (%)
Source: Oxford Economics, 2021, Deloitte, Global Power of Construction 2021

■ Baseline projections
■ Optimistic projections

Residential construction output is expected to have grown 7.1% in the 2021-22 period⁴. This growth is due to a substantial increase in household savings coupled with lower interest rates and expansion in residential financing⁵. Residential construction is expected to grow at a CAGR of 4.6% between 2020 and 2025 (Figure 6).

Simultaneously, infrastructure is the fastest growing construction sub-sector with a growth rate of 5.1% from 2020 to 2025, its growth will likely exceed that of other sub-sectors of construction (Figure 6). Ergo governments around the world are giving

impetus to infrastructure projects (prominently transportation), especially in emerging markets as they develop energy, transport networks, sewage and waste systems, and other large-scale projects.

In the meantime, the nonresidential sector which was massively hit during the pandemic will be the slowest recovering sub-sector. Projections indicate that it will have a 3.7% growth on average between 2020-2025 which is 1.4% points per annum lower than the infrastructure sub-sector which is seeing a tremendous jump (Figure 6).

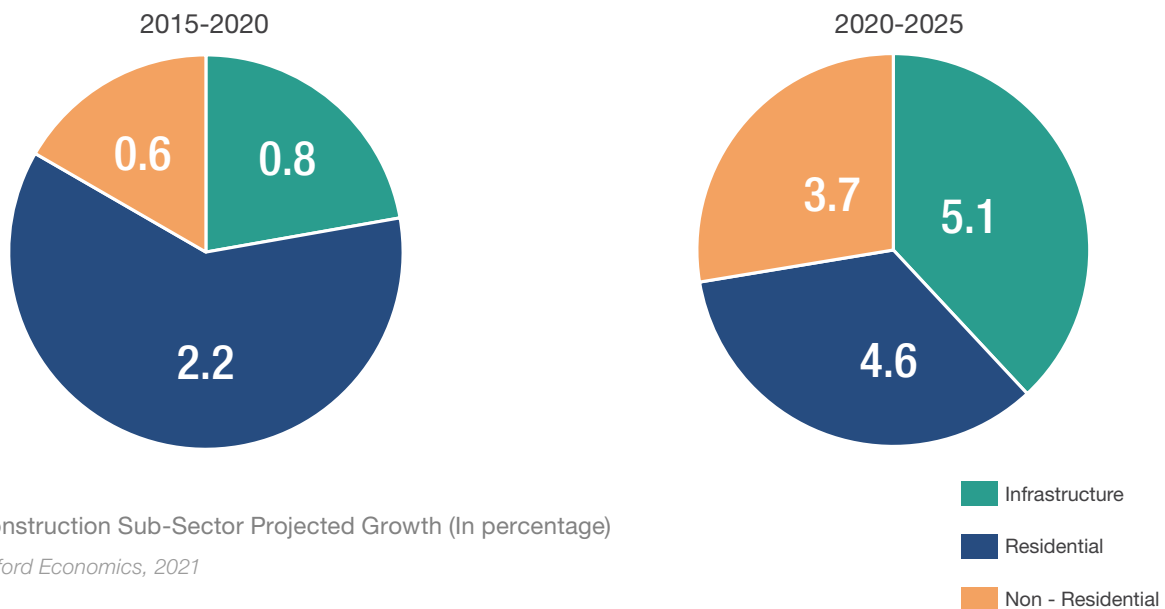


Fig. 6 | Construction Sub-Sector Projected Growth (In percentage)

Source: Oxford Economics, 2021

The slow growth in non-residential sectors is due to the move towards working from home and less international travel which has paused projects focused on commercial office and accommodation sectors. However, industrial construction will see

comparatively higher growth than commercial projects as researchers predict a rise in manufacturing and a shift in spending patterns towards online platforms⁶.

1.2 Regional Growth in Construction Sector

An in-depth investigation of the gross value added by the construction sector globally shows that emerging economies in Asia are the biggest contributors followed by North America and Western Europe (Figure 7). Concurrently, 2030

growth estimates suggest that Sub-Saharan Africa and emerging Asia-Pacific economies will drive growth in the construction sector with a CAGR of 5.7% and 5.1 % respectively (Figure 8).

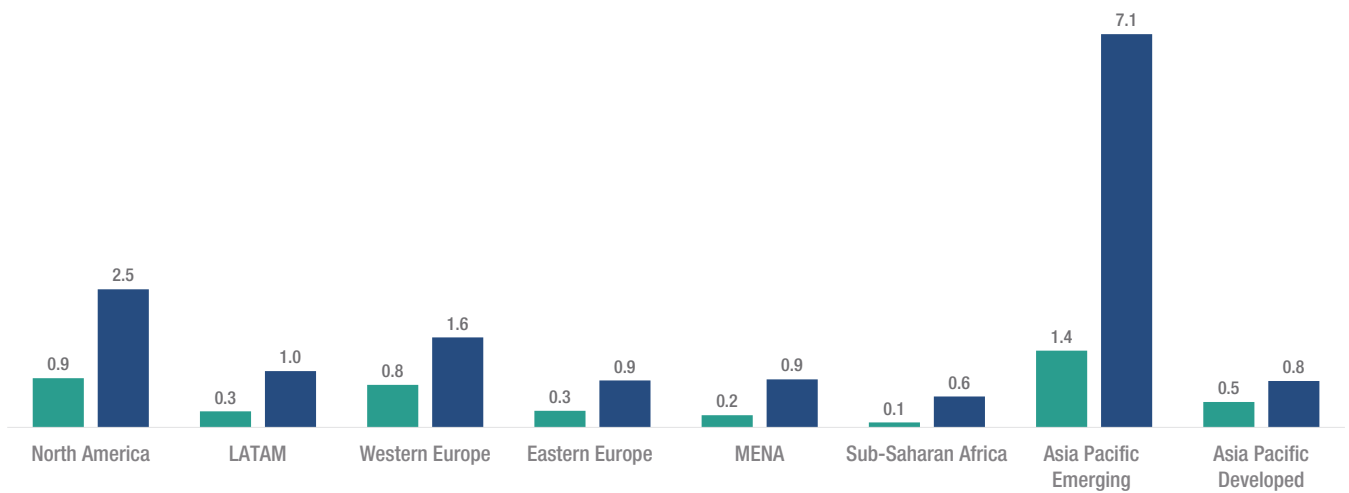


Fig. 7 | Gross Value Added by Construction and Projections (in trillion USD)

Source: UNCTAD, 2019; Oxford Economics, 2021

Note: 2030 projections have been calculated based on the %CAGR estimates from the Oxford Economics report, 2021

2019
2030

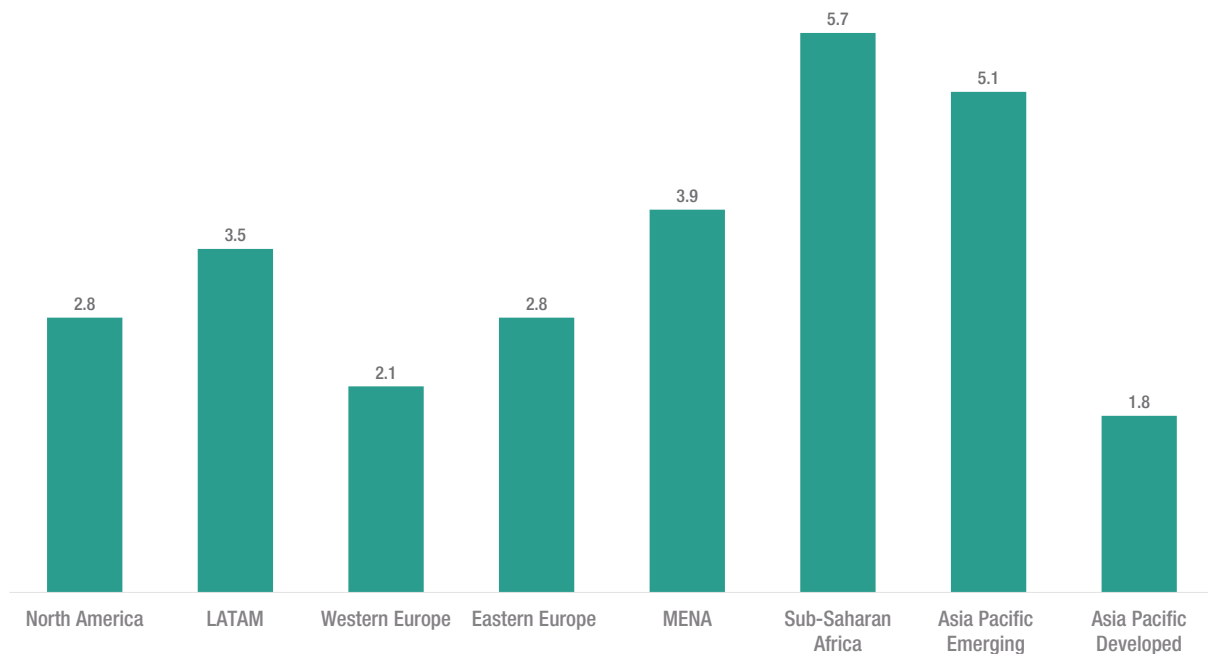


Fig. 8 | Construction Sector CAGR % (2020-2030)

Source: Oxford Economics, 2021

Country-wise data suggests that 83% of the gross total value added by the construction sector is from just 25 economies (Figure 9). Of this 83% of gross total value added by the construction sector, China alone contributes about 21% and the USA

contributes about 17% in 2019. Furthermore, research estimates suggest that construction sector growth is largely concentrated in the top ten markets (Figure 9).

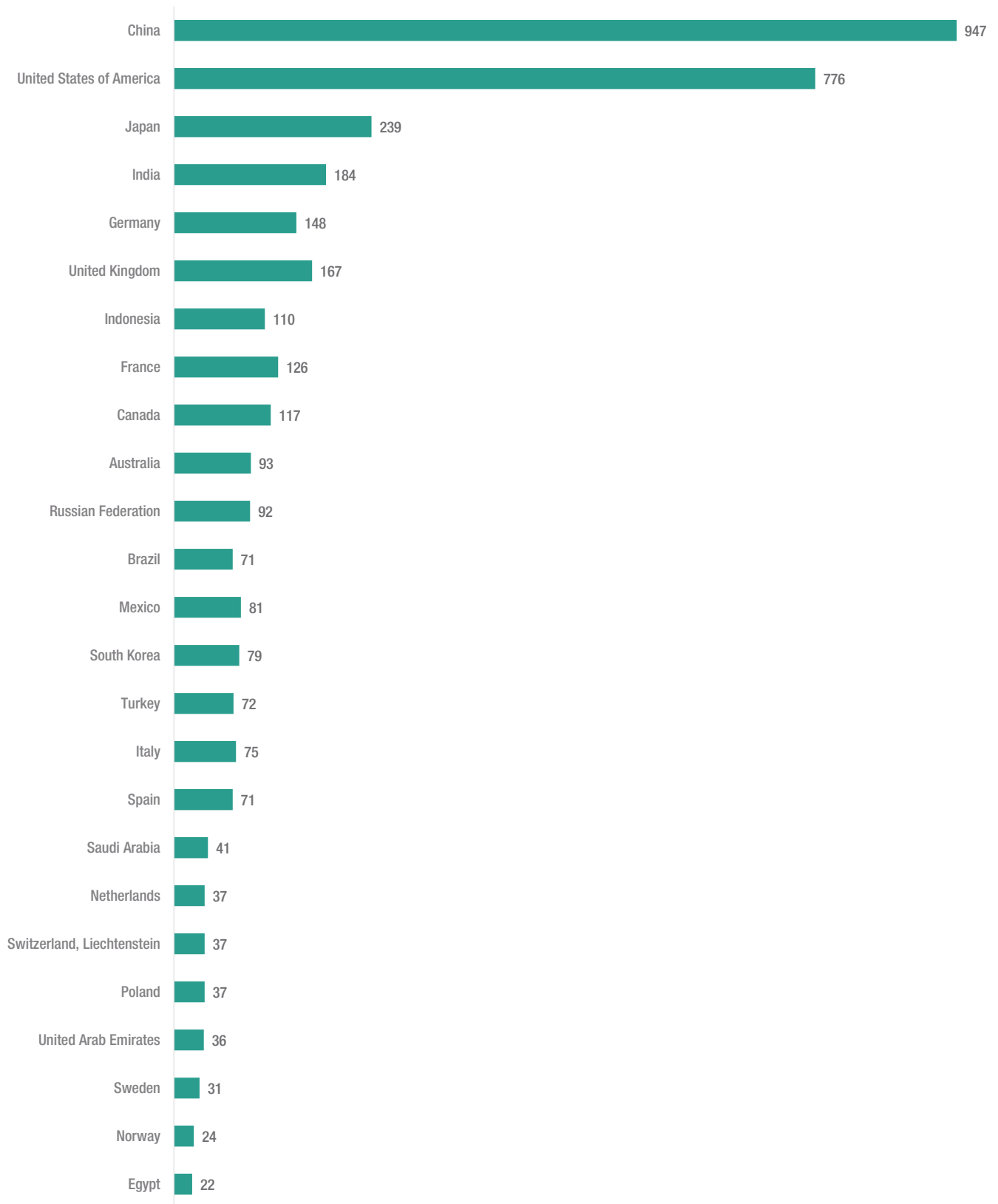


Fig. 9 | Top 25 Economies with the Highest Value Added to the Construction Sector (in billion USD)

Source: UNCTAD, 2019



Asia

Emerging Asia-Pacific:

Growth in construction has been high in Asia specifically driven by the emerging economies,

with average annual growth expected to be over 5.1% by 2030⁷. In fact, emerging Asia's share in global construction is expected to rise by 5.7 trillion from 2019 to 2030 (Figure 7).

Key markets: China, India, Indonesia and the Philippines

- China dominates the Asian construction market and will remain the largest global construction market in the near future followed closely by India.

Key sub-sectors: Infrastructure and Residential

- Infrastructure construction has been resilient despite the 2020 economic slowdown as governments in the region are focused on pushing ahead with a large backlog of key transportation projects.
- Major infrastructure spending programs - India's Gati Shakti program alone constitutes USD 50 billion in infrastructure spending in the country. The 'Build', 'Build', 'Build' program in the Philippines and Indonesia's Presidential Regulation No. 109 of 2020 are notable infrastructure programs in the region.
- China's infrastructure spending activity is expected to grow strongly over the coming years, supported by a number of major transportation projects including 6-meter-deep waterway from Wuhan to Anqing, the Shenzhen-Zhongshan bridge and the Guangzhou-Zhanjiang high-speed railway
- Residential construction in Asia has been strong despite the 2020 economic slowdown, with activity passing the USD 2 trillion mark for the first time ⁸.

- The industrial building sector is expected to see strong levels of activity in many emerging Asian countries as more and more of these countries look to embed in the global supply chains.

Asia- Pacific Developed: The growth forecast is lower for developed markets in comparison with emerging markets.

Key markets: Japan and Australia are important markets in the region.

- Japan is the largest construction market among developed countries in the Asia Pacific followed by South Korea and Australia.

Key sub-sectors: Transportation infrastructure and other non-residential

- Infrastructure is set to remain the largest sub-sector in Japan, as a result of the ongoing disaster proofing of existing infrastructure in Japan.
- Schemes such as Hong Kong's USD 25 billion strategic infrastructure plan are supporting construction in the region⁹.
- Additionally, the Australian 10-year infrastructure investment pipeline has been increased to an unprecedented AUD 120 billion in the 2022-2023 budget, which includes AUD 17.9 billion of new commitments to priority rail and road projects across the country.



Africa

Research indicates that 462 projects with a total project value of USD 521 billion have been underway in the African region in 2021, this is a 20% increase from 385 projects in 2020. The construction market in Sub-Saharan Africa (East, West, Central and Southern African countries) are projected to grow at the rate of 5.7 % between 2021 to 2030 in contracts to the North African region which is projected to grow at 3.7 % (Figure 8).

Within the African continent, the Western Africa belt records the highest number of projects in the continent (i.e., 153 projects) valued at USD 172 billion, followed by Southern Africa with 106 projects which are valued at USD 147.7 billion. East Africa has the third highest number of projects i.e., 102 projects valued at USD 60.6 billion. Meanwhile, North Africa has 86 mega-planned projects valued at USD 132.2 billion. The least number of projects are in the Central African countries, with just 15 mega projects underway and an estimated valuation of USD 7.4 billion¹⁰¹¹¹².

Key markets:

North Africa: Egypt, Algeria and Morocco are the important construction markets.

- Egypt had the largest number of infrastructure projects (42), followed by Morocco (25) and Algeria (9) in 2021
- Egypt leads the construction market in Africa with a significant share of projects (USD 108.8 billion). The high-value mega-projects funded by government investments in Egypt are the New Capital City Project and the Four Winds Coal Fired Power Plant.

Sub-Saharan Africa: Nigeria, Ethiopia, Angola, South Africa, and Tanzania will propel growth for the region.

- Projected annual growth of 5.7% to 2030 (Figure 8), as rising populations and rapid urbanization provide powerful growth drivers in East Africa and West Africa.
- Nigeria has 55 planned mega projects, which is the highest number of projects in West Africa. Nigeria has made investments in infrastructure, and transportation, specifically roads and bridges.
- Meanwhile, Ethiopia has 30 projects underway, the highest number of construction projects in the East African region. Kenya had 25 projects, followed by Uganda with 21 and Tanzania with 19 projects¹³.

Key sub-sectors: transport infrastructure and residential

- Transport sub-sector leads the sectoral mix with the highest share of all projects accounting for 197 projects valuing 121.4 billion USD in 2021.
- Correspondingly, the real estate sector has had the highest value of the project 232.7 billion USD for 85 projects in 2021. Meanwhile, commercial real estate accounted for the largest number of projects in Egypt.
- Transport and real estate sectors are followed by Energy & Power, Water, and Shipping & Ports¹⁴.



Middle East (GCC)

The outlook for the GCC construction industry has been transformed in 2022 by the sustained recovery in oil prices. The increased revenues from oil exports have eased the pressure on national finances and are enabling governments to stimulate the recovery through investment in strategic infrastructure projects. With some USD1.4 trillion worth of construction and transport projects planned in the Gulf Cooperation Council yet to see their main contracts awarded, the pipeline of future project opportunities is vast.

Key markets: Saudi Arabia and UAE

- 63% of construction projects planned in GCC region are located in Saudi Arabia and 22% of construction projects are planned in UAE. Both these economies are expected to post a healthy CAGR in 2022-27. Saudi Arabia is expected to post a CAGR of more than 5% and UAE is expected to grow at a CAGR of 3.9% in 2022-26¹⁵¹⁶. Baseline projections suggest a growth rate for GCC countries to be close to 3.7% (Figure 8).

Key sub-sectors: Commercial and residential

- In both countries commercial projects are expected to increase faster than other sub-sectors driven by increasing consumer confidence, the return of international travel and rising property prices¹⁷¹⁸.



Europe

European construction will see major growth opportunities post-pandemic as stimulus recovery packages are enacted by the EU to support a refiring of the economy. The Next Generation EU fund is focused on supporting the rebound and raising the climate sustainability of the EU economy.

Key markets: Germany and UK

- Germany is expected to post a CAGR of 6.3% in 2022-26¹⁹ while the UK's construction industry is expected to grow at an average annual growth rate of 2.6% in 2023-26²⁰.

Key sub-sectors: transport infrastructure and repair & re-development of existing public buildings

- Investments will be seen in the transport sector especially new rail infrastructure and recharging networks for electric vehicles
- Making old buildings to make them more energy efficient will drive a lot of renovation works on public buildings in the coming years.

Western Europe will see lower growth in the construction sector at only a 2.1 % annual growth rate between 2019-2030 (Figure 8). This shift will be driven by longer-term constraints from ageing population dynamics, high materials prices and product shortages due to Russia's invasion of Ukraine. Russia and Ukraine are key suppliers of steel to the region, and disruptions to oil and gas supplies are having a major impact on energy costs²¹.



Latin America and the Caribbean

Construction output in Latin America is forecast to grow by 3.5% between 2020-2030 period (Figure 8) and is expected to reach USD 545.6 billion in 2030, up from USD 519.4 billion in 2021²².

Key markets: Brazil, Argentina and Peru

- Brazil, performed strongly in 2021 with output levels higher than they were before the pandemic.
- Argentina and Peru also performed strongly, while Mexico's performance has been slow-moving, with the country struggling to regain output lost in 2020.
- It is not expected to reach pre-pandemic levels until 2025. During this time, the market is expected to be affected by high inflation and policy tightening as well.



North America

United States of America: The construction sector is expected to grow by 2.8 % during 2020-2030 (Figure 8).

The sector is expected to face headwinds due to rising energy costs, cost of raw materials and general inflation in the economy.

Key sub-sectors in US: Residential and infrastructure

- Strong residential growth (that continued relatively unhindered by lockdown restrictions) is driving momentum in the construction sector. Conversely, nonresidential growth is expected to continue to be slow with many areas such as office space, retail, and hotels all remaining subdued.
- The Infrastructure Investment and Jobs Act, with investments across healthcare, public safety, and other public infrastructure, is expected to bode well for the main players across the non-residential segment.
- The American Jobs Plan (AJP) will underscore US infrastructure construction. The primary recipient of the AJP stimulus will be the civil engineering sector.
- Construction of a new network of EV charging stations across the country will also be critical in transitioning the US away from internal combustion engine vehicles.

Canada: The construction industry in Canada registered an annual growth of 6.1% in real terms in 2021, compared to a decline of 2% in 2020. The Canadian construction industry is expected to expand by 4% in real terms in 2022, as strong building permit data points to strong growth in 2022²³.

Key subsectors: Residential and Industrial

- Residential construction in Canada has registered an annual growth of 20.3% between 2017 and 2021. This pattern of growth is expected to continue in the coming years²⁴.
- Demand for warehousing and office spaces is driving industrial construction growth, however, it is expected to remain lower than residential construction growth²⁵.

1.3 Key Drivers of Growth in Construction and its Impact on Skill Demand

The growth in the construction sector is predominantly driven by population growth and urbanization which has concentrated construction activities in cities and megacities. Significant investment in transport, water, waste management,

social infrastructure, renewable energies, telecommunications, industrial infrastructure, and adaptation of new technology is driving the trend in the construction sector globally.

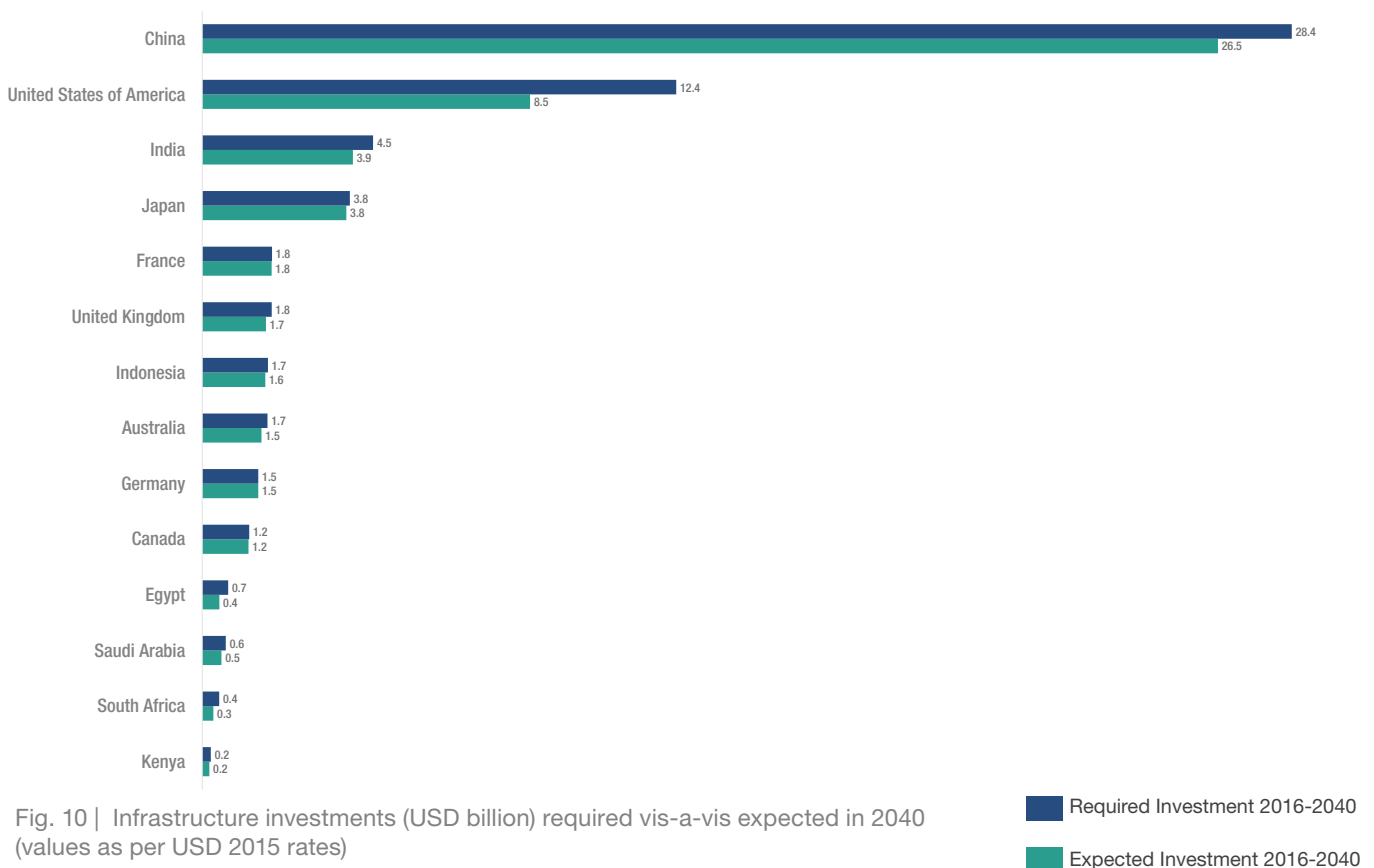
a. Governments impetus towards investments in infrastructure:

The construction industry is an investment-led sector wherein governments hold high levels of interest as it is imperative for the prosperity of their country. Almost two thirds of the infrastructure investment predicted for the decade is concentrated in emerging countries. Emerging markets are primarily looking to develop energy, transport networks, sewage and waste systems, and other large-scale projects to facilitate industrial development.

Parallely, even the developed nations need to invest in infrastructure to improve competitiveness

and meet increasing demand, sustain economic development, decarbonize the economy and digitalize²⁶.

Estimates of infrastructure investment required till 2040 show that China and USA will see a large investment in infrastructure in the coming decades (Figure 10). Investment in infrastructure in countries like Japan, France, UK, Australia and Germany too will remain significant. Investment needs of the countries vary, and as a result the requirement for types of construction sector skills is likely to vary by country²⁷.

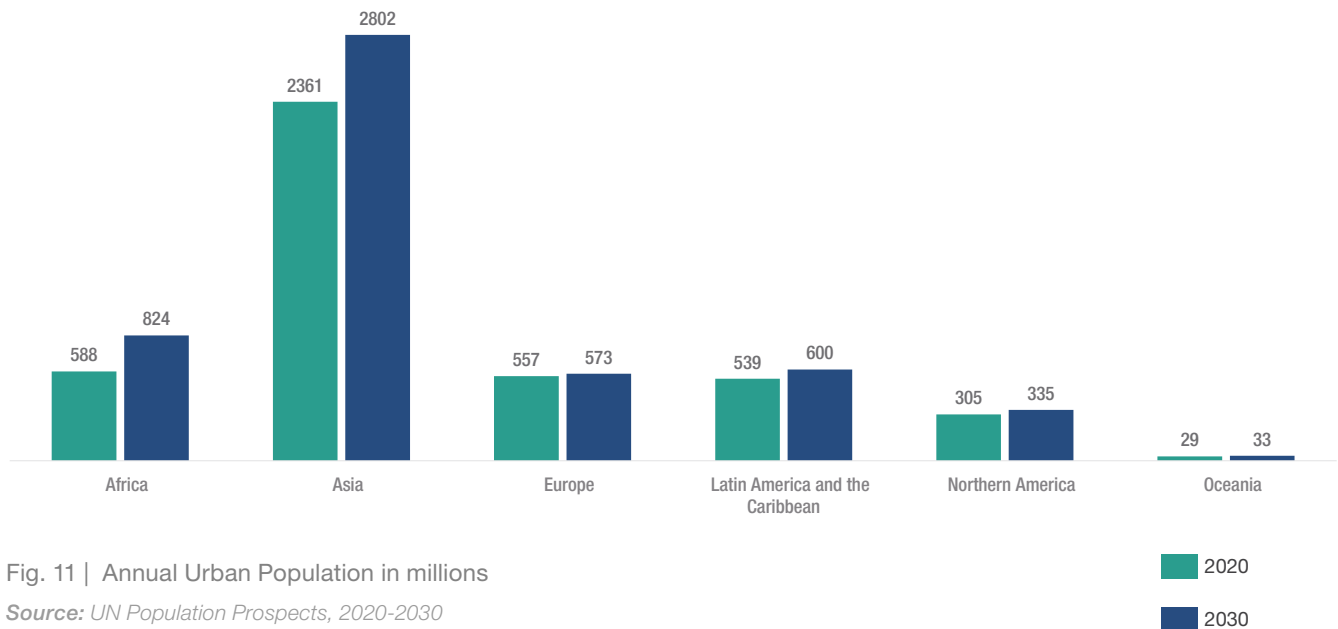


b. Urbanization and population growth:

Growth in population drives the need for basic infrastructure and housing. The global population reached almost 7.8 billion people in 2020 and is expected to rise to over 8.5 billion by 2030. Alongside population growth, there is a gradual rise in urban population and according to the UN, an additional 2.5 billion people will move to urban areas by 2050. 90% of this shift will be witnessed in Asia and Africa continents²⁸²⁹ (Figure 11).

Increasing urban population is driving the demand for urban infrastructure growth. Meanwhile, urban infrastructure projects are becoming increasingly complex and require better, benchmarking, tracking,

reporting and communication. This is driving adoption of better project management practices that are embedded in technology and driving skills required of construction workers³⁰. For example, managers and executives, contractors, consultants and other staff in the supply chain are now required to be digitally well-versed. Non-technical skills like communication, problem-solving approach, collaboration, ability to work in fast-paced environments, and other performance-enhancing skills are becoming increasingly important for all types of workers and need special attention.



c. Pandemic-driven higher household savings is the key driver of the residential construction market revival:

The rise in urbanization and population growth has given a boost to the residential market as well. The residential markets are witnessing a sharp increase in house prices as pent-up demand during the pandemic has now risen. While economic activity came to a virtual halt across most economies during the pandemic, households had the

opportunity to accumulate savings, especially in high-income countries. The release of excess household savings by consumers has driven the boom in the housing market along with residential renovation and upsizing of residential space as well as the repurposing of redundant space mainly from traditional retail sectors in high-income countries³¹.

d. Race towards net zero is driving the move towards sustainable construction:

Construction uses 32% of the world's non-renewable natural resources and is infamous for generating extensive amounts of wastage. Meanwhile, the current climate crisis is driving a huge demand to decarbonize energy networks and develop renewable energy. As a result, sustainable and quality infrastructure is emerging as a key driver of economic growth and social progress to facilitate the achievements of Sustainable Development Goals (SDGs) and Paris Agreement commitments. In 2020, Environment, Social and Governance (ESG) related capital for infrastructure grew 28% with a large part of the increase due to a flow of fundraising into sustainability-related strategies³²³³.

The race to accelerate Net Zero is transforming the construction sector globally along with an increasing focus on ESG and green financing. Globally, 137 countries out of 192 are signatories to the UN Climate Convention, accounting for 80% of global emissions and pledging to achieve net-zero emissions by the year 2050. Several countries globally have set policies and laws to reduce carbon emissions by the year 2050 (Figure 12).

To cope with their sustainability commitments, governments are driving regulatory advances (drafting policies and laws) in relation to ESG concerns and are even establishing terms and conditions that construction companies are required to comply with in order to be able to access infrastructure project tender processes. In addition, private sector stakeholders are also

increasingly acknowledging the social aspects and as a result, institutional investors are focusing on sectors, companies and geographies that are prioritizing climate action and avoiding investments with high levels of exposure to climate change or with potential negative reputations from an ESG perspective³⁴.

As construction companies find themselves in the new realities of climate change and requirements for sustainable construction, the skills required from the construction workforce are also evolving to keep pace. We are already seeing new job titles in the construction industry like Green Building Specialists, Sustainability Engineer, Sustainability Manager, Sustainability Compliance Specialists, etc.

In the meantime, the construction sector largely remains a labour intensive industry and experiences a perpetual shortage of workers, especially skilled workers. The situation is exacerbated by shifting underlying trends in the industry of sustainable construction and changing technology. Thus, the future of the construction industry is bound to change with changing demands for a skilled workforce. In summation, construction activity has optimistic projections but faces some critical challenges of worker and skilled workers shortages which need to be solved systematically for a positive growth. In the next section, we discuss how underlying drivers of the construction sector are shifting the needle on types of construction skills required.

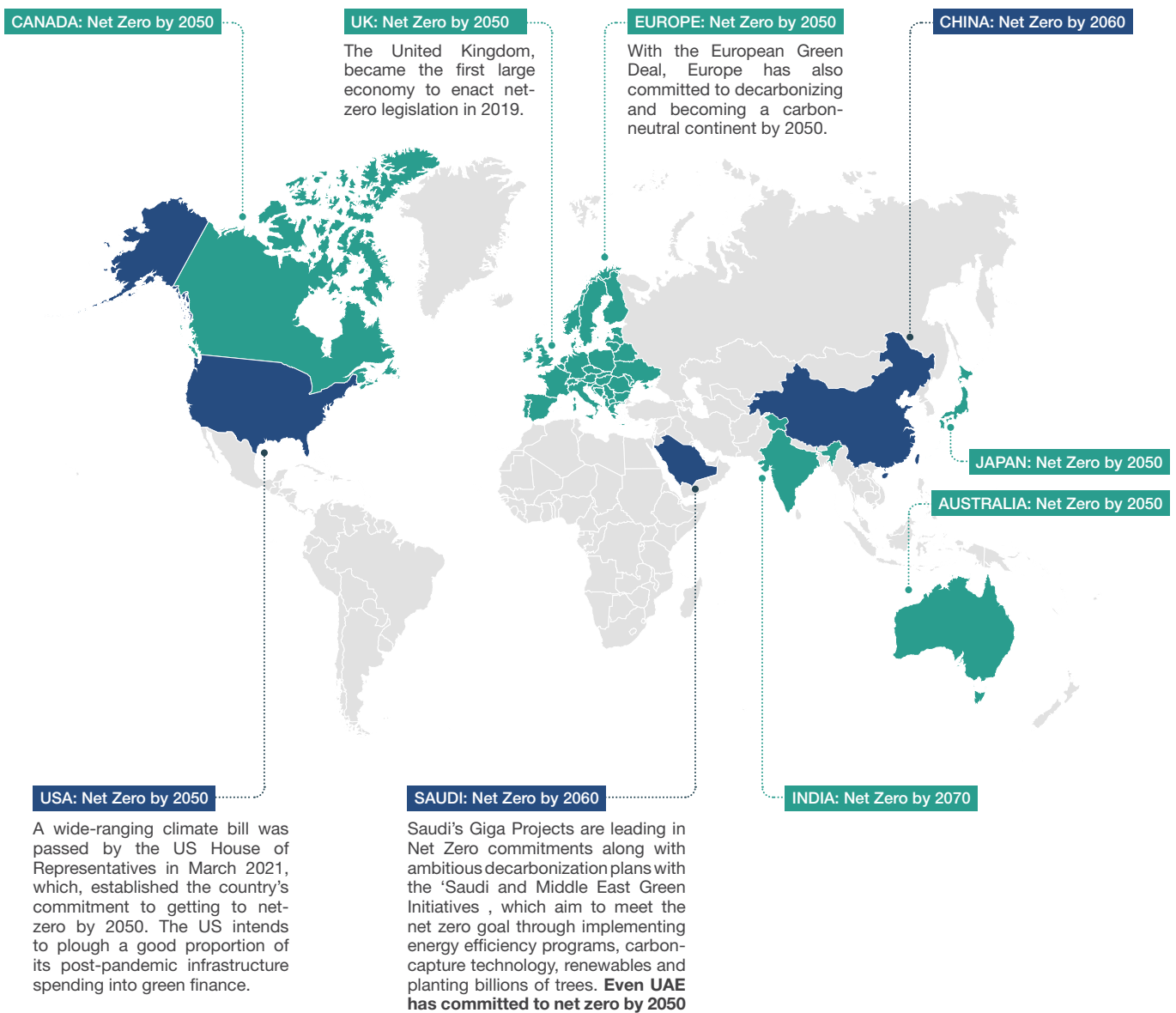


Fig. 12 | Net Zero Commitments for Key Economies

Source: Climate Action Tracker, 2022; India Times, 2021; JLL, MENA Construction Economic & Cost Insights 2022

CHAPTER 2

GLOBAL CONSTRUCTION WORKFORCE

ILO estimates suggest that 257 million workers have been employed by the construction sector which accounted for over 7.7% of global employment in 2020 prior to the pandemic³⁵ (Figure 13). The sector is facing serious challenges as demand for construction workers is increasing while productivity of the workforce remains low. Aging of populations in developed economies is also putting further

pressure on the total workforce. In this section of the report we review the construction sector workforce trends and demands for workforce in key markets. The section concludes with a discussion on opportunities and challenges of sending Indian workers to selected six economies indentified for a detailed analysis.

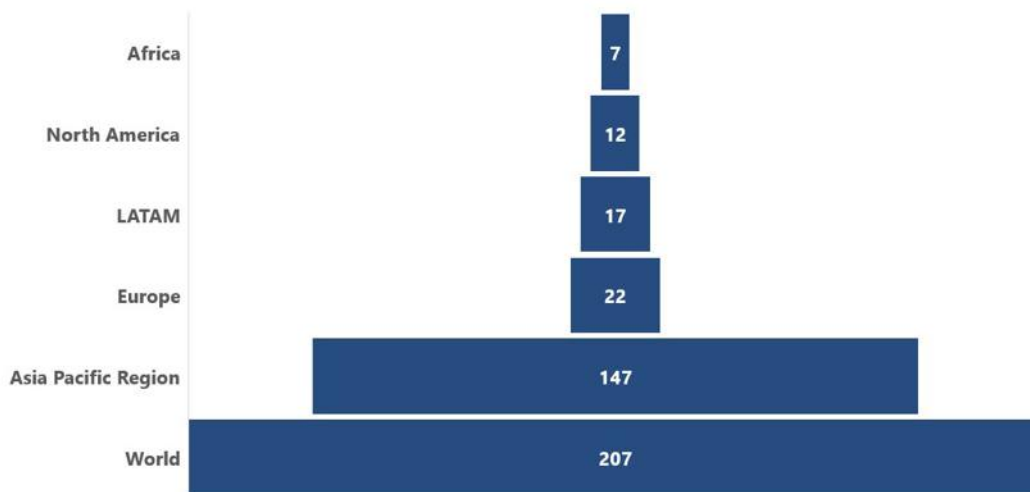


Fig. 13 | Employment in Construction Sector in millions

Source: ILOSTAT; OECD Stats; Statista 2020; PLFS 2019

2.1 Current Status of Construction Workforce

a. Labour shortage across construction markets

The construction industry is in a dire situation, faced with a severe worker shortage. Countries like Qatar, Egypt, India, China, Kenya experienced high growth in construction markets between 2015 and 2019 but employment in the construction

industry hasn't kept pace in these countries (Figure 14). Growth in construction activity in developed countries like Japan, Germany, UK, USA have remained lower than in the developing countries during the same time period, however construction

employment growth has faced pressure due to an aging workforce.

Carpentry or Millwork and Electrical contractors top the list of trades where skilled worker shortages are most expected. Specifically for green projects trades of most concern and deficiency are

heating, ventilation and air-conditioning (HVAC), boilermakers and carpenters. Additionally, concrete finishers, cement mason and iron workers (for steel erection, fabrication and welding) are in inadequate numbers. Shortage in the construction sector also exists in the high skilled workers with shortage

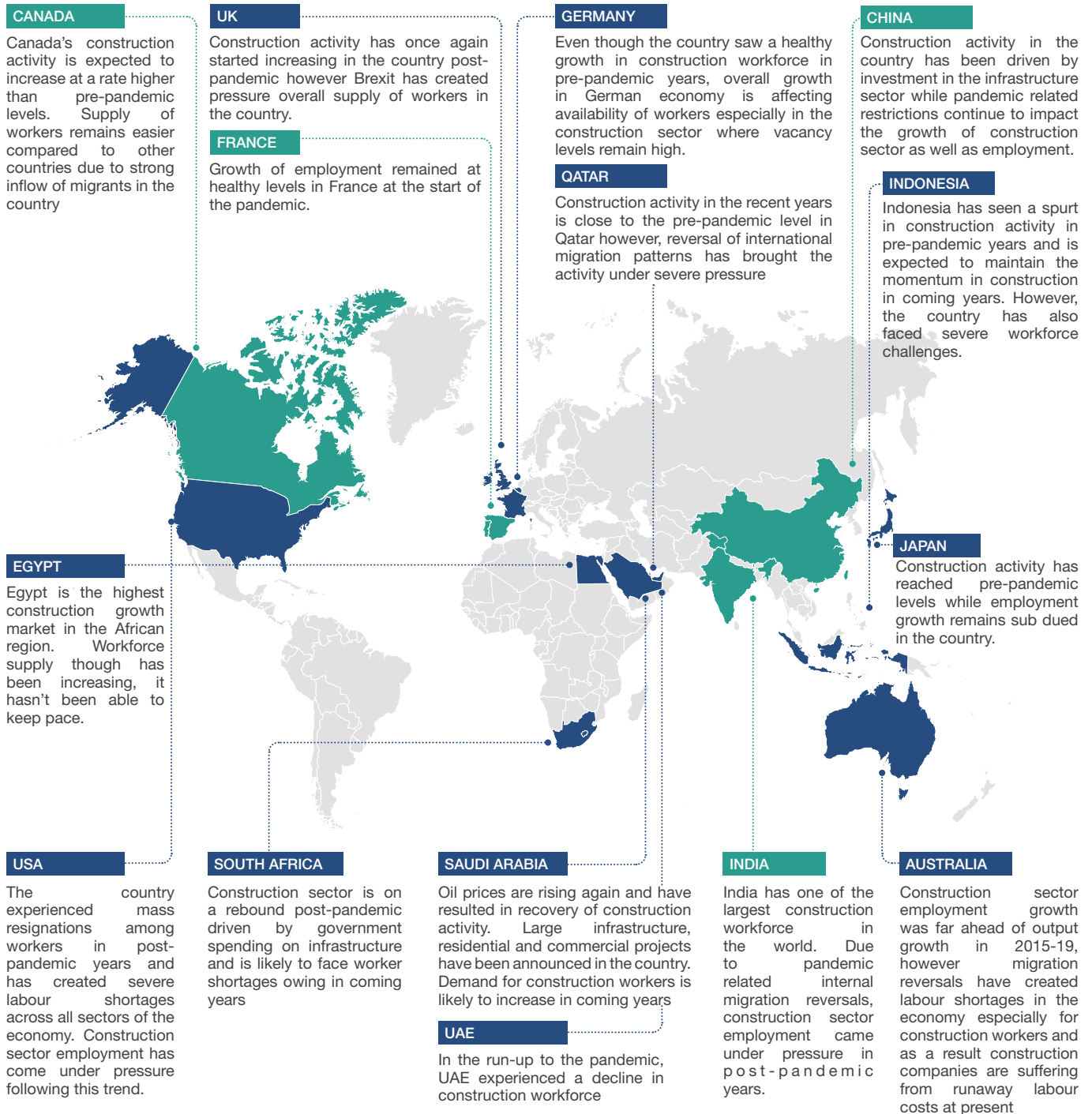


Fig. 14 | Growth in construction outpaced employment growth in most global markets

in Electrical, Plumbing, Civil and Mechanical engineers. Construction had been playing catch-up with these labour shortages for years, when COVID-19 struck, which further complicated the labour supply picture. Countries that rely on international migrant workers such as Singapore,

Malaysia and the United Arab Emirates have been hit particularly hard during the pandemic. In addition to this local workers moved to other lines of work especially in the gig economy during Covid. The transition back to the original geography and sector of work has been slow.

b. Low productivity of construction workers and need to acquire new skills

Construction sector globally has been witnessing low labour productivity in comparison to productivity growth in other sectors of the economy. Labour productivity growth in the manufacturing sector was 3.6% in the last two decades and 2.8% in the total world economy, however, the construction sector managed a labour productivity growth of only 1% in this time period³⁶. Low levels of productivity in the construction sector are due to various factors like:

- Regulations
- Long chain of contractual arrangements
- Slow adoption of new materials, project management techniques and digital technology.

Construction industry has been embracing the use of new technologies to deal with a shortage of talent, navigate the pandemic's impact on on-site working practices, and realize time and cost savings more broadly³⁷. Apart from increasing use of new materials, the construction sector worldwide is seeing increasing adoption of Building Information System (BIM) which allows construction project management to move from

document-centric to data-centric approach. With BIM technology, construction projects are managed collaboratively by bringing together various types of models (architectural, structural, electrical, plumbing etc) and allowing management of complex projects from planning and design to construction and delivery phases seamlessly.

Governments around the world are pushing to mainstream BIM in their construction industry by requiring implementation of public works use BIM³⁸. This push for BIM compliant projects and contractors has created a demand for BIM Engineers, Modelers and Managers. As BIM becomes more commonplace in the industry, even mid-level workers will be required to possess BIM proficiency in near future. Overall, as the construction sector transforms, it is imperative that the workers draw upon different skills than traditional positions require them to have. The increasing need in construction for greater productivity is likely to drive more rapid adoption of these trends which will require skilling initiatives for the construction workforce.

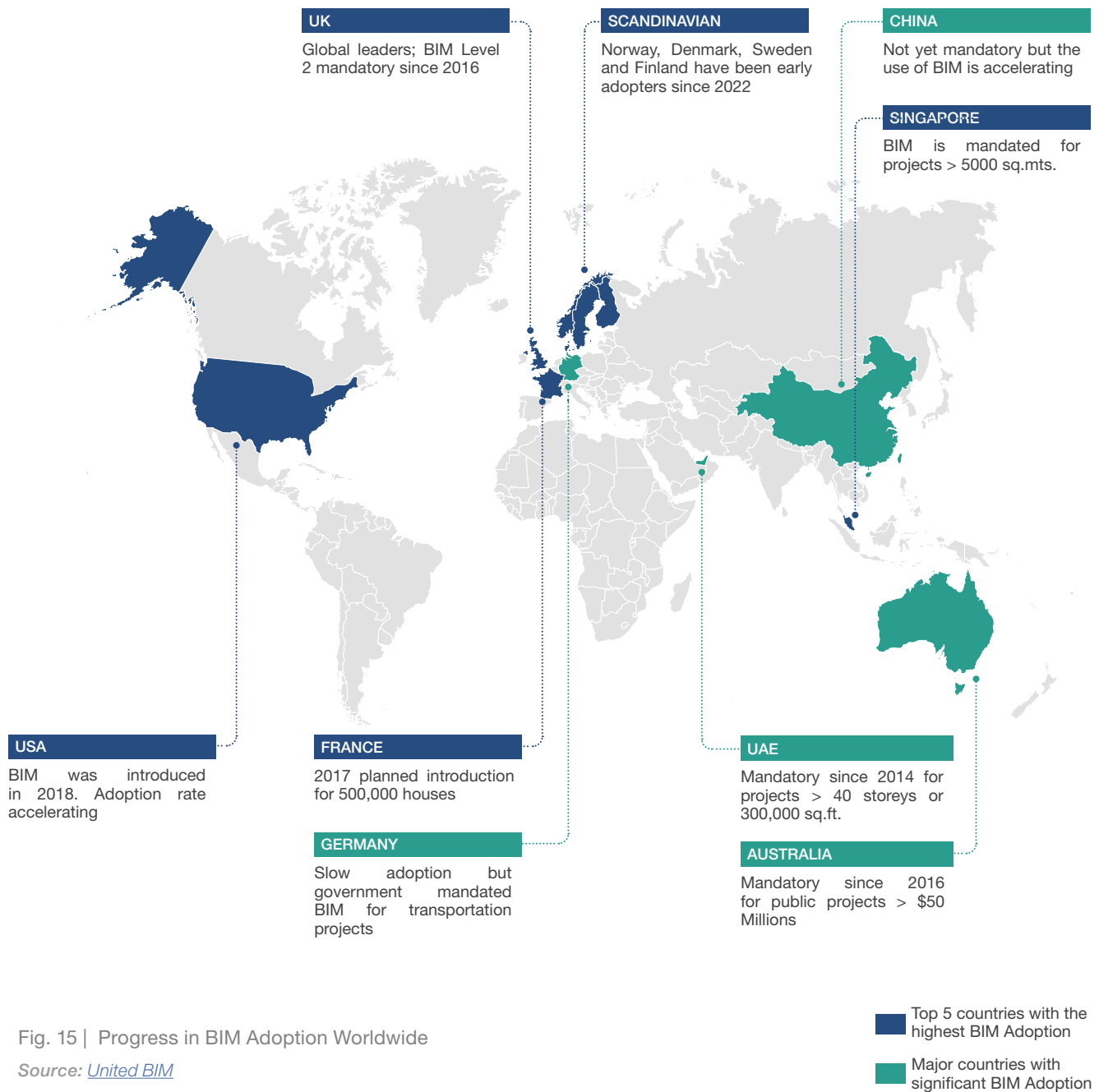


Fig. 15 | Progress in BIM Adoption Worldwide

Source: [United BIM](#)

c. Aging workforce in developed countries

Large construction markets like China, Canada, France, Germany, Japan, UAE, UK and USA are aging fast. Proportion of the population in the 65+ age group is growing much faster than their total population. The situation is especially unfavorable in Japan, France and Germany.

Percentage population in the 65+ age group in Japan increased from 24% in 2010 to 39% in 2020, while its total population declined during this time period. In France, the proportion of population in the 65+ age group increased from 17% to 21% between 2010 and 2020 while its population growth remained subdued at 3% total increase in population between 2010 and 2020. Germany's population in the 65+ age group increased from 20% to 22% and its total population increased by 2% during the same period. USA, Canada and UAE are other construction markets that are aging fast and the proportion of population in the 65+ age

group is quickly catching up with the increase in total population(Figure 16) .

On the other hand, there are countries like Australia, India and Indonesia that have experienced moderate aging but overall population growth remains high. These countries have a sizable construction market too. On the extreme end of the spectrum are Qatar, Kenya, Egypt, Saudi Arabia and South Africa where the proportion of population in the 65+ age group remains low and overall population continues to grow. Their construction markets are also experiencing growth and it is expected that they will continue to grow in the near future. Developed countries with aging populations Japan, Germany and UK face severe challenges with adequate supply of workers to construction sector and are looking at potential international migrant workers to fill the supply gap.

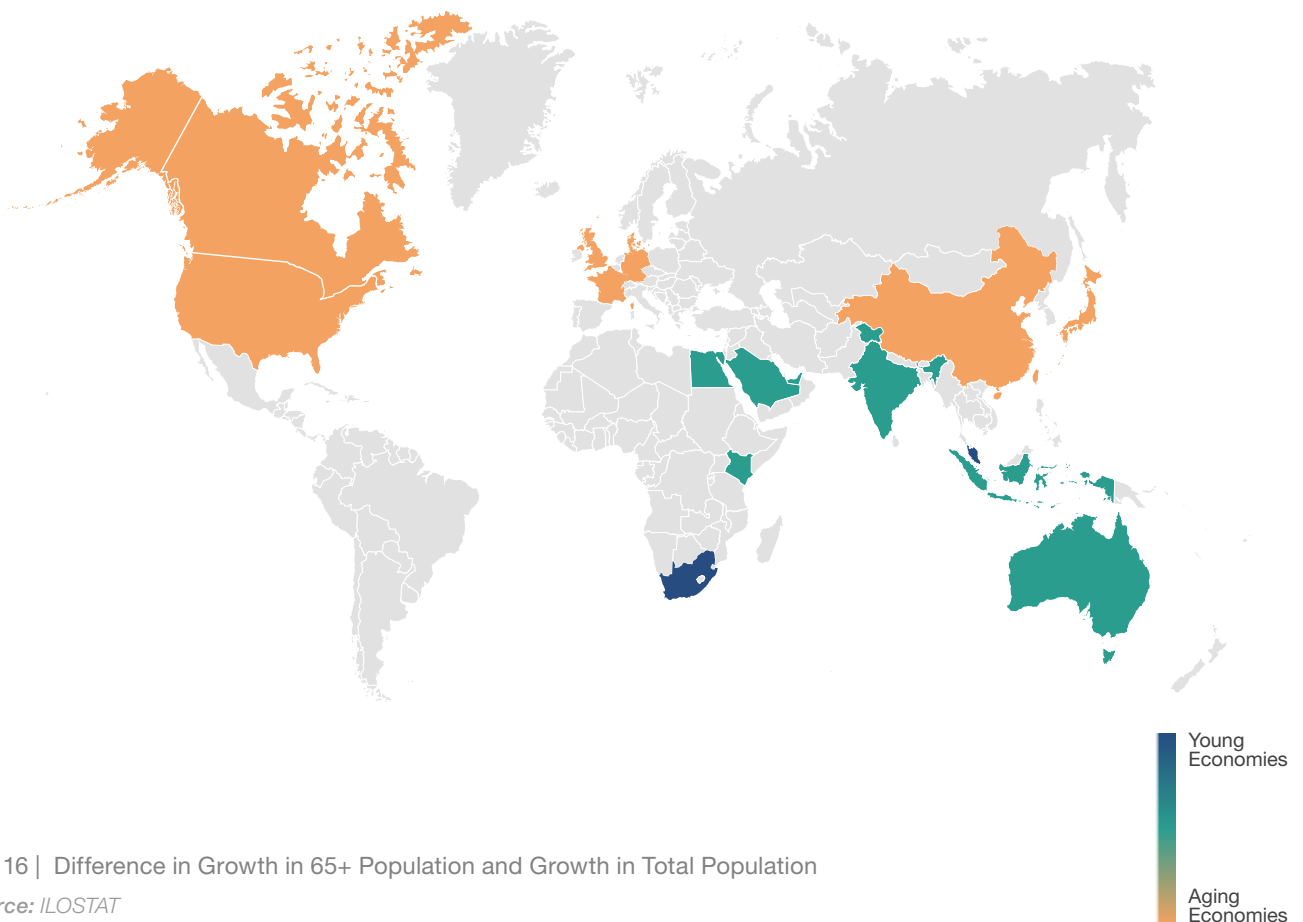


Fig. 16 | Difference in Growth in 65+ Population and Growth in Total Population

Source: ILOSTAT

2.2 Global Labour Force Migration

International migration has been an important lever to help workforce shortages internationally. In 2019, ILO estimated that **169 million people were international migrant workers**. This is an **increase of 5 million migrant workers (3.0%) from 2017, and an increase of 19 million (12.7%) from the 2013 estimate of 150 million migrant workers³⁹ (Figure 17).**

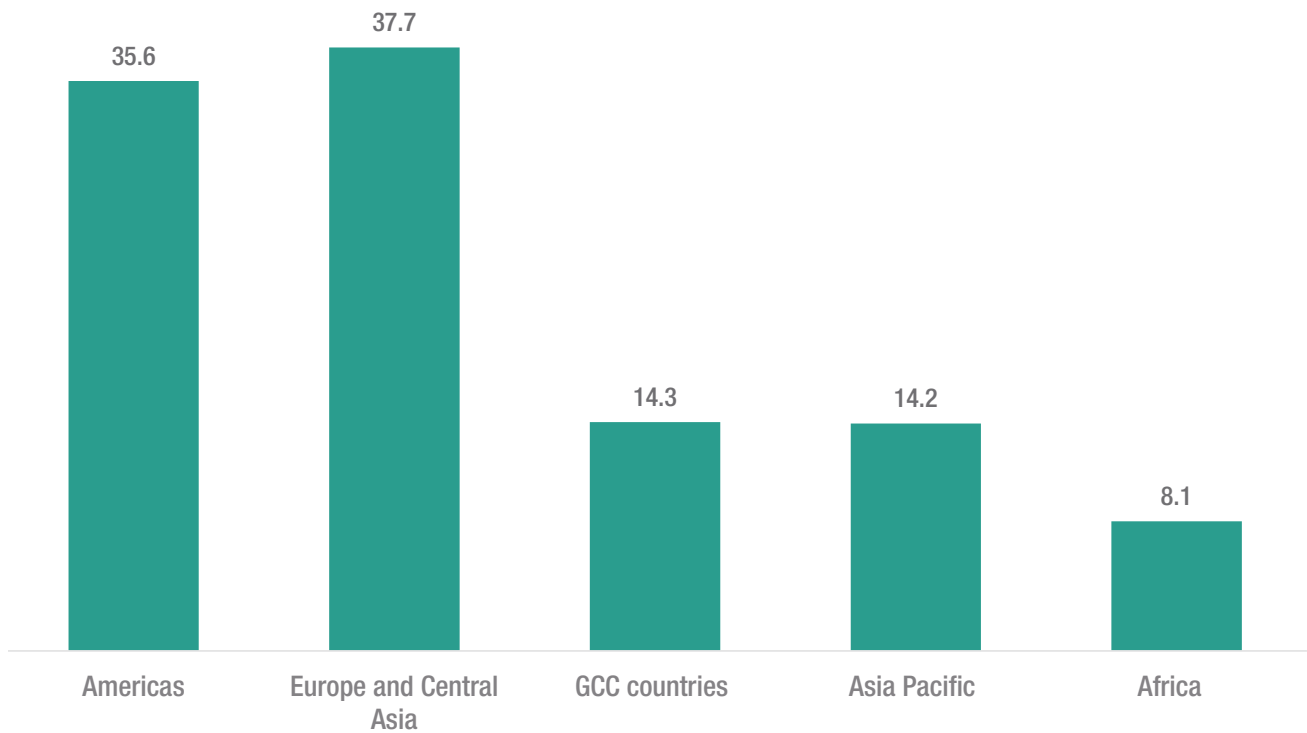


Fig. 17 | International Migrants Workers Regional Distribution (in millions)

Source: UNDESA, 2019; ILO, 2021

→ Majority of international migrant workers travel to high-income and upper middle income countries

Of the estimated 169 million international migrant workers in 2019, **113.9 million (67.4 %)** are in high-income countries and **33 million (19.5%)** in upper-middle-income countries, so that **86.9 percent of international migrant workers are found in either of the two country income groups**. The rest are in lower-middle-income (9.5%) and low-income countries (3.6%).

→ Three subregions of Northern, Southern and Western Europe, Northern America and the GCC countries are key destination with the highest number of international migrant workers:

Globally, 169 million migrant workers are distributed amongst the major regions as follows; Europe and Central Asia, 37.7%; Americas, 35.6%; GCC countries, 14.3%; Asia and the Pacific, 14.2%; and Africa, with only 8.1% (Figure 17).

→ Internationally, migrant workers constitute 4.9 per cent of the global labour force of destination countries:

In **Northern, Southern and Western Europe**, migrant workers make up **18.4% of the labour force**. In **North America**, their share increases to **20.0%**. The highest share is observed in the **GCC countries at 41.4%**, which is due to the relatively small population size of this subregion and the substantially higher labour force participation of migrants as compared to non-migrants.

→ Asia Pacific region is the region of origin for over one-third of the international migrant workers:

63% of working-age international migrants are from the Asia Pacific region. The number of migrants originally from the Asia–Pacific region has almost doubled over the last 20 years. While Asian and Pacific emigrants were around 46.3 million in 2000, that number reached 82.6 million in 2020.

→ India, Bangladesh and Pakistan migrants to GCC countries is one of the main labour migration corridors in Asia and the Pacific region:

Within Asia, India, Bangladesh, Nepal, Sri Lanka, Afghanistan and Pakistan are net origin countries⁴⁰. These countries are primarily supplying medium-skilled workers meanwhile China, India and the Philippines are the an important source of skilled migrant workers⁴¹. However, the pandemic led to a trend of reverse migration and a slow rate of resumption of migrant flow from Asia pacific region. Next we discuss the outflow of migrant workers from some of the key origin countries.

COUNTRY OF ORIGIN	NUMBER OF WORKERS SENT ABROAD	TYPE OF MIGRANT WORKFORCE	TOP FIVE DESTINATIONS
→ India	32 million+ migrants from India live abroad ⁴²	Majority semi-skilled and unskilled Indian workers go to GCC countries High skilled workers go the USA, UK, Canada and Australia	<ul style="list-style-type: none"> • UAE • USA • Saudi Arabia • Oman • Kuwait • UK • Canada
→ Pakistan	6.3 million Pakistani migrants have moved internationally in 2020 ⁴³	The majority of Pakistani workers moving abroad for either skilled (46%) or unskilled (40%) occupations (2021)	<ul style="list-style-type: none"> • Saudi Arabi • Oman • Qatar
→ Bangladesh	Total of 617,000 Bangladeshi workers moved to international destinations in 2021 ⁴⁴	Half of the Bangladeshi workers abroad are engaged in semi-skilled professions.	<ul style="list-style-type: none"> • Saudi Arabia • Oman • UAE • Singapore
→ Philippines	The 2019 survey on overseas Filipinos reported 2.2 million workers working abroad ⁴⁵	<p>Laborers make up 40% of the total migrating workforce in 2019. Crafts and trades workers migrating overseas have seen a 6% decline (2010-2019).</p> <p>Lower percentage shares of professionals, managers, and clerical support workers migrated in 2019.</p>	<ul style="list-style-type: none"> • USA • Saudi Arabia • Canada • UAE • Australia • Japan
→ Vietnam	939,596 Vietnamese citizens migrated internationally in 2020 ⁴⁶	Vietnam mainly sends low-skilled and unskilled migrant workers. In some of the key destinations like Japan, Vietnamese workers have to meet high-quality technical standards.	<ul style="list-style-type: none"> • USA • China • Australia • Canada • France • Japan
→ China	10.5 million people migrated from China abroad in 2021	<p>Most unskilled and semi-skilled Chinese workers move to Hong Kong, Myanmar for work opportunities</p> <p>While high skilled workers move to USA and other OECD countries</p>	<ul style="list-style-type: none"> • Hong Kong • USA • Myanmar • South Korea • Japan

Fig. 18 | Countries in Asia- Pacific with High Workforce Outflow

India

India was the largest origin country of international migrants in the world in 2020⁴⁷. According to Ministry of External Affairs at present 32 million Indians living abroad and about a third of Indians, i.e, 8.9 million are living in GCC countries alone⁴⁸. As per the number of ECR passport holders working in ECR countries, most Indian workers traditionally

migrate to GCC countries for work (Figure 19). Highest number of ECR were cleared for Saudi Arabia (13.1 million) followed by UAE (9.9 million) between 2014 and June 2022. ECR passport holders are usually Indian workers with below class 10 education migrating for work purposes to the 17 ECR countries.

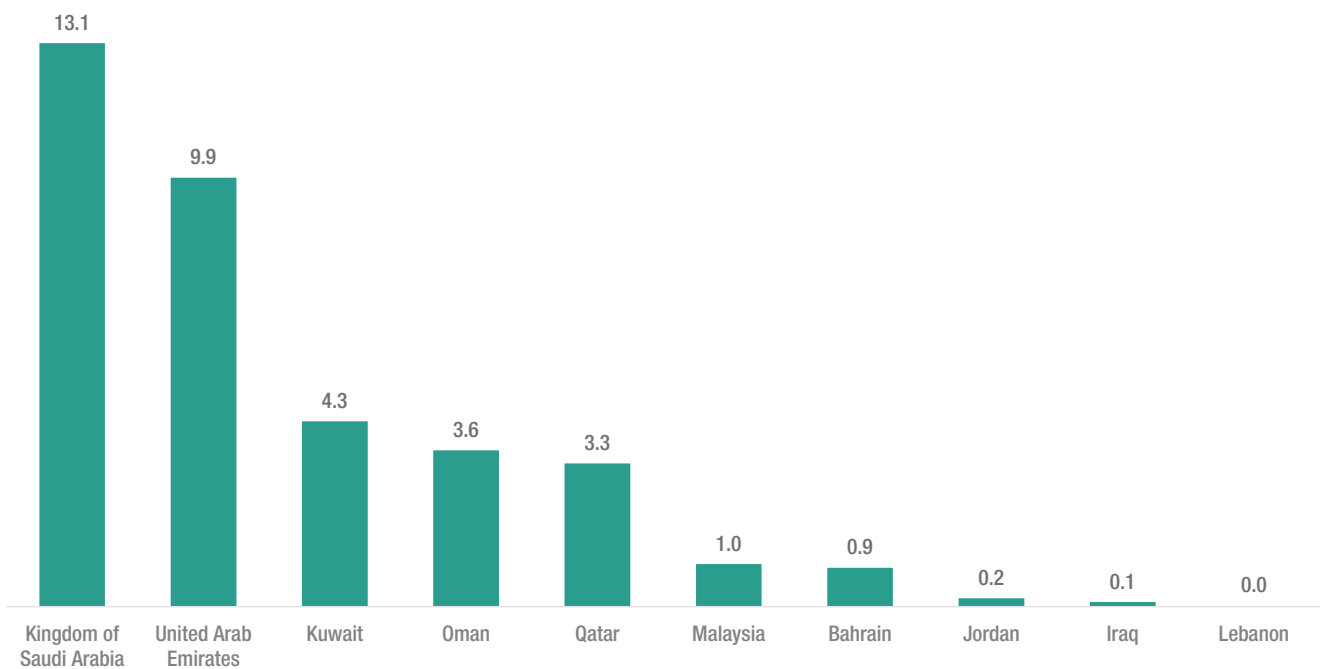


Fig. 19 | Emigration Check Requirements cleared from 2014 to June 2022 (in one hundred thousand)

Source: Ministry of External Affairs, 2022

Meanwhile, number of Indians migrating to GCC has been on a decline over the past decade due to a combination of factors⁴⁹:

- Lower wages offered to Indian workers compared to home country
- India's strict regulation of its citizens' overseas employment
- Emergence of other countries sending workers to GCC for instance Bangladesh has been increasingly sending more workers.
- Higher fees for work permits and higher taxes

in destination countries

- Training of local population to take up more jobs in GCC destination countries

Albeit, India has been the largest recipient of remittances since 2008. Remittances are widely considered to be the most direct and measurable link between migration and development. In 2020 the USD 540 billion in remittances worldwide far exceeded the sum of foreign direct investments (USD 259 billion) and overseas development assistance (USD 179 billion), according to the World Bank, 2021⁵⁰.

India continues to be the top recipient country with USD69 billion of remittances in 2017 sent by a large pool of skilled, semi-skilled and unskilled Indian migrants across the globe. **Kerala, Maharashtra and Karnataka are the major recipient States**

(Figure 20). 82% of the total remittances received by India originated from seven countries, viz., the United Arab Emirates, the United States, Saudi Arabia, Qatar, Kuwait, the United Kingdom and Oman.

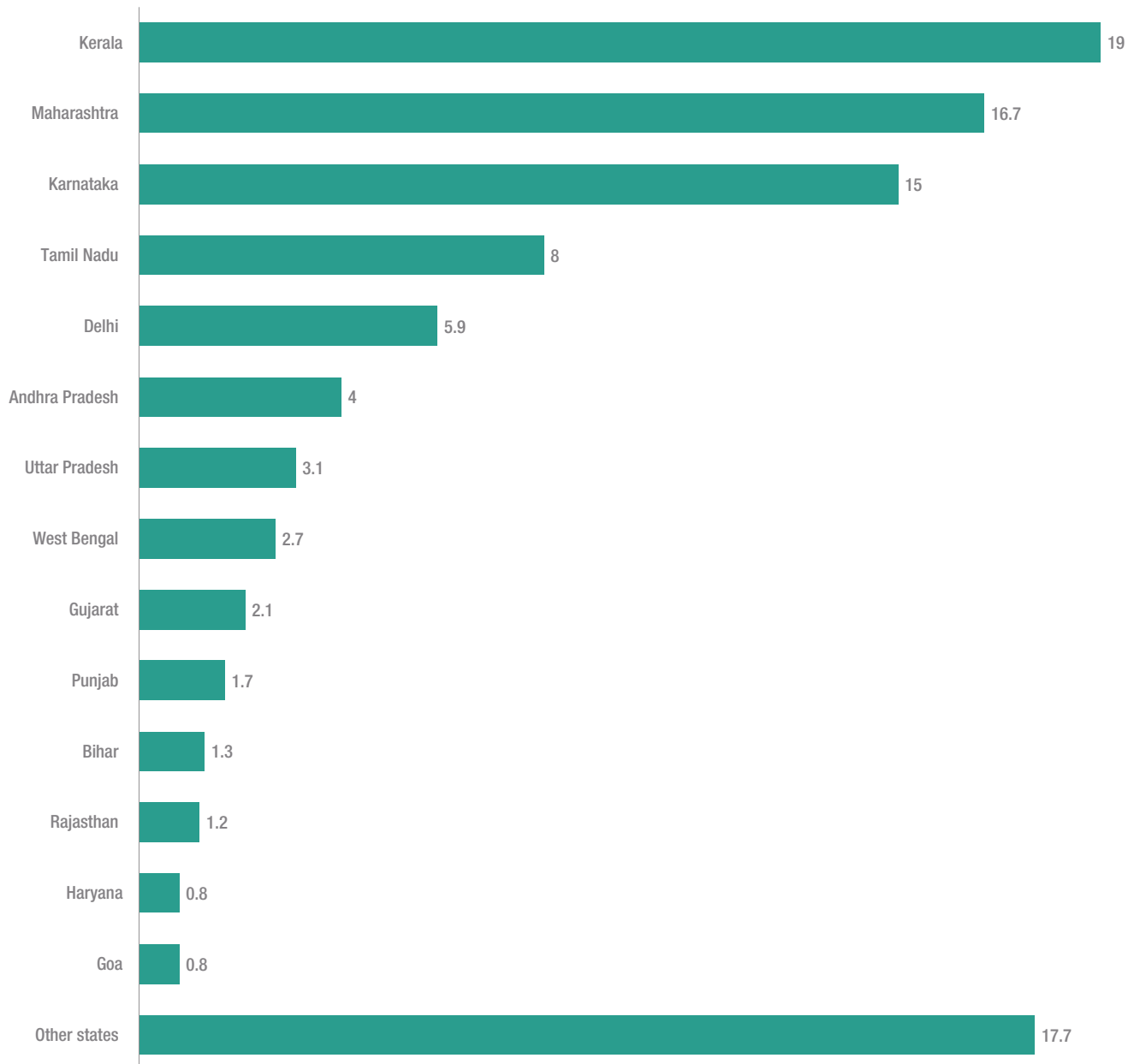


Fig. 20 | State-wise Share of Remittances in India (in billion USD)

Source: [RBI, 2018](#)

The GCC countries account for more than 50 per cent of total remittances received in 2016-17. Contrastingly, the Indian diaspora in the USA,

which sends the second highest remittance to India is characterized by a high skills and high earnings group of workers.

2.3 International migration as a strategy to fill worker supply gap

Countries have been using international migration as an important strategy to bring economic and productivity growth. Research has shown that international migration especially in advanced economies improves the output and productivity of recipient countries at the same time improving the outcome for migrating population⁵¹. In line with this trend, the Indian diaspora has been making significant economic contributions in destination countries in technology, health, retail and other sectors.

Meanwhile, the number of Indians migrating to international locations has been increasing every year. In 2020, approximately 18 million migrated abroad⁵² and about 59% of Indians who move abroad suggest their reason to move is for employment⁵³. India's enormous demographic dividend and its increasing focus on skilling the workforce gives the Indian workforce the potential to alleviate labour supply and productivity challenges around the world.

We study three developed markets that are experiencing labor shortages especially in the construction sector and are inviting international workers to fill open positions. At the same time, traditional destination countries in GCC areas have shifted their requirements towards workers skilled through formal training and armed with certifications.

Considering these shifts, we have identified 6 economies - Qatar, UAE, Saudi Arabia, Australia, Germany and Japan for further analysis. The six economies have been selected based on the following parameters (Figure 21);

- Size of the construction sector in these countries
- Shortage of workers
- Rate of aging of workforce
- Existing international migration corridors









COMPONENTS	QATAR	UNITED ARAB EMIRATES	SAUDI ARABIA	AUSTRALIA	GERMANY	JAPAN
 Construction value added in 2019 (in USD billions)	21	36	41	93	148	239
 Construction labour force in 2019 (in millions)	0.9	1.3	2.3	1.2	2.9	5
 Construction sector projected growth (CAGR) (%)	10.54 (2021-2027)	3.9 (2022-2026)	>5 (2018-2027)	2.4 (2023-2026)	6.3 (2022-2026)	5 (2020-2027)
 Major Construction sub-sectors	Infrastructure, Non-residential & Residential	Commercial, Infrastructure, Residential, Industrial	Industrial, Infrastructure, Commercial and Residential	Engineering Construction & Non-residential	Residential, Commercial & Public Construction	Commercial, Industrial Infrastructure & Energy and utilities
 Major Construction hotspots	Doha and Al Wakrah	Dubai and Abu Dhabi	Riyadh, Makkah, Tabuk, Madinah	Sydney Melbourne	Frankfurt, Stuttgart, Berlin	Tokyo
 Participation in vocational programs 15-24 years (%)	0.6 (2018)	0.5 (2017)	0.3 (2017)	19.9 (2017)	20.6 (2017)	22 (2017)
 Indian diaspora in the country (2020)	0.7 Millions (32%) (Top most)	3.4 Millions (40%) (Top most)	2.5 Millions (19%) (Top most)	0.5 Millions (8%) (Top 4)	0.10 Millions (0.7%) (Top 31)	0.03 Millions (1.3%) (Top 11)
 Other major countries of origin	Bangladesh (12%) Nepal (11%) Pakistan (11%) Egypt (8%)	Bangladesh (12.57) Pakistan (11%) Egypt (10%) Philippines (6%)	Indonesia (12%) Pakistan (11%) Bangladesh (10%) Egypt (7%)	United Kingdom (17%) China (9%) New Zealand (8%) Philippines (4%)	Poland (14%) Turkey (12%) Russian Federation (8%) Kazakhstan (7%) Syria (4%)	China (28%) Republic of Korea (16%) Vietnam (12%) Philippines (9.93%) Brazil (7%)

Fig. 21 | Construction Market in Selected Economies

Japan is the largest construction market among the six countries with the highest market size and largest construction workforce followed by Germany. Qatar is expected to experience runaway growth in the construction sector followed by Germany, UAE and Japan. All these countries are facing challenges in increasing the size of the construction workforce. Australia, Japan and Germany have a mature TVET ecosystem and are facing challenges due to aging populations while Qatar, UAE and Saudi Arabia have nascent TVET ecosystems and have always relied on international

migrant workers for employment due to the small size of the national population.

The study further analyzes the opportunity for the Indian construction workforce to contribute towards the construction sector in the selected six economies based on the need of construction workforce and the rate of Indian migrant outflow. Following indicators across the six selected economies have been used to divide the countries in a two by two matrix to identify the potential for Indian workforce to contribute (figure 22).

POTENTIAL FOR INDIAN WORKFORCE TO CONTRIBUTE

- Language requirements for work visa
- Fees for work permits
- Ease of hiring foreign labour
- Number of foreign migrant workers

Among these six countries, Australia, Germany and Japan are relatively harder for migrant workers to migrate to due to a large number of requirements related to skills exams (Japan), skill recognition (Germany), licensing (Australia) in addition to

CHALLENGES FOR CONSTRUCTION WORKERS

- Construction or general worker shortages
- Aging of the workforce
- Nationalisation or Liberalisation of workforce
- Maturity of skilling ecosystem

language proficiency. Movement to GCC countries is relatively easier as licenses and certifications are required for only a few trades like scaffolding inspector, riggers etc.

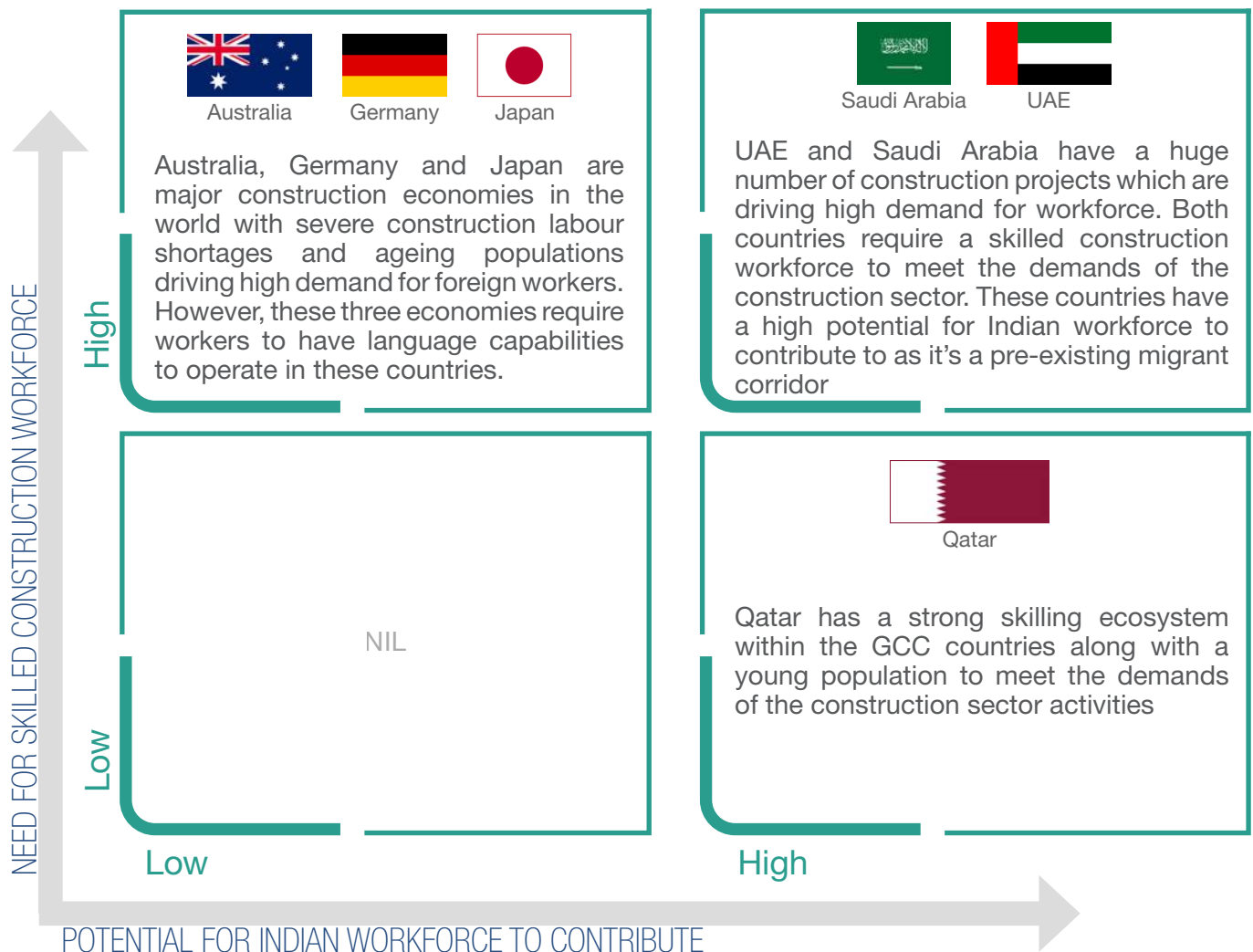


Fig. 22 | Country Matrix

JAPAN

Japan in recent years has begun liberalizing its stance on immigration in recognition of the needs of its aging population, and foreign workers in the country have doubled since 2013. Number of migrant workers in Japan has been steadily increasing since the last decade. Vietnam and other ASEAN countries workers mostly provide migrant workers to Japan⁵⁴.

Australia's construction industry has been traditionally dependent on migratory labor⁵⁵. As employment in the economy expands post-pandemic, the construction sector is facing challenges in attracting enough workers to the sector. There are 40,000 open jobs in the construction sector as of May 2022. Workforce shortages are showing up especially in the infrastructure sub-sector⁵⁶.

AUSTRALIA**GERMANY**

Germany is facing a critical shortage of skilled workers in all sectors of the economy with more than 50% businesses surveyed in a large sample survey suggesting shortage of skilled workers in the month of July 2022⁵⁷. Labor shortages are structural in construction for Germany, as employment and vacancies in construction have already passed their previous peaks. Unless there is an increase in migration to help fill these jobs, or a sustained burst in productivity, there is a risk that construction companies will have to pay more to attract workers, or delay work on the existing pipeline of projects.

	GERMANY	JAPAN	AUSTRALIA
Visa programs to tackle labour shortage	The Skilled Immigration Act makes it easier for workers with vocational training from non-EU countries to move to Germany for work.	Specific Skills Work Visa to allow foreign nationals to take up jobs where shortages are being felt the most.	Australia has unveiled Priority Migration Skilled Occupation List (PMSOL) to allocate work permits to foreign nationals
Expected number of workers to be allowed	Germany issued 60,000 visas between March - December 2020 under the Skilled Immigration Act.	Japan started accepting 5000 migrant workers per day since March 2022	Plans to accept permanent migrants 195,000 from June 2023 up from current quota or 160,000 in 2022 ⁵⁸
Construction occupations supported by visa programs	Welding & joiners, construction electronics engineers, pipe installation and maintenance professions, carpentry, glazing, roller shutter & venetian blind installation, finishing work, etc.	Formwork & reinforcement construction, plastering, concrete pumping, construction machinery, earthwork, roofing, scaffolding, carpentry, plumbing, building sheet metal work, HVAC, offshore civil engineering, etc. ⁵⁹	Construction project manager, surveyor, civil engineer, geotechnical engineer, structural engineer, electrical engineer, mechanical engineer.
Labour related treaties	Comprehensive Migration and Mobility Partnership Agreement between India & Germany to enable the “mutual mobility” of students, professionals and researchers ⁶⁰	Japan & India signed a Memorandum of Cooperation pertaining to the “Specified Skilled Worker” status of residence in Japan to absorb skilled foreign professionals & experts immediately for job opportunities.	IndAus Economic Cooperation and Trade Agreement 2021 facilitates the movement of Indian IT professionals to benefit the Australian ecosystem.
Barriers for Indian workers	Recognition of vocational training by Germany. German language skills at a minimum level of B1 according to the Common European Framework of Reference for Languages (CEFR)	Foreign nationals applying for work under the specified skilled worker category need to clear a skills examination as well as a Japanese language proficiency examination	Have acceptable vocational level English tested through tests like IELTS, TOEFL, CTE etc. Training programs completion for acquiring licenses to work on construction sites.
Major immigrant nationalities in the country	Poland, Turkey, Russian Federation, Kazakhstan. Syrian Arab Republic	China, Republic of Korea, Vietnam, Philippines, Brazil	UK, China, New Zealand, India, Philippines

GCC countries host the maximum number of Indian migrants with UAE leading the way. The other migrant nationalities include Bangladeshis, Pakistanis, Egyptians. Migrants from UK seem to

prefer Australia as their destination country whereas Germany and Japan host migrants majorly from Poland and China respectively.

2.4 Next Steps

Indian construction workers have traditionally been migrating to GCC countries, specifically Saudi Arabia and UAE. The two large markets, Saudi Arabia and UAE have a high market share of foreign workers especially Indian workers and both economies have made major commitments and investments towards construction projects (refer to country snapshot table).

However, the opportunity for Indian construction workers in traditional GCC destinations has been shifting due to increasing demand for well trained and certified workers, increasing wages in the Indian market, rise of other source countries sending workers to the GCC region and tighter

regulation of unskilled and semi-skilled Indians working abroad.

At the same time, we have seen a rise in demand for skilled construction workers from high-income countries like Australia, Germany and Japan. However, movement of Indian construction workers to these countries faces challenges related to clearing language skills exams, vocational skills exams, receiving training from recognized skilling institutions and earning licenses and permits to work in certain occupations. In order to create opportunities for Indian construction sector workers in international markets, concentrated efforts are required around:

- ➔ **Language skills** - introduce language skill courses (English, German, Japanese) for Indian construction workers. In addition to this there is an opportunity for the Indian agencies to start a dialogue around rationalization/relaxation of language skills required vis-a-vis the occupation of the migrant worker.
- ➔ **Acquisition of specific licenses** - help Indian workers prepare for various licenses required to practice certain trades in international markets.
- ➔ **Skill harmonization and recognition of certifications** - create a process for skill harmonization to align workers' qualifications with training requirements in international markets.
- ➔ **Career guidance to Indian workers** - setting up of government and semi-government nodal bodies to facilitate movement of skilled construction workers from India by connecting workers to authentic employers globally.

CHAPTER 3

COUNTRY SPOTLIGHTS

3.1 Qatar

3.1.a Qatar Construction Sector Overview : Demand-side

Qatar's construction sector is projected to growth at the rate of 10.54 % between 2022-2027 and reach USD 76 billion by 2027

The construction market in Qatar was valued at USD 55 billion in 2021, and is forecasted to reach a value of USD 76 billion by 2027, with CAGR of 10.54% over the period of 2022-2027⁶¹. Figure 23⁶²

shows the value added by the construction sector between 2010-2019, wherein the last decade witnessed substantial growth in construction activity.

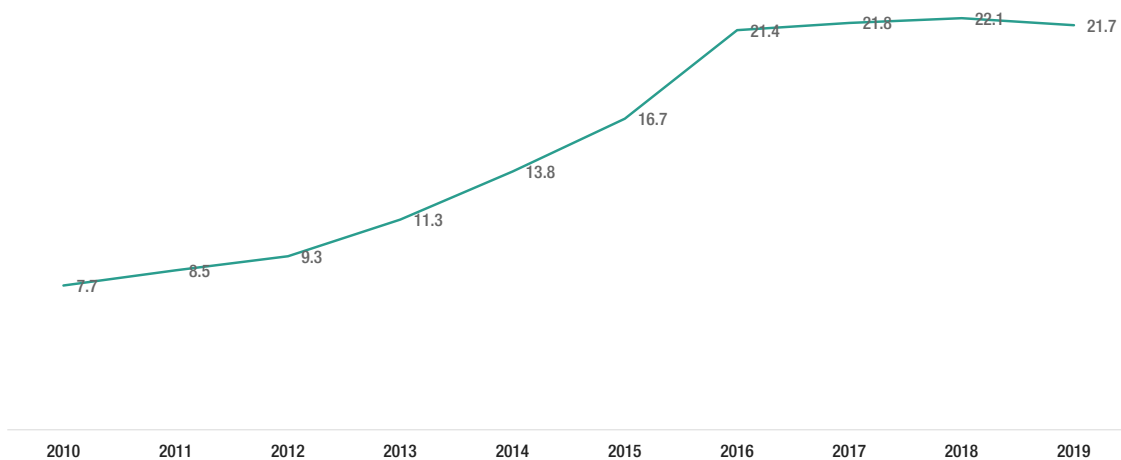


Fig. 23 | Value Added by the Construction Sector (2010-2019) (in USD billions)

Source: UNCTAD

Qatar has been positioning itself as a prime hotspot for hosting sporting events and tourist destinations.

The construction growth has been predominantly driven by the Qatar government's shifting focus in making its economy resilient, dynamic and diversified moving away from its traditional focus on natural gas. Natural gas boom has driven the country's economy since the early 2000's. However, in 2011 National Development Strategy was

introduced where in primarily, the government's strategy has been to build sustainable tourism and transport infrastructure so as to position Qatar as an important destination for international sporting events and tourism.

Thus, as part of the 'Qatar National Tourism

Sector Strategy 2030' has been implemented to strengthen global visibility of Qatar as an attractive tourist destination. The strategy aims to bring in 500,000 cruise tourists every year starting 2026 which is five times the current rate of cruise tourism in the country. In order to achieve these targets, the Qatar government has made significant investments in ports and associated infrastructure. Construction projects to build Doha port and the Doha metro system are also inline with the targets of the strategy.

Additionally, hosting large sporting events has

induced investments in the construction sector. Qatar has hosted numerous sporting events like 2006 Asian Games, 2010 IAAF World Indoor Championships, 2011 Asia Football Cup of Nations, 2012 Football's Asian Cup, 2015 Men's Handball World Championships. Sports and tourism as priority sectors are essential to Qatar's forward-looking economic diversification and increasing private sector growth. Hosting the FIFA World Cup 2022 along with FINA in 2023 and Asian Games in 2030, Qatar is expected to be positioned as an international tourism destination.



Fig. 24 | Current and Projected Growth of Construction Market Size⁶³

Source: Research and Markets, 2022

Qatar's National Vision 2030 is giving a boost to the infrastructure and commercial sub-sectors

The growth in recent years is promoted by Qatar's National Vision 2030. The country has envisioned to become an advanced society capable of sustaining its development and providing a high standard of

living to its people. The goals are projected to give a massive push to the construction activity primarily in infrastructure and non residential (commercial and industrial) followed by real estate sectors.

Infrastructure construction activity is the key driver for Qatar’s construction sector⁶⁴

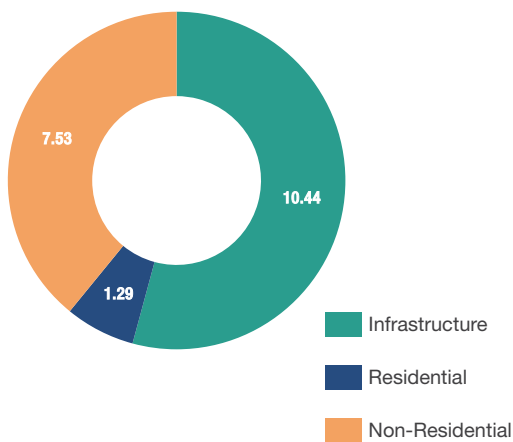


Fig. 25 | Market Size of Construction Sub-Sectors in 2020 (in USD billion)
Source: Consulting Haus, 2022

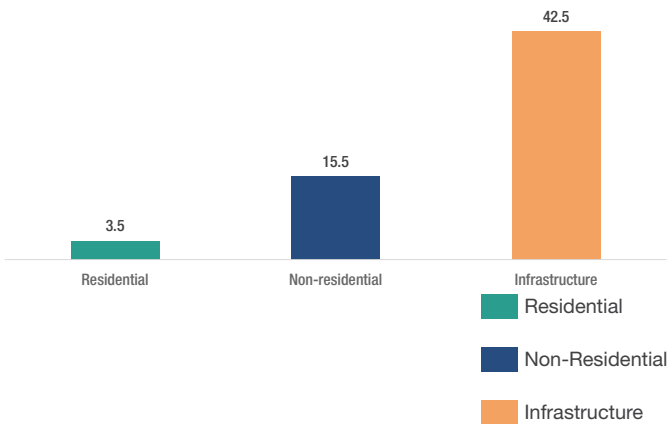


Fig. 26 | Project Awarded by Sub-Sector (in USD billion)
Source: Consulting Haus, 2022

A major sub-sector in the construction market is the infrastructure sector followed by the non-residential sector. In the time span of 3 years (2018-2021) projects worth 42.5 billion USD and 15.5 billion USD were awarded in the infrastructure and the non-residential sector respectively. Building stadiums, homes, hotels, malls, new ports, highways, and a wide network of metro and rail systems are Qatar's main priorities.

Construction Projects worth USD 85 billion (approx) are planned in Qatar with a maximum value of projects coming up in the residential and the non residential sector (USD 32 billion), followed by Gas (USD 21.2 billion) and transport sector (USD 13 billion)⁶⁵.

Doha and Al Wakrah will see most new construction activity

These are some of the projects that will keep the Qatar construction industry active in the coming years. The projects are either in the early phases of construction or are in the pre-execution stage with construction set to this year or by next year.

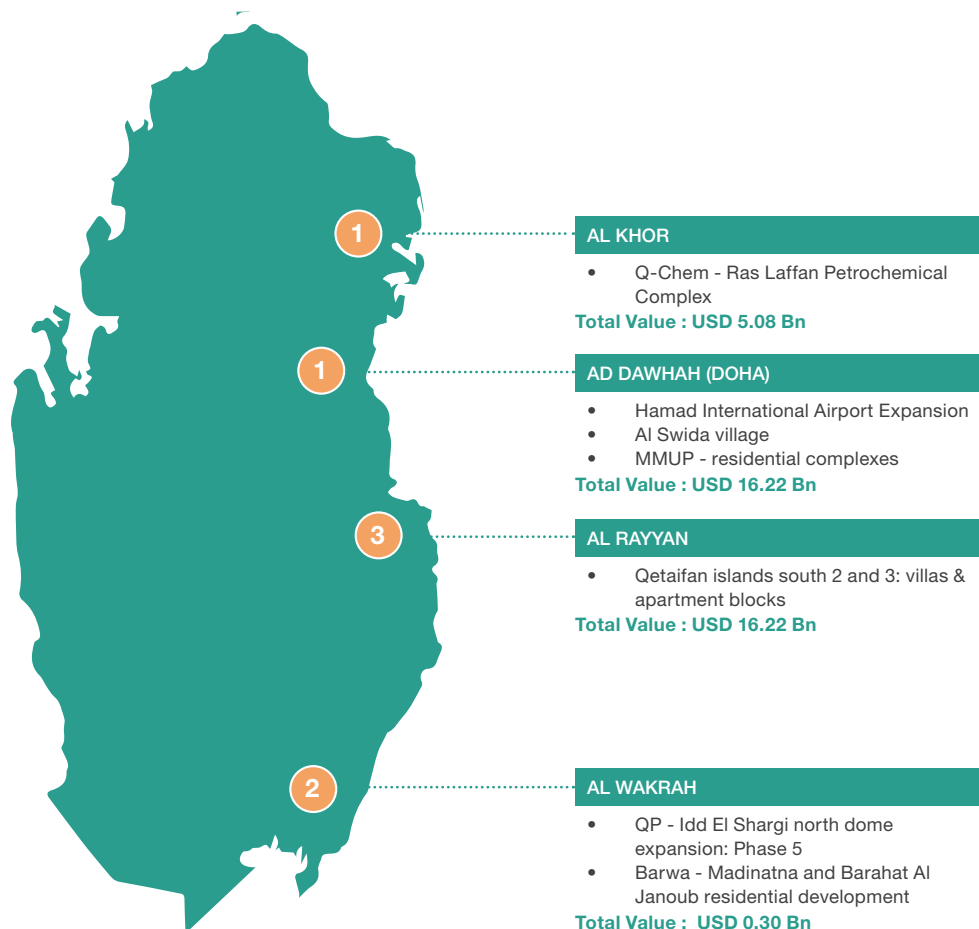


Fig. 27 | Major Construction Hotspots in Qatar

PROJECTS (UPCOMING)	DESCRIPTION - TYPE OF PROJECT	COST (EXPECTED)	LOCATION
North Field Expansion Project⁶⁶	Also referred to as the North Field East project encompasses the expansion of the North gas field aimed at increasing the country's LNG capacity. The expansion is expected to be carried out in two phases.	USD40 Bn	North East of Qatar Peninsula
Ashghal Expressway Programme⁶⁷	This project focuses on establishing an advanced and integrated expressway network in Doha and all the regions of the country as part of Qatar 2030 Vision.	USD20 Bn	Nationwide
Hamad International Airport Expansion⁶⁸	It is a two-phased passenger-centric expansion plan that will ensure increased capacity and greater facilities to passengers catering to Qatar's thriving economic diversification and growth	USD15.5 Bn	Doha
QP - Idd El Shargi north dome expansion: Phase 5⁶⁹	The project involves the development of an offshore oil field and will also include the construction of administrative space, a manifold, a floating production unit, terminals for storage of oil, storage tanks etc. <i>(The pipeline will travel from the offshore ISND platform to Wakrah Station)</i>	USD 0.91 Bn	Al Wakrah
Barwa - Madinatna and Barahat Al Janoub residential development⁷⁰	A residential project for the families and workers aimed at adding a human dimension to its real estate projects	USD 1.37 Bn	Al Wakrah
Al Swida village⁷¹	It is a residential project located in Al Thumama expected to be completed in 2025	USD 0.36 Bn	Doha
'Q-Chem - Ras Laffan Petrochemical Complex.⁷²	The project will center around a nearly 2 MMtpy ethane cracker unit, expected to be the largest of its kind in the Middle East. This project is also building two high density polyethylene units as well.	USD 5.08 Bn	Al Khor
MMUP - residential complexes in Doha	These are the affordable housing residential complexes that are being developed by the Ministry of Municipality and Urban Planning.	USD 0.36 Bn	Doha
Qetaifan islands south 2 and 3: villas & apartment blocks⁷³	Qetaifan Island-South is an eco-friendly community that will offer residential, commercial, marinas and non-marina villas in Lusail city	USD 0.30 Bn	Lusail, Al Daayen

Fig. 28 | Key Construction Projects in Qatar

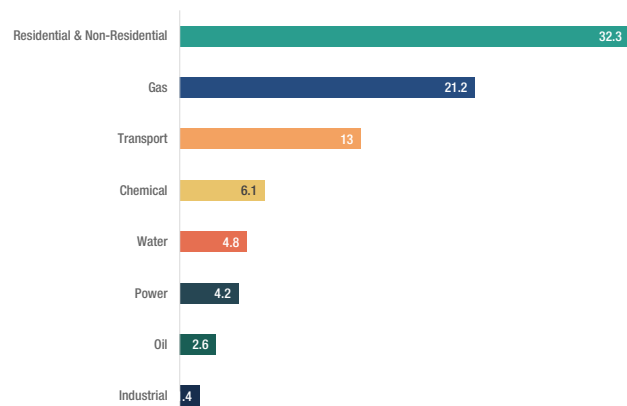


Fig. 29 | Planned Projects by Sector (in USD billion)

Source: Consulting Haus, 2022

Projects worth USD 85 billion (approx) are in the pipeline with the maximum value of projects coming up in the residential and the non residential sector (USD 32 billion), followed by Gas (USD 21.2 billion) and transport sector (USD 13 billion).

3.1.b. Qatar's Construction Workforce: Supply Side

Qatar has an well educated labor force but technical education is still in nascent stages



11.9% | Population aged 15-24 (2019)



94.6% | Youth literacy rate, population 15-24 years, both sexes (2017)



0.6% | Participation in technical and vocational programmes, 15-24 years (2018)



Private and Company Training Centres
Government Training Institutes

720
Enrolment in secondary vocational, both sexes (2018) (number)

Fig. 30 | Technical and Vocational Educational and Training Institute in 2019

Source: UNESCO, International Centre for Technical & Vocational Education & Training

The Government of Qatar sees education as a crucial engine for modernizing the nation, reducing its reliance on hydrocarbons, and raising the level of international competitiveness of its citizens. There has been continuous investment in Qatar's education and training system with the focus of becoming a "research oriented knowledge-base with skilled human capability" to accomplish Qatar National Vision 2030 to be a knowledge driven

society.

In 2019 Qatar government appointed the Office of TVET under the Ministry of Education and Higher Education to develop and implement the TVET policy in the country. This was the need of the hour as in 2018 the participation rate of the youth in the age group 15-24 years in the technical and vocational programs was negligible (around 0.6%).

Skill Training Institutes and Courses Offered

INSTITUTES	CERTIFICATION/TRAINING
Arabian InfoTech Training Institute	<ul style="list-style-type: none"> • HVAC Technician • Electrical Technician • Plumbing Technician • Building Management System (BMS) Technician
Enertech Qatar Safety Training Centre	<ul style="list-style-type: none"> • Institution of Occupational Safety and Health (IOSH) certifications • Construction Safety Training (Working at heights, confined space entry, rigging & slinging, rigging supervisor, lifting supervisor, scaffolding supervisor, scaffolding safety, scaffolding inspector)
Qatar Skill Training Center	<ul style="list-style-type: none"> • Construction Management • Construction supervision skills • Institution of Occupational Safety and Health (IOSH) certification • Health & Safety for construction labourers • Work at heights
Qatar Steel	<ul style="list-style-type: none"> • Provides in house training and development programs for skill-building of the workers.
Aecor International Training	<ul style="list-style-type: none"> • Construction Industry Scaffolders Record Schemes (CISRS) Certification • Construction Industry Scaffolders Record Schemes Overseas Scaffolder Training Scheme (CISRS OSTs)

Fig. 31 | Skill Training Institutes and Courses Offered in Qatar

The TVET sector is beginning to provide training for HVAC, electrical, plumbing, scaffolding and occupational safety. Meanwhile, the construction sector is seeing an increase in requirement for certifications in occupational health and safety and specialized training for scaffolders. However, gaps remain in the TVET education space in Qatar.

TVET as a sector seems to witness low perception rate and is seen as a less desirable educational pathway than other academic-based schooling in the country. Qatar's young population in general and women and girls in particular do not find TVET job opportunities as dependable and prefer to stick to degree courses offered by esteemed universities

Qatar's construction sector is unable to attract workers in professional and managerial level positions

Under the National Development Strategy (2011-2016) Qatar's government focussed on improving the skill of workers and increasing the labour force participation rate. As a result we see a rise in construction employment from 2011 to 2016

with a peak in 2015 (Figure 32). In 2016 with the declining oil price, the country suffered a setback and as a result a dip in employment and the construction value added was witnessed.

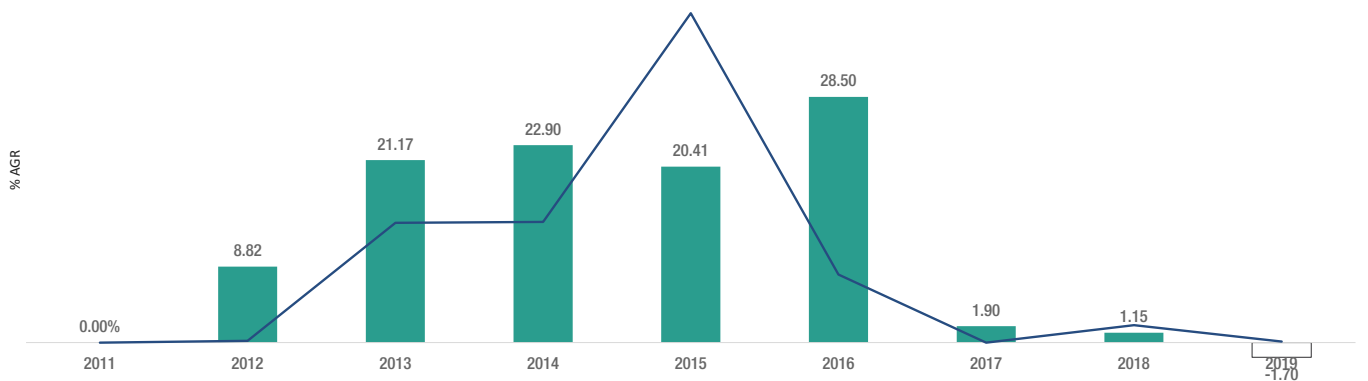


Fig. 32 | Qatar Construction value added vis-a-vis construction employment

Source: ILOSTAT & UNCTAD

Construction GVA (AGR in %)
Construction Employment (AGR in %)

Figure 33⁷⁴ illustrates the educational attainment levels of Qatar's economically active population in 2020⁷⁵. One-fourth of the economically active

population had university level education. Also, seventeen percent of the EAP had secondary level education.

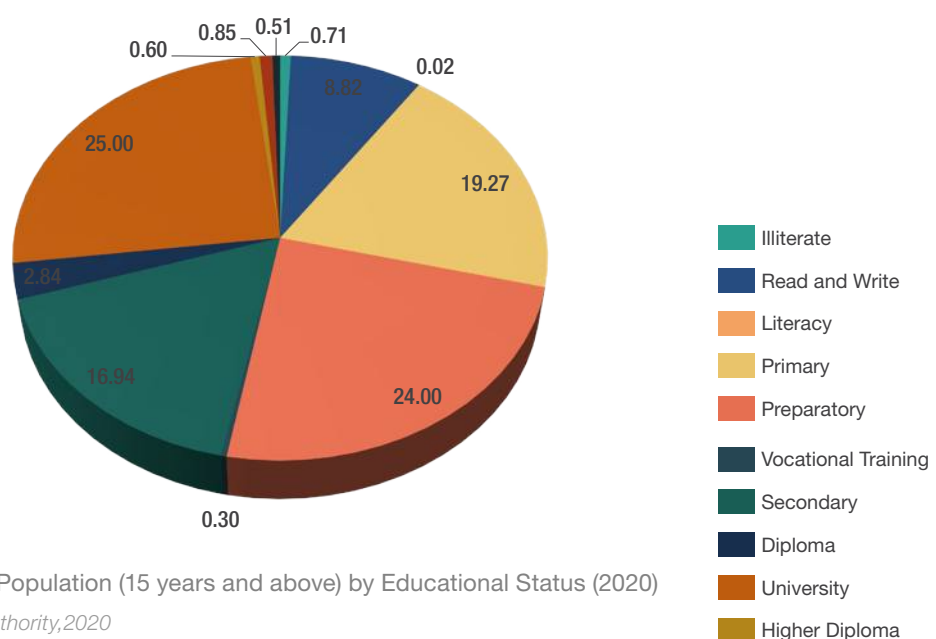


Fig. 33 | Economically Active Population (15 years and above) by Educational Status (2020)

Source: Planning and Statistics Authority, 2020

Qatar’s construction sector workforce composition highlights a high supply of skilled craftsmen and machine operators which highlight the strength of the skilling ecosystem in the country

A major chunk of the workers are plant and machine operators and craftsmen having specialized skills (Figure 34). However the existence of skilled workers like professionals and managers is very low. This highlights the prevalence of skills inequality in the construction sector employment.

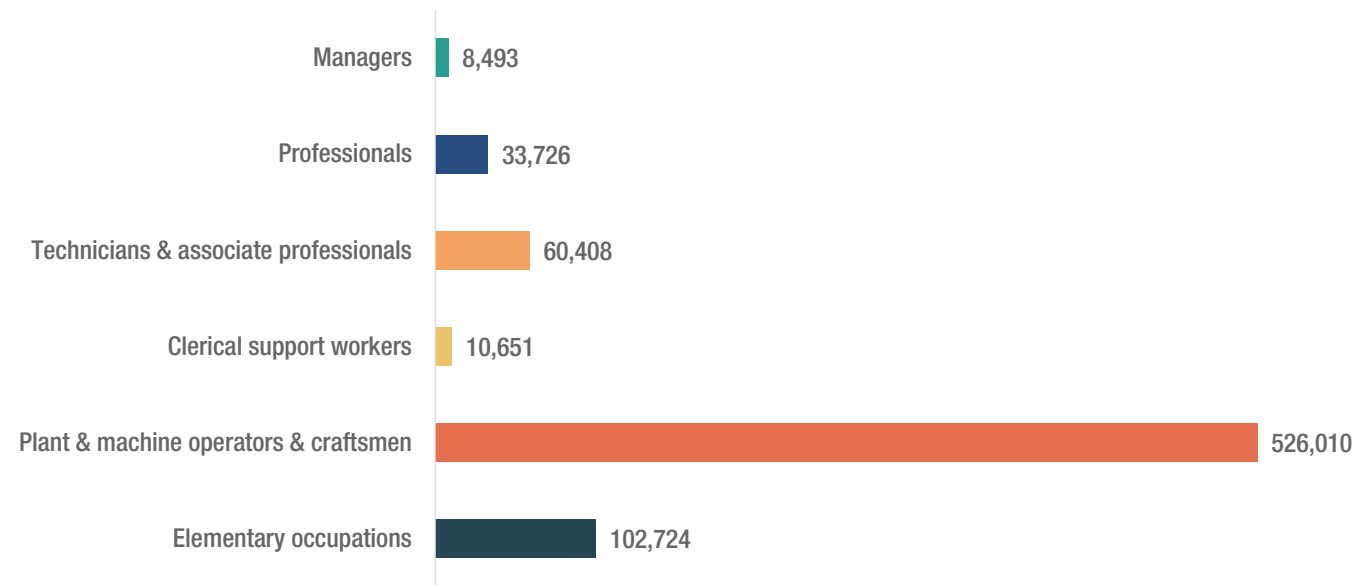


Fig. 34 | Composition of Construction Sector Workforce in 2020

Source: Planning and Statistics Authority, 2020

3.2 UAE

3.2.a Construction in UAE : Demand-side

UAE's Construction Sector is Expected to Double in Next Four Years

Over the past ten years, the UAE government has been reorienting its economy away from hydrocarbons and effectively ensuring that it is the main center for international trade, finance, and tourism. The construction sector within the UAE economy to play a significant role. The share of the construction sector to the GDP has increased from 8% in 2005 to 9.3% in 2019 with a peak in

2012 as depicted in figure 35⁷⁶. Value added by the construction sector recorded a CAGR of 4.5% during 2005-2020⁷⁷ (figure 36). Mega-projects in construction are being undertaken in Dubai and Abu Dhabi, which has led to higher visibility at a global level, attracted foreign investment and boosted tourism.

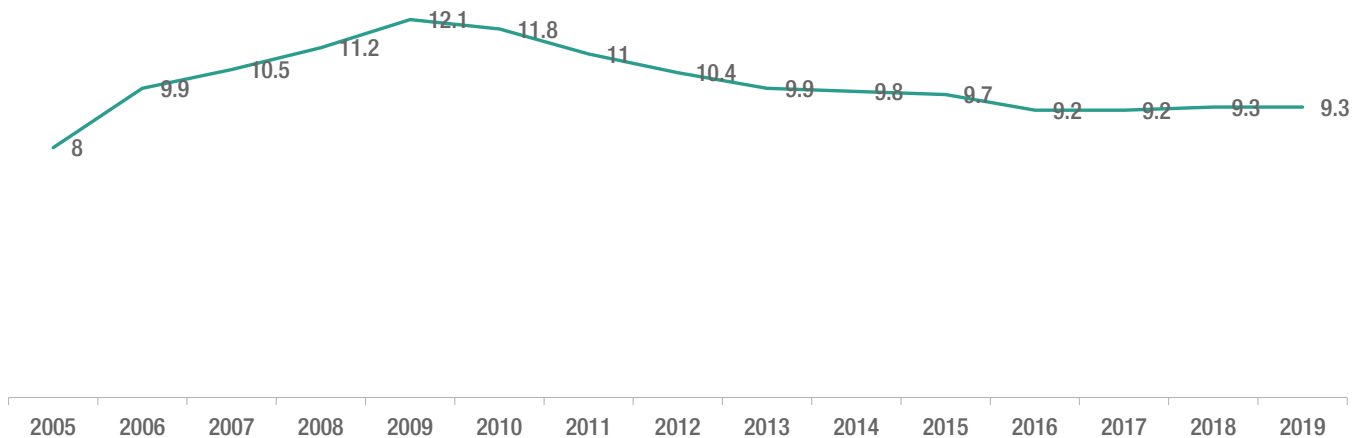


Fig. 35 | Share of Construction Sector to the GDP (%) (2005-2019)

Source: UNCTAD, 2005-2019

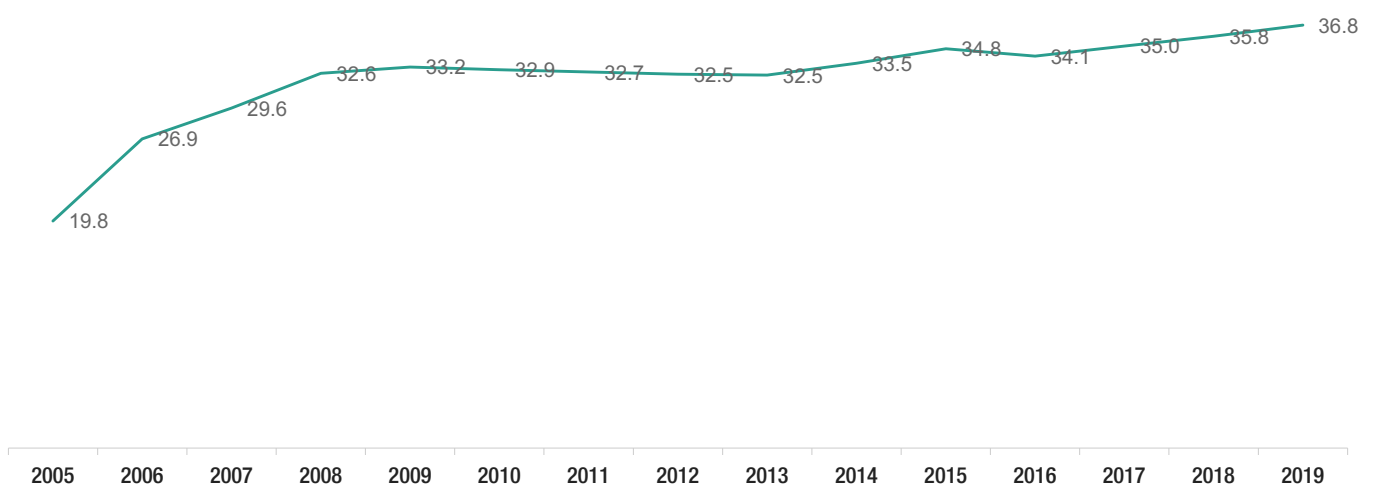


Fig. 36 | Value Added by the Construction Sector (2005-2019) (in USD billions)

Source: UNCTAD, 2005-2019

The UAE's construction industry has remained under pressure due to various reasons including weakening of cash flow into the system, cost overruns, project delays etc and Covid 19 further

accelerated the problem. In the post pandemic scenario, the government has committed to stimulate the economy by investing predominantly in the infrastructure sector.

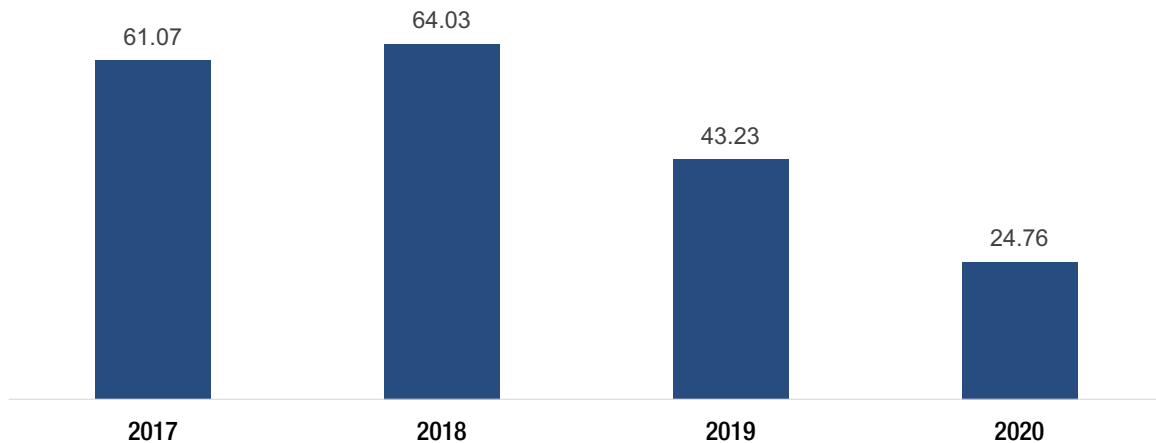


Fig. 37 | Value of Contracts Awarded in UAE (in USD billion) (2017-2020)

Source: Research and Markets, 2022

The expansion of the construction industry in the UAE is anticipated to be supported by a number of government programmes, including the Abu Dhabi Economic Vision 2030 (reduce dependency on oil sector, while building a robust infrastructure and knowledge based industries), the Energy Strategy 2050 (reduce carbon footprint and strengthen clean energy use), the Dubai Tourism Strategy

(aims to attract 25 million visitors by 2025) and the Sheikh Zayed Housing Program (provide affordable housing to its citizens). Additionally, the government is putting a lot of effort into creating smart cities and attracting foreign investors which is expected to propel the construction market which is expected to record a CAGR of 3.9% during 2022-2026⁷⁸.

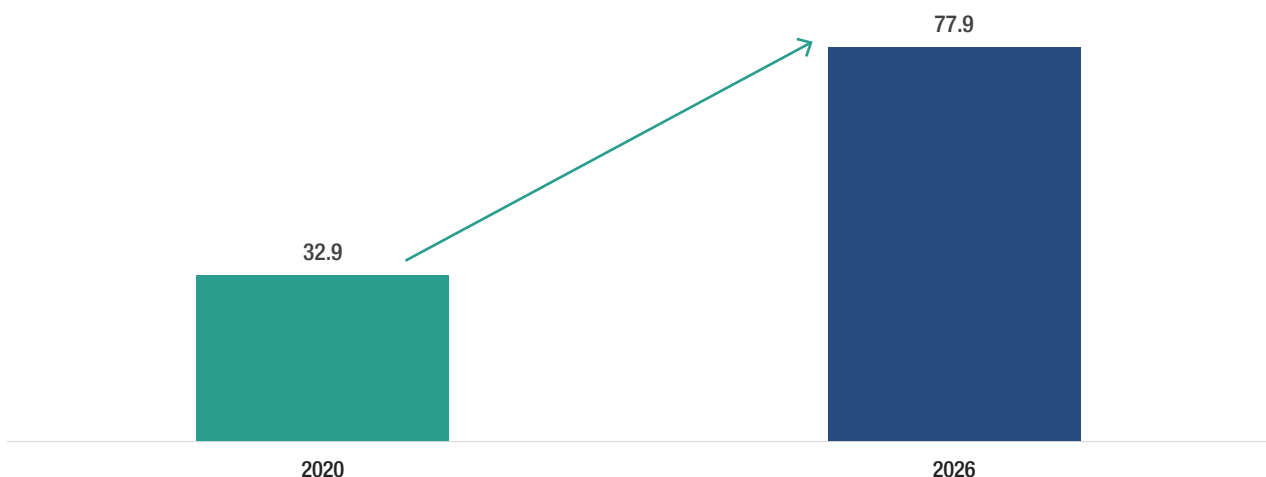


Fig. 38 | Construction Sector Projected Growth (in USD billion)

Source: UNCTAD, ConsTrack360

Commercial construction will drive the sector in UAE

In 2019 the commercial sector dominated the construction sector followed by infrastructure and residential sectors. The UAE's industry is anticipated to grow with the help of the commercial infrastructure sector in the coming years as well.

The UAE has emerged as a popular tourist

destination during the last ten years. As part of the Abu Dhabi Plan 2030 and Dubai Tourism Plan, the government plans to keep that way. Consequently, the government intends to increase investment in commercial infrastructure to accommodate the massive influx of tourists.

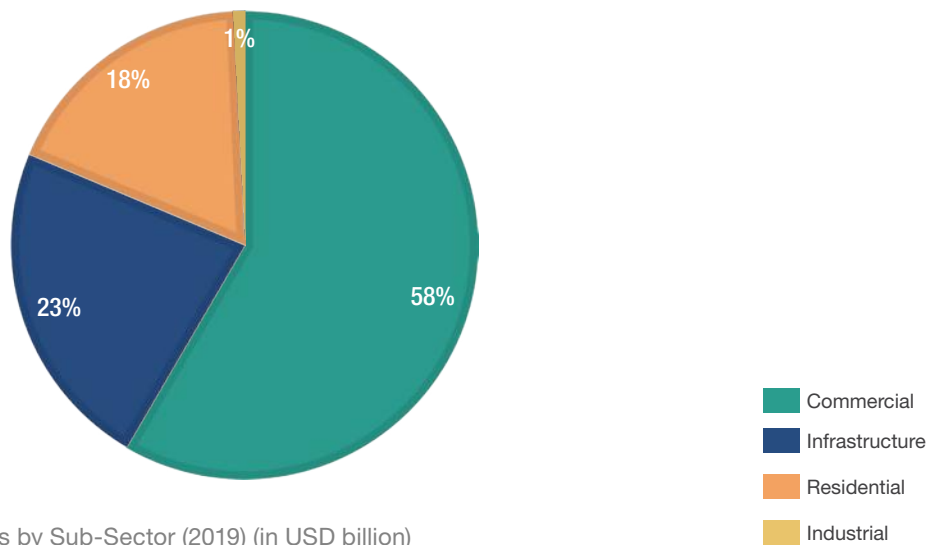


Fig. 39 | Value of Construction Projects by Sub-Sector (2019) (in USD billion)

Source: Dubai Chamber, 2021. Please note that values are based on the value of construction projects undertaken in Dubai.

Abu-Dhabi and Dubai will remain the demand hubs for construction activity in the country

Largest projects in UAE will be in the areas of energy (both renewable and non-renewable), ports and commercial buildings. Energy and port projects will be concentrated in Abu Dhabi, while Dubai too will see investments in ports and commercial building projects.

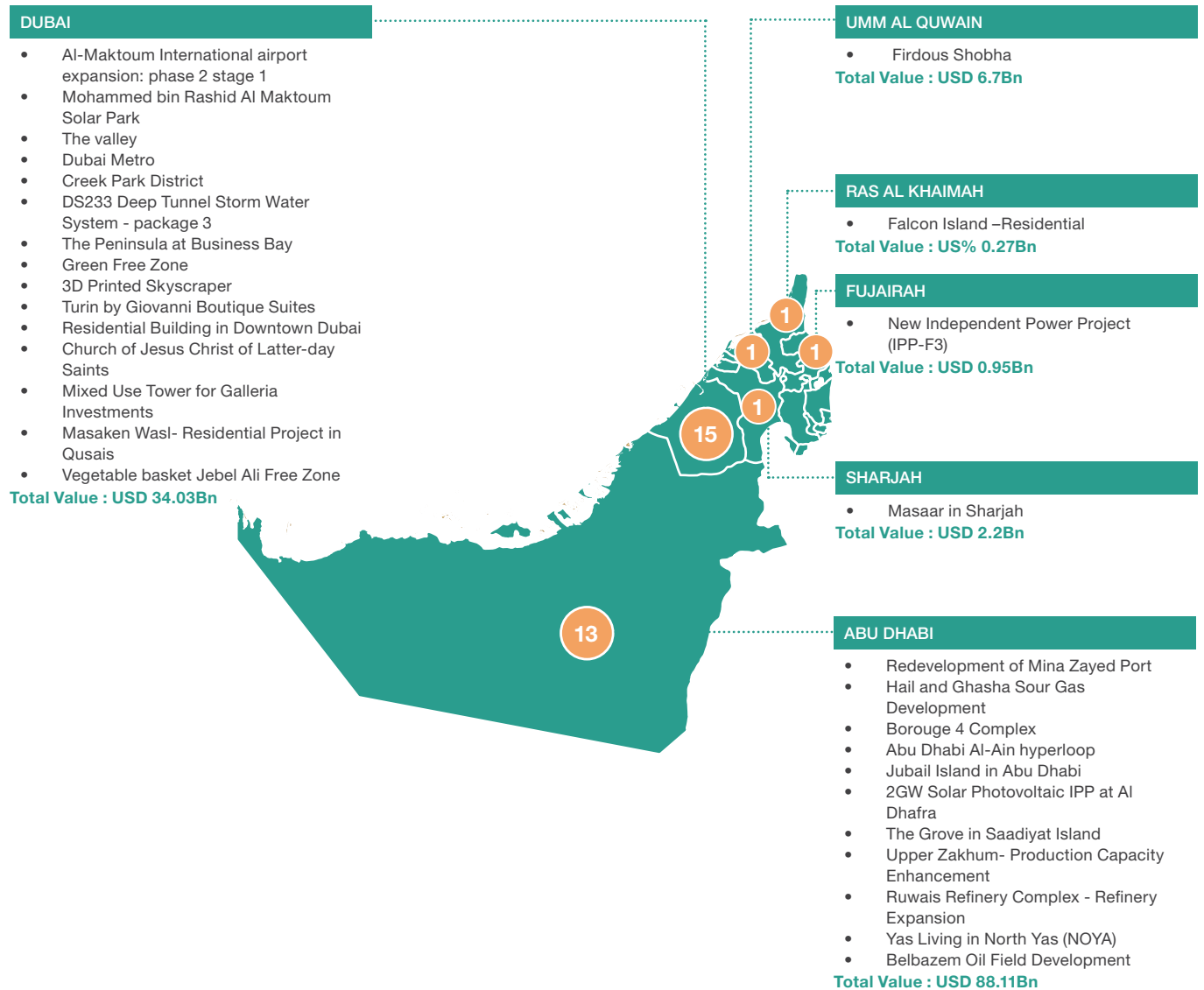


Fig. 40 | Major Construction Hotspots in UAE

LOCATION	MAJOR PROJECTS	COST (EXPECTED)
Abu Dhabi ⁷⁹	Redevelopment of Mina Zayed Port	USD 15 Billion
Abu Dhabi ⁸⁰	Hail and Ghasha Sour Gas Development	USD 15 Billion
Abu Dhabi ⁸¹	Borouge 4 Complex	USD 4.5 Billion
Sharjah ⁸²	Masaar in Sharjah	USD 2.2 Billion
Dubai	Dubai Al-Maktoum International airport expansion: phase 2 stage 1	USD 7 Billion
Umm-Al Quwain	Firdous Shobha	USD 6.7 Billion
Dubai	The valley	USD 6.6 Billion
Abu Dhabi	Abu Dhabi Al-Ain hyperloop	USD 6 Billion
Dubai	Mohammed bin Rashid Al Maktoum Solar Park ⁸³	USD 13.6 Billion
Dubai	Dubai Metro ⁸⁴	USD 3.02 Billion
Dubai	Creek Park District in Dubai creek harbor ⁸⁵	USD 0.9 Billion
Dubai ⁸⁶	DS233 Deep Tunnel Storm Water System - package 3	USD 0.45 Billion
Dubai	The Peninsula at Business Bay ⁸⁷	USD 0.3 Billion
Dubai	3D Printed Skyscraper ⁸⁸	USD 0.06 Billion
Dubai	Turin by Giovanni Boutique Suites ⁸⁹	USD 0.04 Billion
Dubai	Residential Building in Downtown Dubai - Plot No. 345-0441 ⁹⁰	USD 0.04 Billion
Dubai	Church of Jesus Christ of Latter-day Saints at the District 2020 ⁹¹	USD 0.02 Billion
Dubai	Mixed Use Tower for Galleria Investments in Sheikh Zayed Road (City Tower 1) ⁹²	USD 0.40 Billion
Abu Dhabi	Jubail Island ⁹³	USD1.7 Billion
Dubai	Vegetable basket Jebel Ali Free Zone ⁹⁴	USD 1 Billion
Dubai	Masaken Wasl- Residential Project in Qusais ⁹⁵	USD 0.4 Billion
Dubai	Green Free Zone ⁹⁶	USD 0.2 Billion
Abu Dhabi	2000 MW (2GW) Solar Photovoltaic IPP at Al Dhafra ⁹⁷	USD1.5 Billion
Abu Dhabi	The Grove in Saadiyat Island ⁹⁸	USD 0.63 Billion
Fujairah	New Independent Power Project (IPP-F3) ⁹⁹	USD 0.95 Billion
Abu Dhabi	Upper Zakhum- Production Capacity Enhancement ¹⁰⁰	USD 21.8 Billion
Abu Dhabi	Ruwais Refinery Complex - Refinery Expansion	USD 20 Billion
Abu Dhabi	Abu Dhabi North West Development - Hail and Ghasha Sour Gas	USD 15 Billion
Ras Al Khaimah	Falcon Island (Ras Al Khaimah)- Residential	USD 0.27 Billion
Abu Dhabi	Yas Living in North Yas (NOYA) ¹⁰¹	USD 0.98 Billion
Abu Dhabi	Belbazem Oil Field Development ¹⁰²	USD 1 Billion

Fig. 41 | Key Construction Projects in UAE

3.2.b. UAE's Construction Workforce: Supply Side

Vocational education is in nascent stages in UAE



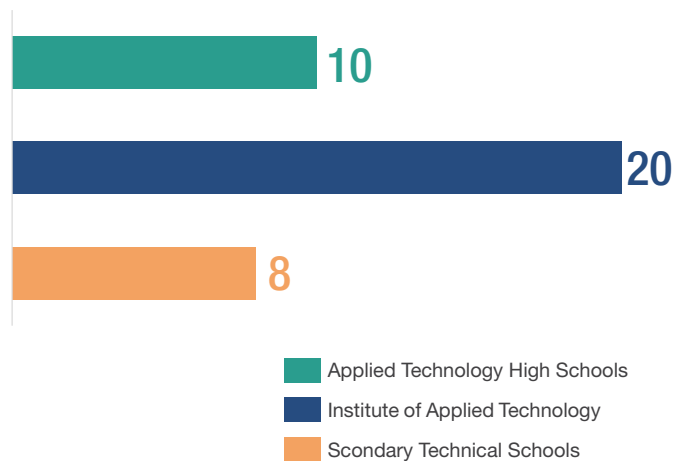
11.2% | Population aged 15-24 (2019)



96.3% | Youth literacy rate, population 15-24 years, both sexes (2019)



0.5% | Participation in technical and vocational programmes, 15-24 years (2017)



8.2
Enrolment in secondary vocational, both sexes (2017) (in thousand)

Fig. 42 | Technical and Vocational Education and Training Institutes in 2020

Source: UNESCO International Centre for Technical and Vocational Education and Training

The TVET sector in UAE is regulated by the National Qualifications Authority (NQA) which is a federal agency in charge of creating and maintaining a framework for national qualifications. NQA approves national vocational qualifications and recognises TVET awarding organizations and issues all the national vocational certificates. Under the aegis of NQA there exists a federal Vocational

Education and Training Awards Council (VETAC) that coordinates and manages the technical, vocational, and professional education and training sector while at the province level in Abu Dhabi and Dubai, ACTVET (Abu Dhabi Centre for Technical and Vocational Education and Training) and QAD manages the same (qualifications and awards in Dubai).

VOCATIONAL AND TECHNICAL EDUCATIONAL CENTERS

- Centre of Excellence for Applied Research and Training under Higher Colleges of Technology (HCT)
- The National Institute for Vocational Education (NIVE) (to provide customized and high quality vocational education as per the professional standards)
- ADNOC Technical Academy
- Petroleum Institute (PI)
- Mohammed bin Rashid School of Government
- Etisalat Academy
- Abu Dhabi Centre for Technical and Vocational Education and Training (ACTVET)
- Abu Dhabi Vocational Education and Training Institute (ADVETI)

Enrolment of youth (15-24 years) in the vocational and training programs is merely 0.5% which is considerably lower when compared to countries like Egypt, Australia and Germany etc.

In the UAE, students prefer university degree programs over vocational education due to high salary and better growth prospects that come with academic education. In accordance with the International Labour Organization's International Standard Classification of Occupations (ISCO), the Ministry of Human Resources and Emiratisation (MoHRE) divides employment into nine skill levels of which level 1 (for Legislators, business executives and managers) level 5 (for Service and sales occupations), level 7 (for Craftsmen in

construction, mining, and other craftsmen), level 8 (for Operators and assemblers of machinery and equipment) relates to the construction linked skill development¹⁰³. Hence, a labor is considered as skilled if they fulfill certain conditions comprising a certificate higher than the secondary certificate or an equivalent certificate which is duly attested by competent authority, employee's monthly compensation (before commission) is not less than AED 4,000 and employee must be qualified as a professional.

UAE's construction sector continues to suffer from shortage of workers

In 2018, the share of the construction labor force in the total labor force was 22%. Post 2018, the share will be reduced to 17% in 2019 and 2020. The covid 19 pandemic caused major upheaval in the construction sector employment with lay off and salary cuts. Even during pandemic construction

sites remained active but the outbreak of disease at the construction sites reduced the labor force participation rate. The country experienced a 10% hike in job creation in the 2nd quarter as against the first quarter in 2022, indicating construction sector employment to pick up.

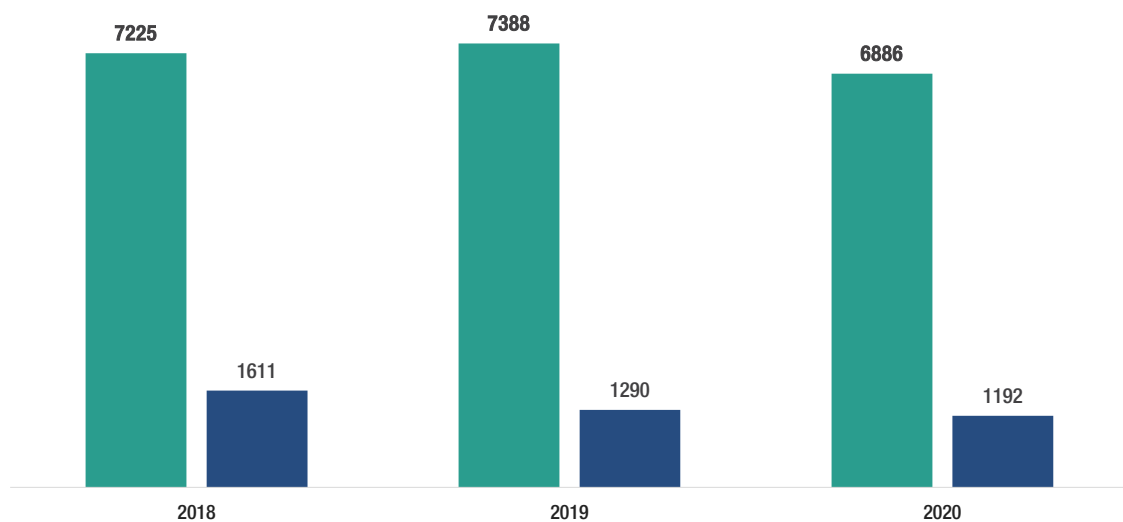


Fig. 43 | Construction Sector Workforce (in thousands)

Source: ILOSTAT, 2018-2020

■ Total Labour Force
■ Construction Labour Force

Figure 44 shows the level of skills construction sector workers possess. It is substantially dominated by the crafts and trade workers. However the existence of skilled workers (professionals and

managers) and mid skilled workers (technicians and clerical support workers) is meagre. Thus, highlights the prevalence of skills inequality in the construction sector employment.

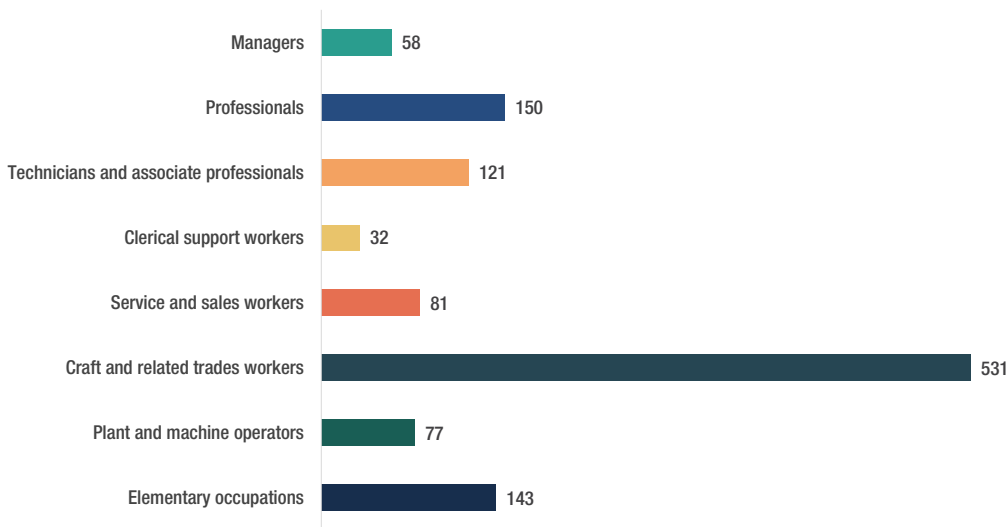


Fig. 44 | Level of Skills of Workers in Construction Sector in 2020 (in thousands)

Source: ILOSTAT

3.3 Saudi Arabia

3.3.a Construction in Saudi Arabia : Demand-side

Saudi Arabia construction market is expected to grow with a CAGR of 5%

Saudi Arabia has been the largest exporter of oil in the world and as a result even after the global financial and economic crises the economy continued to thrive and the construction industry in particular experienced notable growth. Between 2005 and 2020, the construction industry's value

added registered a CAGR of 4.54%. However, a dip in the construction value added post 2014 is seen due to sharp decline in oil prices and growing regional tensions. Having said that although oil remains Saudi Arabia's main source of income, the country has also made efforts to diversify its

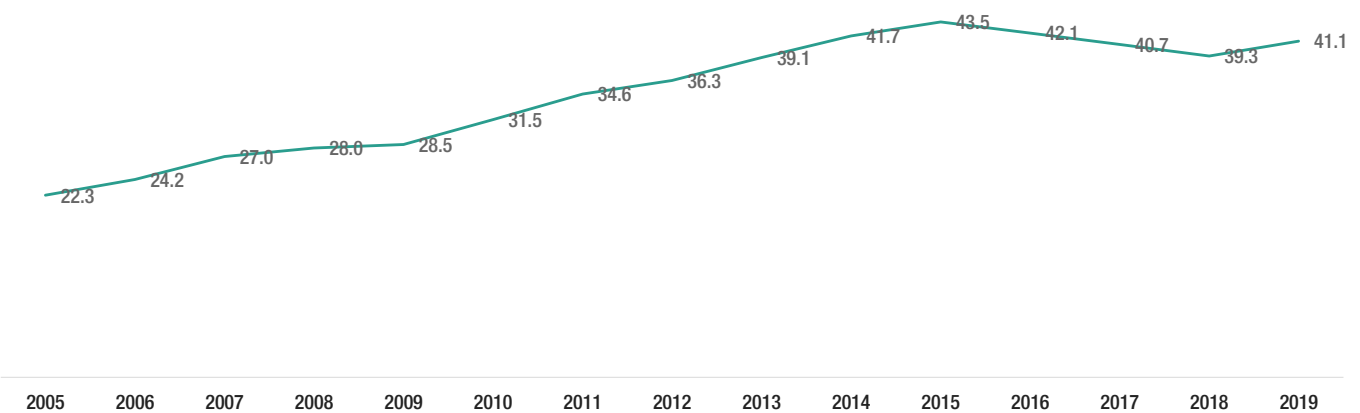


Fig. 45 | Value Added by the Construction Sector (2005-2019) (in USD billion)

Source: UNCTAD, 2005-2019

economy with major focus on building infrastructure and addressing the housing shortages need arising due to expanding population. Saudi construction market is expected to register a CAGR of more than 5% in 2022-27¹⁰⁴ driven by Saudi Vision 2030, Housing Program and strategy to diversify the economy away from oil.

Under the Saudi Vision 2030¹⁰⁵, the focus is to build a diverse economy that prioritizes sustainability, education, and hydrocarbon facilities by strengthening investment capability. The Housing Program under the Vision 2030 aims to achieve the goal of having 70% of Saudi families home ownership by 2030 and with the major upcoming projects focusing on modernizing the existing

infrastructure and construction of new residential and non-residential projects, the construction sector is anticipated to considerably help Saudi Arabia's economy move away from an oil-based economy.

Economic empowerment of women is also at the center of the Kingdom's Vision 2030 reform initiative. Women have been granted more rights in the country that has strengthened their economic involvement and contribution in the economy. Women are expected to provide further impetus to the residential market as more women are now entering the workforce and buying rental properties and homes of their own¹⁰⁶

Industrial construction is the largest construction sub-sector and is expected to growth the fastest

In 2018, the Industrial sector held the largest market size in the construction sector followed by infrastructure, commercial and residential sectors as depicted in figure 46¹⁰⁷. However, in 2024, commercial, residential, infrastructure and industrial sector market size is expected to increase

by 35.3, 34.4, 33.9 and 31.5 percent respectively due to its current reforms to diversify away from oil, vision 2030, granting more rights to women, increased government spending and strengthening transport and regional connectivity.

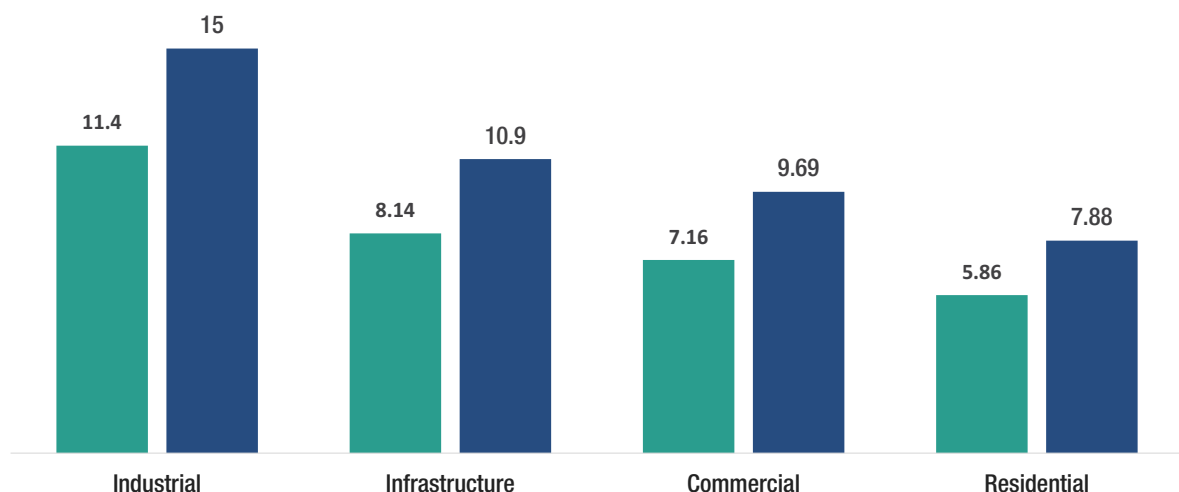


Fig. 46 | Saudi Arabia Construction Sub-Sector Market Size (in USD billion)

Source: TECHSCI Research, 2019

2018
2024 (Expected)

Neom City in Tabuk region, followed by Riyadh, Mecca and Madinah will be the key construction hotspots

Tabuk city is coming up as the most important construction hotspot in terms of value of projects with the Neom City, Red Sea and Amaala projects.

Riyadh and Makkah have the most number of construction projects in the pipeline.

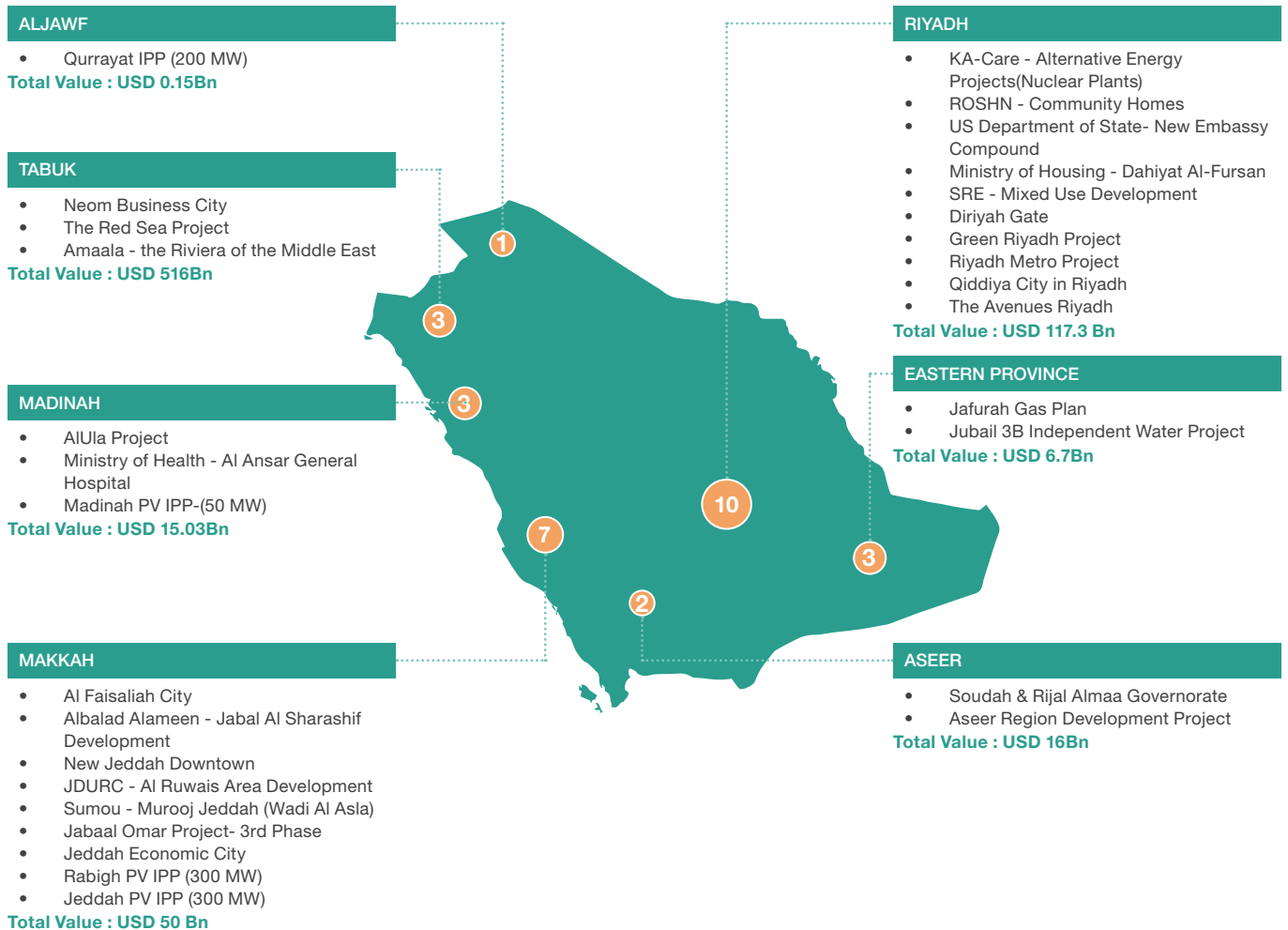


Fig. 47 | Major Construction Hotspots in Saudi Arabia

PROVINCE	MAJOR UPCOMING PROJECTS	COST (EXPECTED)
Tabuk Province	Neom Business City ¹⁰⁸	USD 500 Billion
Riyadh	KA-Care - Alternative Energy Projects - Nuclear Plants ¹⁰⁹	USD 32 Billion
Riyadh	Riyadh Metro Project ¹¹⁰	USD 22.5 Billion
Riyadh	Green Riyadh Project ¹¹¹	USD 22 Billion
Riyadh	Ministry of Housing - Dahiyat Al-Fursan ¹¹²	USD 20 Billion
Makkah	Jeddah Economic City ¹¹³	USD 20 Billion
Eastern Coast of Arabian gulf	Marjan Oil Field Expansion ¹¹⁴	USD 15 Billion
Madinah	AIUla Project ¹¹⁵	USD 15 Billion
Aseer	Aseer Region Development Project ¹¹⁶	USD 13 Billion
Tabuk Province	The Red Sea Project ¹¹⁷	USD10 Billion
Makkah	Makkah Region Development Authority - Al Faisaliah City ¹¹⁸	USD 9.5 Billion
Makkah	Albalad Alameen - Jabal Al Sharashif Development ¹¹⁹	USD 8.7 Billion
Riyadh	Diriyah Gate (World's largest cultural and heritage development) ¹²⁰	USD 6.3 Billion
Eastern Province	Jafurah Gas Plan ¹²¹	USD 6 Billion
Tabuk	Amaala - the Riviera of the Middle East ¹²²	USD 6 Billion
Riyadh	SRE - Mixed Use Development	USD 5 Billion
Riyadh	Qiddiya City ¹²³	USD 5 Billion
Makkah	PIF - New Jeddah Downtown ¹²⁴	USD 4.8 Billion
Riyadh	The Avenues ¹²⁵	USD 3.7 Billion
Makkah	JDURC - Al Ruwais Area Development in Jeddah ¹²⁶	USD 3.3 Billion
Aseer	SDC - Tourism Destination: Soudah & Rijal Almaa Governorate ¹²⁷	USD 3 Billion
Makkah	Sumou - Murooj Jeddah (Wadi Al Asla) ¹²⁸	USD 3 Billion
Eastern Province	Jubail 3B Independent Water Project ¹²⁹	USD 0.7 Billion
Riyadh	US Department of State- New Embassy Compound (NEC) ¹³⁰	USD 0.5 Billion
Makkah	Jabaal Omar Project- 3rd Phase ¹³¹	USD 0.5 Billion
Al- Madinah	Ministry of Health - Al Ansar General Hospital ¹³²	USD 0.3 Billion
Riyadh	ROSHN - Community Homes in Al-Kharj ¹³³	USD 0.3 Billion
Makkah	Rabigh PV IPP (300 MW) ¹³⁴	USD 0.2 Billion
Al Jawf	Qurrayat IPP (200 MW) ¹³⁵	USD 0.15 Billion
Madinah ¹³⁶	Madinah PV IPP-(50 MW)	USD 0.03 Billion
Makkah	Jeddah PV IPP (300 MW)	NA

Fig. 48 | Key Construction Projects in Saudi Arabia

3.3.b. Saudi Arabia's Construction Workforce: Supply Side

Technical education in Saudi Arabia is in nascent stages

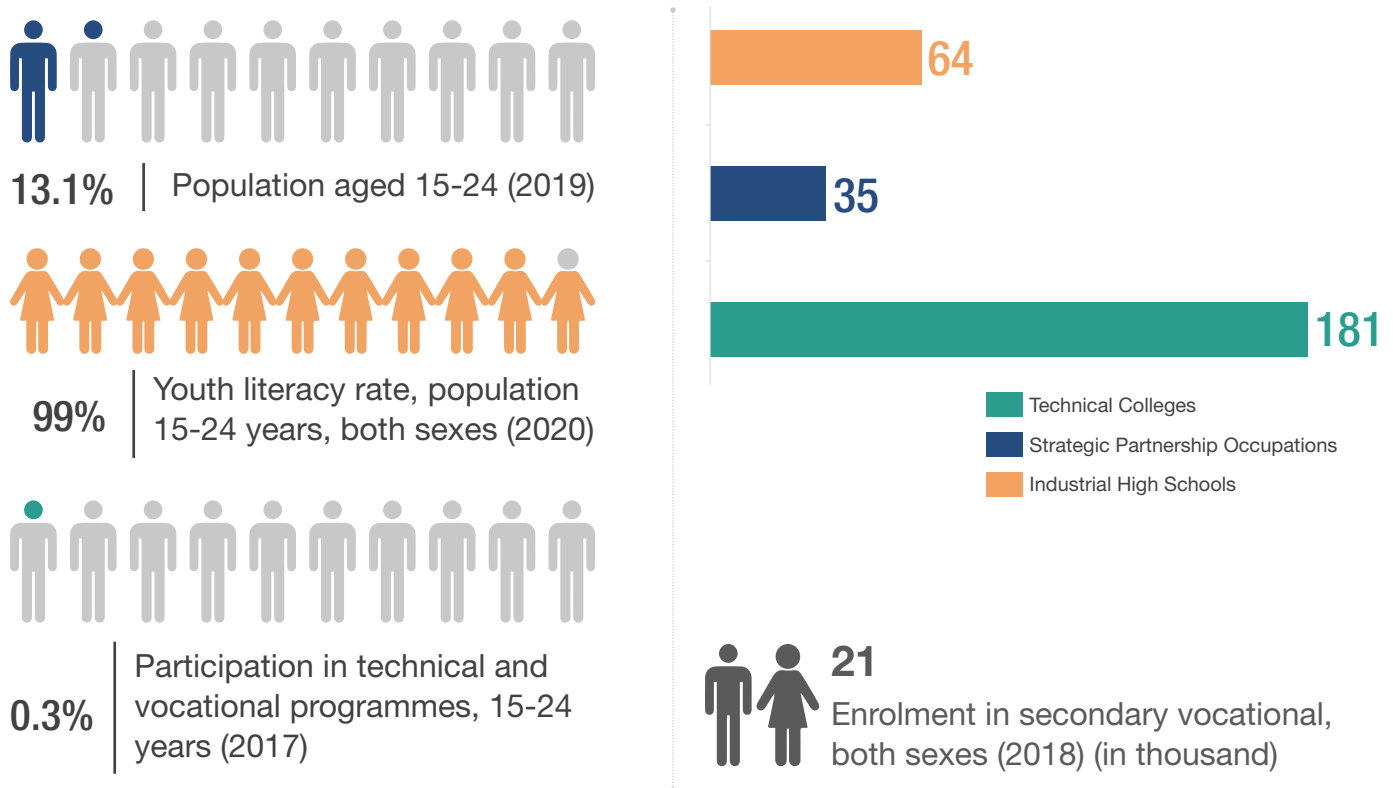


Fig. 49 | Technical and Vocational Education and Training Institutes in 2020

Source: UNESCO, International Centre for Technical and Vocational Education and Training

The TVET system in Saudi Arabia is jointly governed by the Ministry of Education, Ministry of Finance, Ministry of Labor and Social Development and the Ministry of Economy and Planning as well as the Chambers of Commerce. The Technical and Vocational Training Corporation (TVTC) serves as an umbrella organization for TVET institutions. The major function of TVTC comprises designing and implementing TVET programs, conducting research, qualifying TVET trainers, setting standards and issuing licenses to the private TVET institutions.

Saudi Arabia's technical and vocational training is budding but the scope remains fairly constrained. The participation of youth (15-24 years) remains severely low by international standards accounting merely around 0.3% compared to high income

countries like Germany, Norway, Australia and Japan. However, in line with the enhanced prominence of TVET internationally, Saudi Arabia's TVET has initiated reforms and development initiatives to strengthen the skilling ecosystem of the country. The level of flexibility for students to choose their educational courses and move from vocational education to higher education programmes has expanded as a result of reforms in recent years. Also, TVTC colleges capacity has been expanded with the launch of new female targeted programs. This has raised the participation rate in the TVET institutions over the past few years. Reform initiatives under Vision 2030 aims to diversify educational pathways, encourage more high school graduates to pursue careers in vocational education, and enhance the view of these programmes as promising job paths in Saudi Arabia.

Skill Training Institutes and Courses Offered

SKILL TRAINING INSTITUTES	TRAINING/CERTIFICATION
Sustainability Leaders Co. ¹³⁷	<ul style="list-style-type: none"> • NEBOSH International Diploma • NEBOSH International General Certificate • IOSH Managing safely • Level 1 Scaffolding Erection • Level 2 Scaffolding Inspector • Level 1 Work at heights • Level 1 Scissor Lift Operator • Level 1 Award in Scaffolding Risk Awareness • Level 2 Working at heights and rescue • First Aid/CPR
Integrated for Training ¹³⁸	<ul style="list-style-type: none"> • Scaffolding Supervisor and Inspector • Occupational Health & Safety Technician • Plumber Technician • Welder and Fabricator Technician • Industrial Electricity Technician • Pipe Fitter Technician • Instrumentation Technician
TAFE Arabia ¹³⁹	<ul style="list-style-type: none"> • Construction Supervisor • IOSH Managing Safely • Welding Technician • Electrical Maintenance and Machine Controlling • HS5 IOSH Working Safely • NCFE IOSH Level 3 Certificate • CISRS UK Scaffold Supervisor • CISRS Scaffold Inspection • CISRS UK Scaffold Level 1 and Level 2 • NEBOSH HSE Certificate in Process Safety Management • HS4 - IOSH Managing Safely • Saudi Aramco Work Permit Receiver Course (WPR) • TAFE A27 Welding Safety • TAFE A32 IADC - Certified HSE Officer • TAFE A49 IADC - Scaffold Safety Erection • TAFE 850 IADC Scaffold Inspection • TAFE A56 IADC - Advanced Crane Operation
Engineering Science Institute for Training	<ul style="list-style-type: none"> • Building Information Modelling Training • Safety, Health and Environment (HS&E) Certified Training Courses
Green World Group ¹⁴⁰	<ul style="list-style-type: none"> • NEBOSH International Diploma for Occupational Health and Safety Management Professionals • IOSH Managing and Working Safely • OSHA 30 Hour Construction Industry • OHSAS 18001:2007 Awareness • RoSPA¹⁴¹ Approved HSE Courses

Fig. 50 | Skill Training Institutes and Courses Offered in Saudi Arabia

Even though vocational education is in nascent stages, some specific construction sector occupations require appropriate certifications. For example, Scaffolder Inspectors are required to have 3rd Party Scaffolding Inspection Certifications (i.e., TUV, CITB NVQ Level 3). Saudi job postings also suggest that HSE Certifications (NEBOSH, IOSH, OSHA) are desirable. Construction companies often hire Aramco approved construction workers in the fields of scaffolding, rigging, etc especially when working on Aramco projects.

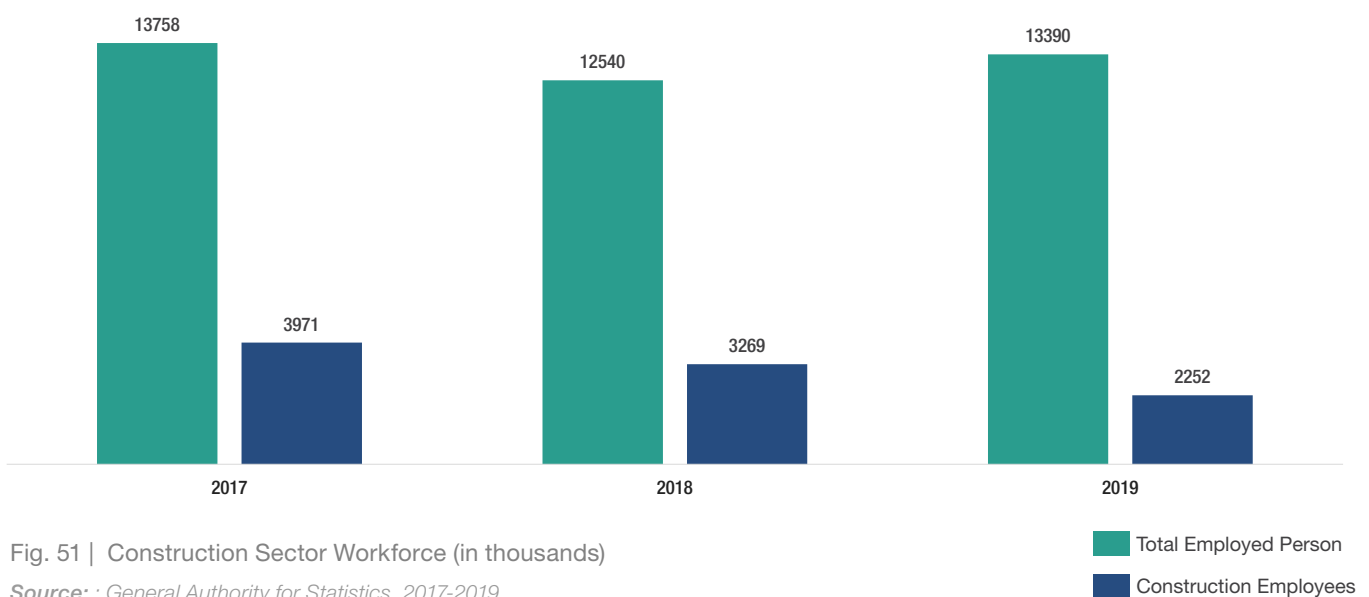
Overall, the Saudi Arabian TVET sector faces typical challenges of a nascent system affected by imbalances in demand and supply of relevant courses. Availability of appropriate courses is

lacking in computer, technical support, and equipment programmes. Since 2017, student demand for these fields soared, but the TVET system has not been able to keep up. Additionally, there appears to be a disconnect between Saudi Arabian female students' shifting career objectives and the TVET system's inability to quickly adjust while managing shifting social and labour market trends. For instance, in Saudi Arabia, the offering of TVET programmes for women has narrowly focused on more stereotypically "female" areas like make-up, apparel, fashion design etc. However, social conventions and views about working women are fast shifting in Saudi Arabia, and with them, women's choices and career paths have also seen a transformation.

Construction workforce has been declining in Saudi Arabia

Construction sector workforce accounted for 28% of the total labour force in 2017 while the share fell to 16% in 2019. However, major construction visionary projects like Red Sea, Qiddiya and Neom City, Diriyah gate and Amaala mega project are expected to give a push to the construction sector employment in the coming years. Additionally,

under the 2030 vision, Saudi's government expects to reduce the overall unemployment rate to 7% by 2030 and seeks to strengthen the private investments in the construction sector. With these initiatives, employment is expected to witness promising results in the future.



Around 30 percent of the labour force holds bachelor's degrees while 26 percent of them have completed their secondary schooling. Also very few workers seem to hold masters and doctorate degrees.

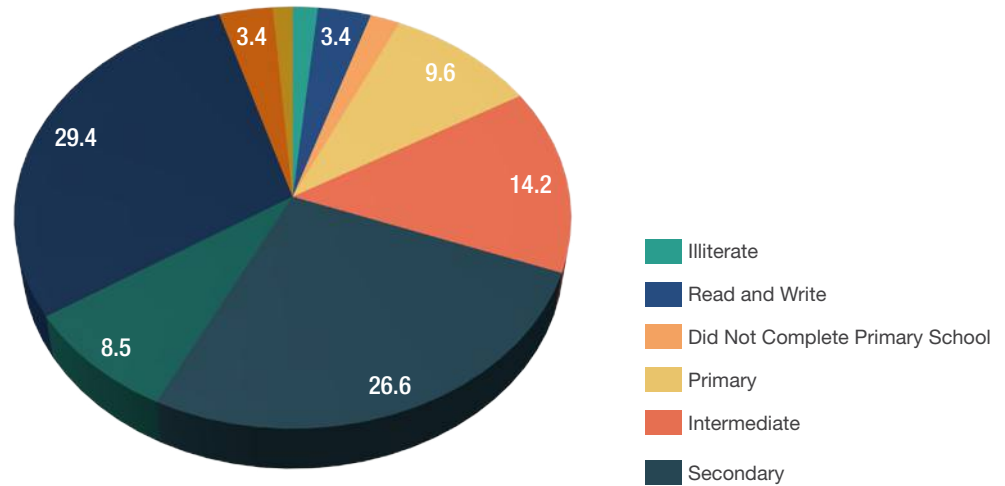


Fig. 52 | Labour Force (15 years and above) by Educational Status

Source: General Authority for Statistics, 2020

3.4 Australia

3.4.a Australia Construction Sector Overview : Demand-side

Construction sector is expected to grow at a CAGR of 2.4% in 2023-26 with non-residential construction driving the sector

The construction industry is the third largest contributing 9% to the GDP of Australia and was valued at USD 165.9 billion in 2021¹⁴². It is projected to grow at an AAGR of more than 2.4% during 2023-2026, generating over \$360 billion in revenue¹⁴³. Over 1.15 million people were employed in construction in 2019, and another 118,800 jobs are expected to be added by May 2023¹⁴⁴.

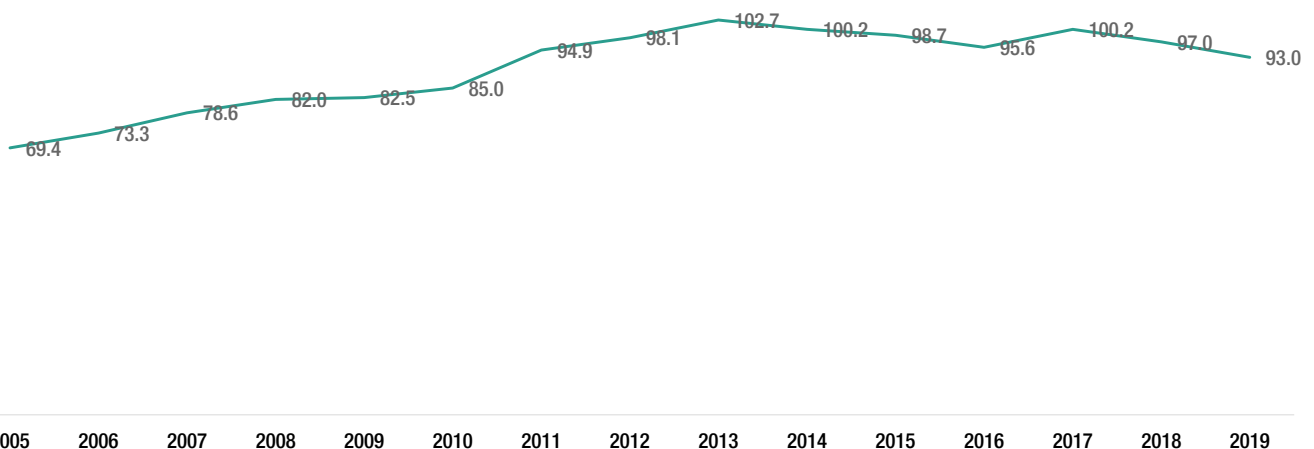


Fig. 53 | Value Added by the COConstruction Sector (2005-2019) (in USD billion)

Source: UNCTAD

Engineering construction and the non-residential construction sector are the major contributors, since growing investments in quarrying and related construction of roads and rails for freight travel along with the resulting growth of offices and storage facilities¹⁴⁵.

Sydney and Melbourne areas will lead construction activity in the country

Connectivity (through road and rail) projects in and around Sydney and Melbourne while a few construction projects will take place in Queensland, Mt Holland etc.

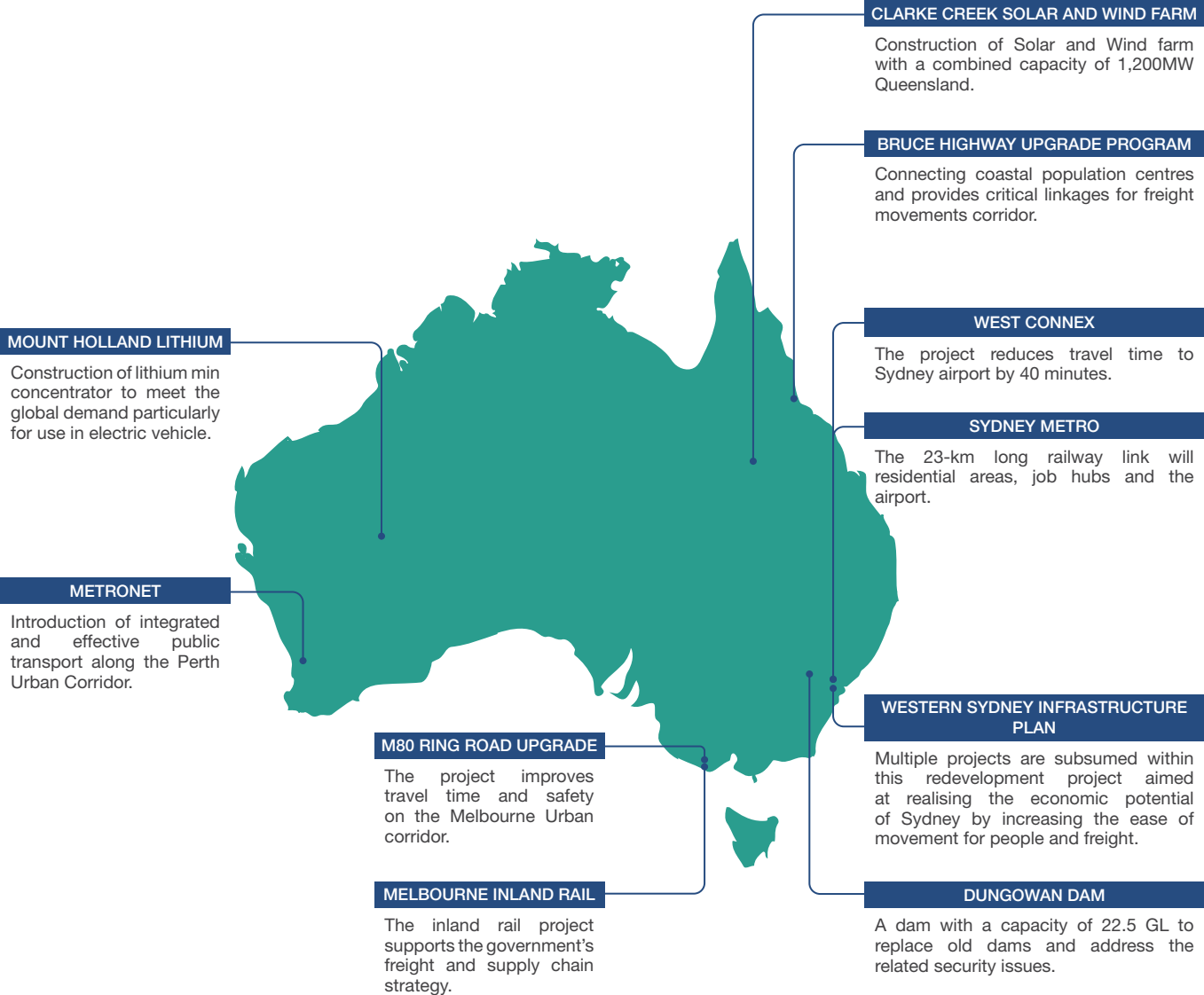


Fig. 54 | Major Construction Hotspots in Australia

PROJECT NAME	DESCRIPTION	PROJECT VALUE
West Connex	The project reduces travel time to Sydney airport by 40 minutes	UAD 16 Billion
Sydney Metro	The 23-km long railway link will have residential areas, job hubs and the airport.	USD 12 Billion
Melbourne Inland Rail	The inland rail project supports the government's freight and supply chain strategy.	USD 14.5 Billion
Bruce Highway Upgrade Program	Connecting coastal population centers and providing critical linkages for freight movements.	USD 8.5 Billion
Western Sydney Infrastructure Plan	Multiple projects are subsumed within this redevelopment project aimed at realizing the economic potential of Sydney by increasing the ease of movement for people and freight.	USD 2.9 Billion
M80 Ring Road Upgrade	The project improves travel time and safety on the Melbourne Urban corridor.	USD 1 Billion
METRONET	Introduction of integrated and effective public transport along the Perth Urban Corridor.	USD 3.7 Billion
Mount Holland Lithium Project	Construction of lithium min concentrator to meet the global demand particularly for use in electric vehicles.	USD 1,400 Million
Clarke Creek Solar and Wind Farm	Construction of Solar and Wind farm with a combined capacity of 1,200MW Queensland	USD 2,150 Million
Dungowan Dam	A dam with a capacity of 22.5 GL to replace old dams and address the related security issues.	USD 959 Million

Fig. 55 | Key Construction Projects in Australia

Source: Australian Government | Department of Infrastructure, Transport, Regional Development, Communications and the Arts; Five largest construction projects initiated in Australia in Q3 2021; Sydney Metro Project Overview

Australia has a developed TVET sector with almost 20% of young individuals taking up vocational training

The Australian TVET education system prepares almost 20% of young people in the 15-24 age group for various careers and is dominated by private training institutions. The country has 3227 institutions providing TVET training as compared to 24 government run Technical and Further Education (TAFE) institutions. These courses are open to international students as well. Students need to have IELTS or Cambridge Certificate to

signal knowledge of English language.

In addition to institution based training programs, Australia also has vibrant traineeship and apprenticeship programs. Traineeship programs are on-the-job training programs available in a wide range of vocations while apprenticeships are on-the-job training programs to learn skills in a specific trade.

3.4.b. Australia's Construction Workforce: Supply Side

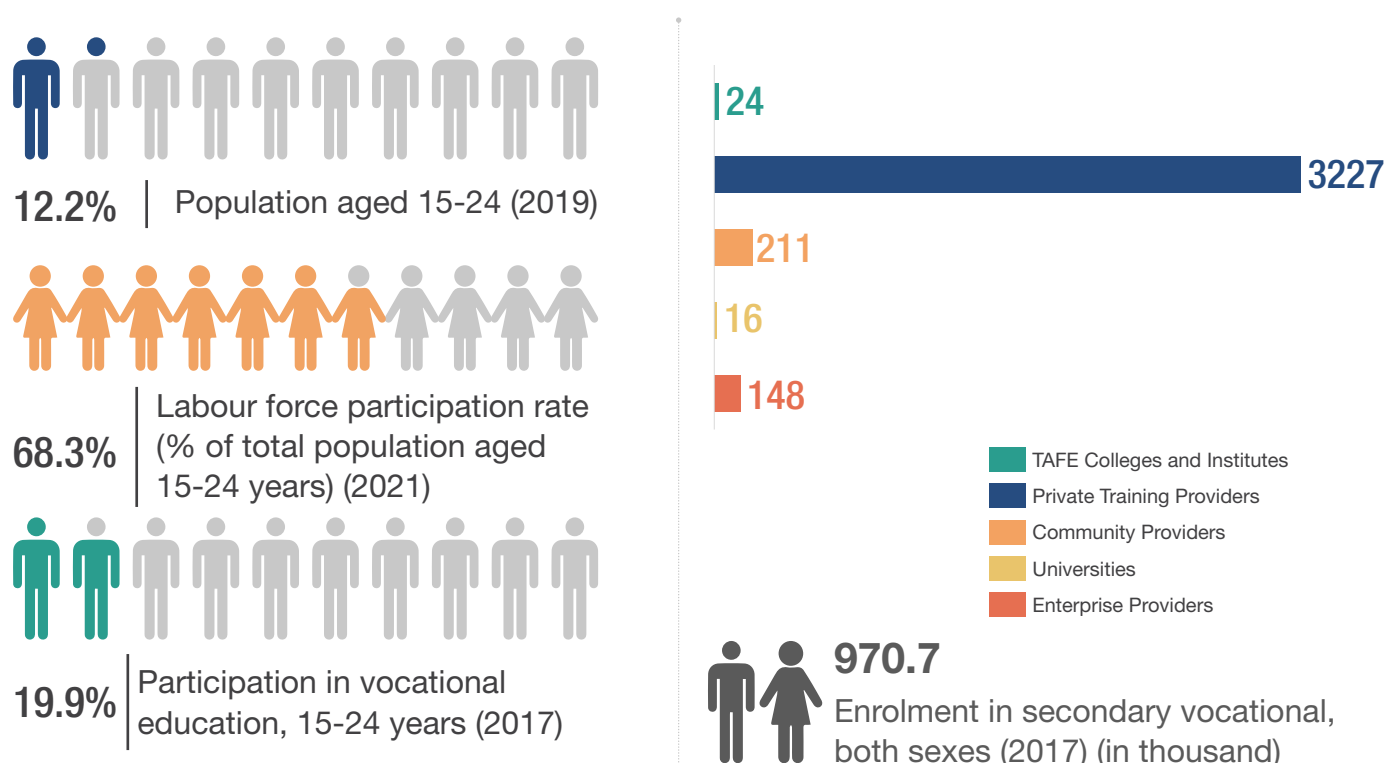


Fig. 56 | Technical and Vocational Education and Training

Source: UNESCO, International Centre for Technical and Vocational Education and Training

Skill Training Institutes and Courses Offered

SKILL TRAINING INSTITUTES	COURSES / CERTIFICATIONS
All Global Training ¹⁴⁶	<ul style="list-style-type: none"> License To Operate A Forklift Truck Work Safely At Heights Enter And Work In Confined Spaces License To Erect, Alter And Dismantle Scaffolding- Basic, Intermediate and Advance level License To Operate A Vehicle Loading Crane Prepare To Work Safely In The Construction Industry White Card
Construction Training International ¹⁴⁷	<ul style="list-style-type: none"> License To Erect, Alter And Dismantle Scaffolding- Basic, Intermediate and Advance level Certificate III in Civil Construction (General Course and Plant Course) License to operate a Materials Hoists (HM) License to operate a Forklift Truck (LF) Work Safely at Heights Also provides Offsite Training on need basis

SKILL TRAINING INSTITUTES	COURSES / CERTIFICATIONS
Informa Connect ¹⁴⁸	<ul style="list-style-type: none"> • Provides a variety of training programmes on workplace issues, safety, and human resources • Provides customized and offsite training
HPA Training ¹⁴⁹	<ul style="list-style-type: none"> • License to operate a personnel and materials hoist • License To Erect, Alter And Dismantle Scaffolding- Basic, Intermediate and Advance level • License to operate a tower crane • License to operate a forklift truck • License to operate a slewing mobile crane (over 100 tonnes)
Holmesglen ¹⁵⁰	<ul style="list-style-type: none"> • Certificate IV in Building and Construction • Enter and Work in Confined Space • Prepare to work safely in construction Industry (White Card) • Operate Elevated Work Platform • License To Erect, Alter And Dismantle Scaffolding- Basic • License to operate a forklift truck • Operate a boom type elevating Work Platform License • Operate a Bridge and Gantry Trade License • Restricted Electrical Workers License Class 2 (Appliances and Motors) • Shift Loads using gantry equipment • Traffic Management Skill Set • Work Safely at Heights • Construction Wiring and Mandatory Testing • Course in Civil Construction Pathway
Chisholm ¹⁵¹	<ul style="list-style-type: none"> • Certificate II in Building and Construction Pre-apprenticeship (focus on carpentry) • Certificate II In Building And Construction Pre-apprenticeship (focus on bricklaying) • Certificate III in Carpentry • Certificate III in construction waterproofing • Certificate IV in building and construction • Operate work elevated platforms • Prepare to work safely in construction industry • Traffic management skill set • Construction Induction (White Card) • Diploma of Building and Construction
Design Learning Inspection ¹⁵²	<ul style="list-style-type: none"> • Work safely at heights • Work safely in construction industry (White card) • Operate elevating work platform (EPW Yellow card) • Confined space courses • Forklift license • WHS Construction¹⁵³

Fig. 57 | Skill Training Institutes and Courses Offered in Australia

Apprenticeship programs in the construction sector are more successful than apprenticeship programs in other sectors in Australia. In fact construction apprentices accounted for 53% of all apprentices in South Australia in 2019. Meanwhile, the number of construction sector employers employing apprentices has also increased steadily. Most apprentices train as electricians, plumbers and carpenters¹⁵⁴.

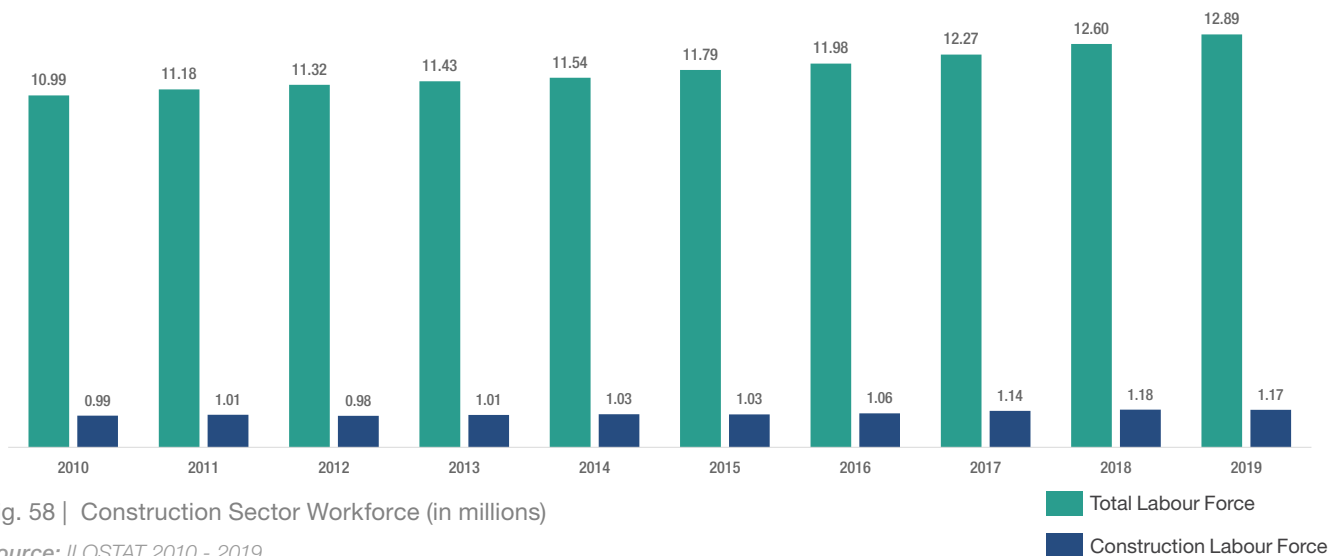
Australian Apprenticeship Support Network is the nodal body and a first point of contact for apprentices and employers in the country and helps connect individual workers to training providers and jobs. It also helps employers find apprentices, trainees and group training organizations (GTOs). GTOs employ apprentices in Australia on a training contract and place them with employers. At

present there are 48 GTOs registered in Australia that provide training for trades under Building and Construction sector¹⁵⁵.

Construction industry in the country requires all workers to have a White Card which shows that a worker has completed training in safely working at construction sites. In addition to this some types of workers require licenses/certifications, for example:

Scaffolders in Australia require Intermediate and/or Advanced Scaffold tickets, Confined Space and Working at Heights tickets while barbending and steel fixers are required depending on the task, and workers require High Risk work licenses¹⁵⁶. Additionally, Carpenters and Joiners that make up 10% of the workforce in the construction sector are the most common VET-regulated job, with a projected to grow by 17% between 2021-25.

Construction sector workforce is mainly crafts and trades workers with fewer professionals, managers and technicians



The share of the construction labour force has risen from 0.99 millions in 2010 to 1.17 millions in 2019. Construction sector employment seems to hold a marginal share in the total employment levels in Australia. Of the 50 occupations relevant

to public infrastructure development, nearly 34 are rated as either likely or potentially in shortage. These primarily include engineers, scientists and architects¹⁵⁷.

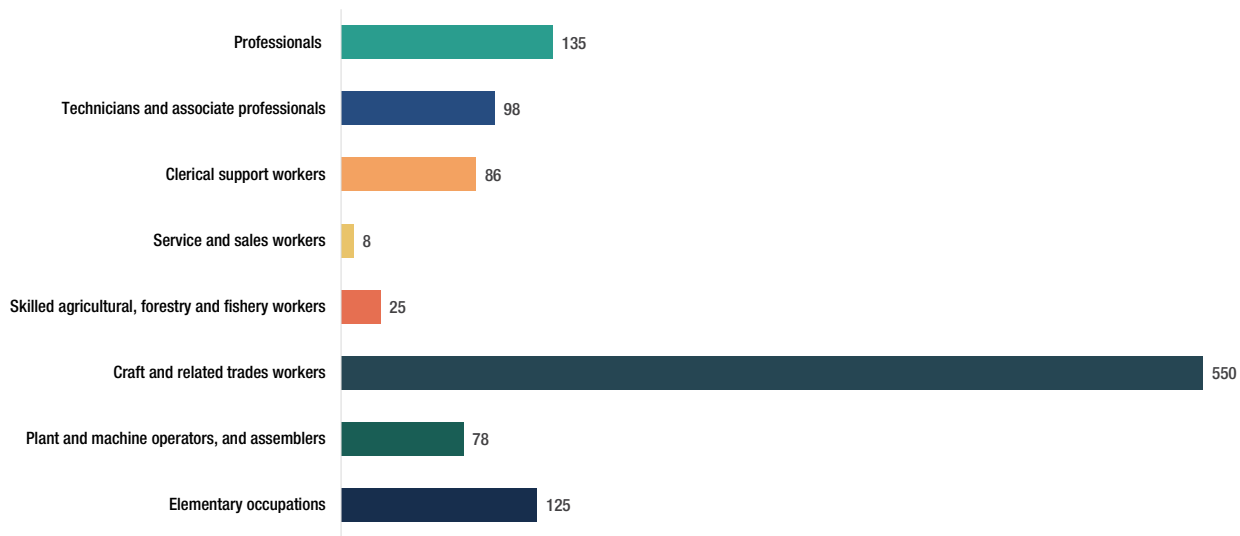


Fig. 59 | Composition of Construction Sector Workforce in 2020 (in thousands)

Source: ILOSTAT

There are presently 200,000 more vacancies in Australia than in the pre-pandemic period, and vacancies in the construction sector grew by 140%

since the beginning of the pandemic¹⁵⁸. This is pushing the costs of construction and delaying the project delivery.

3.5 Germany

3.5.a Germany Construction Sector Overview : Demand-side

Germany's construction sector is expected to grow with a CAGR of 6.3% between 2022-26

The German construction market size was valued at \$486 billion in the year 2021¹⁵⁹. The Global Construction Survey found that the German construction industry is expected to grow by 11.1% to reach EUR 261,240 million in 2022¹⁶⁰. The German construction industry shrank marginally by 0.5% in real terms in 2021, following a relatively

strong performance in 2020, when the industry expanded by 3.8% despite the disruptions caused by the Coronavirus (COVID-19) pandemic¹⁶¹. With a projected CAGR of 6.3% for 2022-26, the growth momentum would be maintained, and the construction output is expected to grow to EUR 333,922 million by 2026¹⁶².

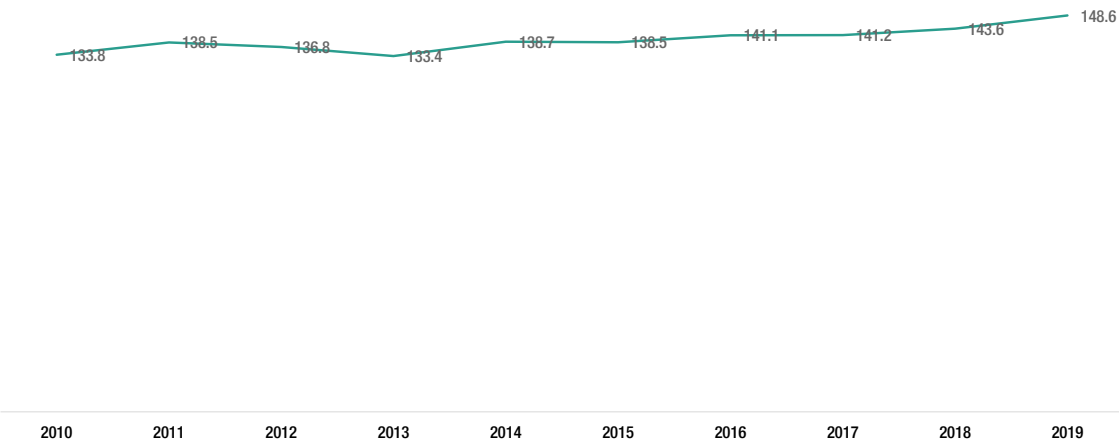


Fig. 60 | Value Added by Construction Sector (2010-2019) (in USD billion)
Source: UNCTAD

Residential construction sector leads the construction sector in Germany aided by government-backed affordable housing programs. The government launched plans to build 400,000 new housing units every year in 2021, of which 100,000 are to be publicly subsidized¹⁶³.

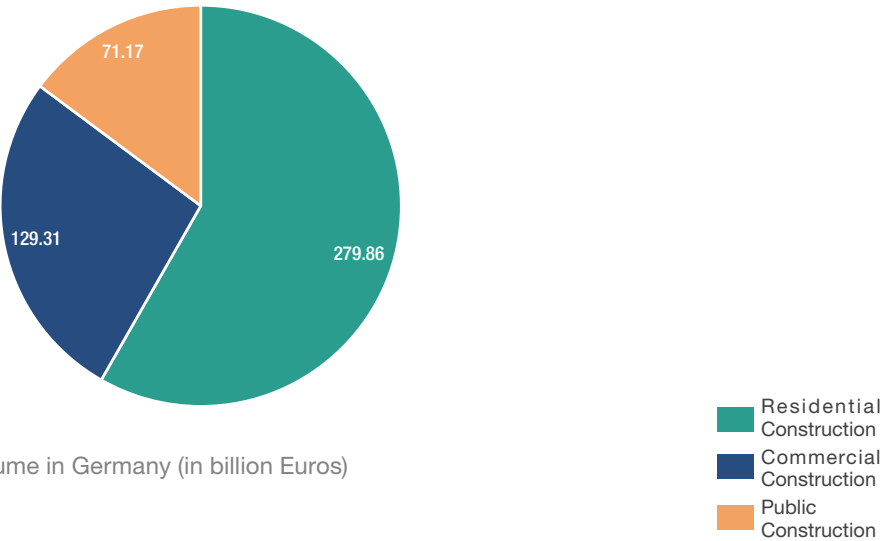


Fig. 61 | Development of Construction Volume in Germany (in billion Euros)
Source: EconStor, 2022

Even though the construction activity is widespread across the country some large project will be in and around Frankfurt

Planned infrastructure construction projects beginning in Q3 2021 are also expected to add to the construction sector growth. Growth will also be supported by the 10-year plan to invest EUR 86 billion (\$94.7 billion) on the maintenance and modernization of the country's rail network between 2020 and 2030¹⁶⁴.

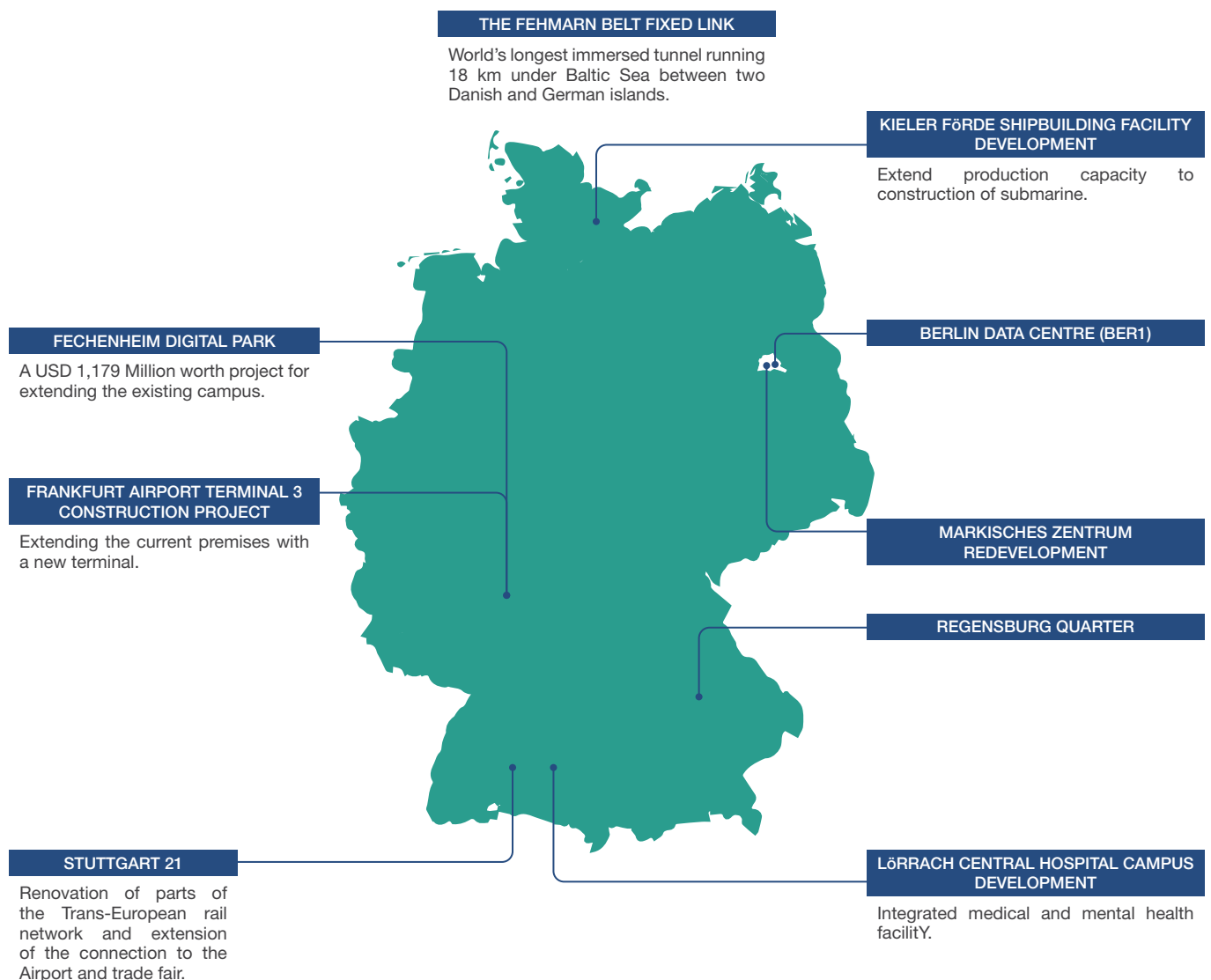


Fig. 62 | Major Construction Hotspots in Germany

Frankfurt will get a new data park and an airport terminal at the same time, Berlin will also see development of commercial buildings like a data center and redevelopment of Märkische Zentrum complex.

PROJECT NAME ^{165 166 167}	DESCRIPTION	ESTIMATED COST
Digital Park Fechenheim	The project involves the construction of the Digital Park Fechenheim in Frankfurt-Fechenheim, Hesse, Germany.	USD 1.2 billion
Berlin Data Center Campus (BER1 & 2)	Berlin, Germany.	USD 500 million
Lörrach Central Hospital campus Development	The project involves the construction of the Central Hospital campus with a gross floor area of 47,000m ² in Lörrach, Baden-Württemberg, Germany.	USD 418 million
Kieler Förde Shipbuilding Facility Development	Kieler Förde, Schleswig-Holstein, Germany.	USD 8.5 billion
Märkisches Zentrum Redevelopment	Märkisches Zentrum complex in Berlin, Germany.	USD 234 million
The Fehmarn Belt Fixed Link	the world's longest immersed tunnel, that is currently being built to connect the Danish island of Lolland with the German island of Fehmarn, a distance of 18-kilometers across the Fehmarn Belt in the Baltic Sea.	USD 7.53 billion ¹⁶⁸
Regensburg Quarter	Introduction of integrated and effective public transport along the Perth Urban Corridor.	USD 3.7 billion
Stuttgart 21	Stuttgart 21 is a railway and urban development project that is a part of the new and renovated Stuttgart–Augsburg railway, as well as the Main Line for Europe (Paris–Vienna) within the context of the Trans-European Networks.	USD 9.31 billion ¹⁶⁹
Frankfurt Airport Terminal 3 Construction Project	This project involves the construction of a new terminal for Frankfurt Airport on the site of a former US military base.	USD 3.33 billion ¹⁷⁰

Fig. 63 | Key Construction Projects in Germany

Germany's TVET sector is well developed and open for foreign nationals

Germany has a strong TVET system embedded with its formal schooling system. After completing 10 - 13 years of formal schooling, students in Germany can opt for vocational training or academic education. Vocational education can be pursued through school based VET programs or apprenticeship programs where students can work and learn at the same time¹⁷¹. Germany's vocational

education system is accessible to EU and non-EU foreign students as well. Students traveling from foreign countries can seek admission in vocational schools or take up apprenticeship training. Skilled workers can work in Germany after gaining appropriate recognition of their skills acquired in the home country.

3.5.b. Germany's Construction Workforce: Supply Side

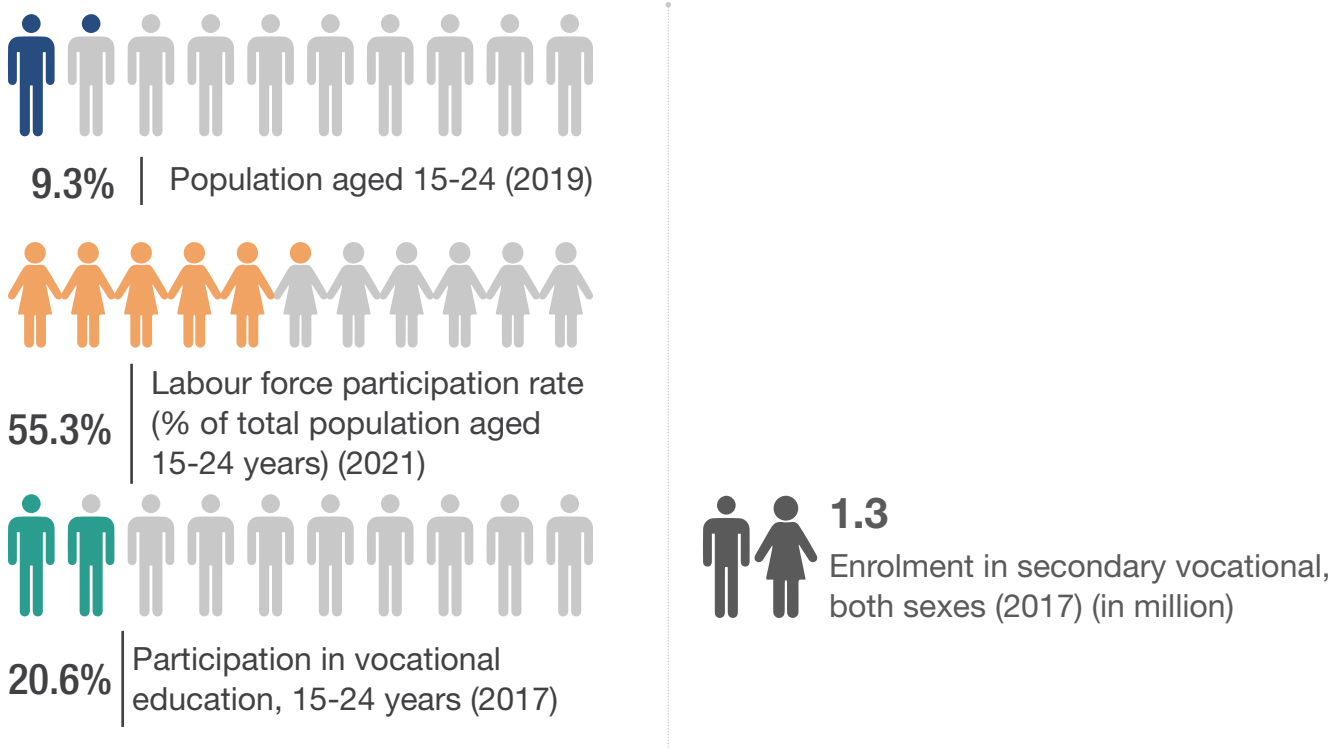


Fig. 64 | Technical and Vocational Education and Training

Source: UNESCO, International Centre for Technical and Vocational Education and Training

Skill Training Institutes and Courses Offered

SKILL TRAINING INSTITUTES	COURSES / CERTIFICATIONS
DIN Academy ¹⁷²	<ul style="list-style-type: none"> • BIM training courses • Fire protection • Soundproofing • Advance course in Architecture • Site manager training
Woodwork Academy ¹⁷³	<ul style="list-style-type: none"> • Provides introductory and intermediate carpentry workshops
The Berufskolleg Ernährung – Sozialwesen – Technik ¹⁷⁴	<ul style="list-style-type: none"> • Building and road construction courses • Carpentry • Professional house painting • Training courses for Electricians, Electrical engineers and metal workers
Richard-Riemerschmid-Berufskolleg ¹⁷⁵	<ul style="list-style-type: none"> • Provides training in • Technical assembler • Painter and Varnisher • Interior decorator

Fig. 65 | Skill Training Institutes and Courses Offered in Germany

Knowledge of German is necessary to work and thrive in the country. In addition to this, professionals moving into regulated occupations require necessary licenses under Trade and Crafts Code to work as self employed persons in Germany. Workers seeking employment require appropriate certifications and vocational training in construction sector occupations while applying

for open positions . Workers trained outside of Germany will require their training to be recognized by German authorities. Recognition process may require workers to go through additional training in Germany to have their prior training recognized by applying on German recognition portal Anerkennung in Deutschland.

Share of construction labour force to the total labour force has risen from 2.6 million in 2011 to 2.9 million in 2019

The share of construction labour force to the total labour force has been lower in Germany. However, government through its fiscal policy reform initiatives have announced an additional EUR3.1 billion (\$3.5 billion) annually between 2021 and 2024 on public

investment in infrastructure, including railways, roads and the construction of affordable housing. This is expected to give a boost to the construction sector employment in the coming years.

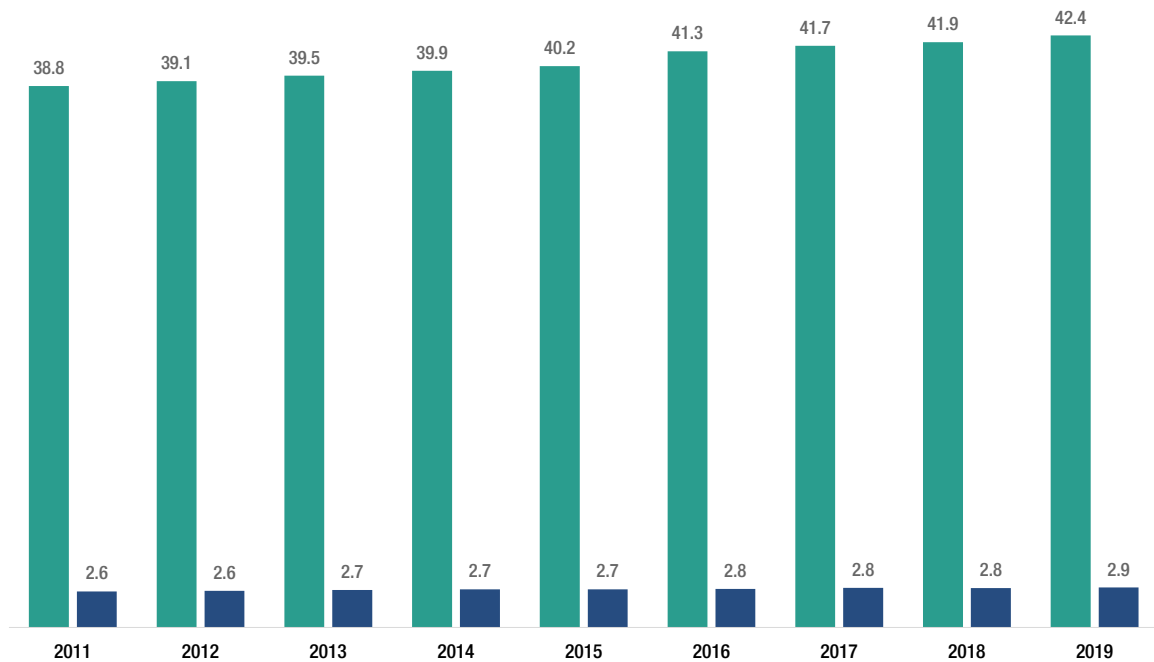


Fig. 66 | Total labor force and the construction labor force (in millions)

Source: ILOSTAT 2011-2019

■ Total Labour Force
■ Construction Labour Force

Majority of German Construction workforce includes crafts and trades workers

Craft and related trade workers dominate the labour market due to the inclusion of skill training through secondary, senior-secondary and vocational education levels. An IMF Working group paper found that on average a lesser educated immigrant worker was paid 20% lesser wages in 2013, have

a lesser chance of securing a job and remain unemployed for longer stretches of time. Whereas, the gap decreases when comparing immigrants from advanced countries, with good German language skills, and with a German degree.¹⁷⁶

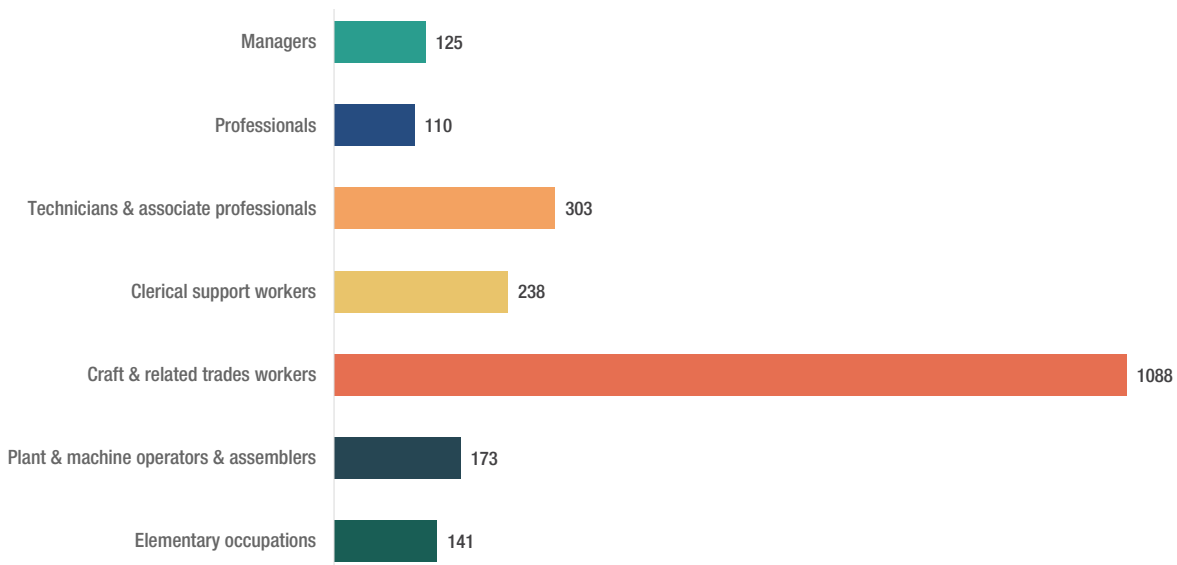


Fig. 67 | Composition of Construction Sector Workforce (2020) (in thousands)

Source: ILOSTAT

3.6 Japan

3.6.a Japan Construction Sector Overview : Demand-side

Japan's construction sector expected to grow at CAGR of 5% between 2021-2027

Over the last decade, Japan's construction industry has largely been driven by government spending in response to rebuilding efforts after major natural disasters (the Great Hanshin-Awaji Earthquake of January 1995 and the Great East Japan Earthquake and Tsunami in 2011) and investment in the redevelopment of urban areas and infrastructure

for Tokyo Olympics of 2020¹⁷⁷.

Following the asset bubble burst in the early 1990s, the Construction sector's Gross Value Added bottomed out in 2010 and started on a positive trajectory only in 2013¹⁷⁸. Between 2013 and 2017, the sector posted a growth rate of 4%. In 2018 and 2019, we can see a descending trend (Figure 68).

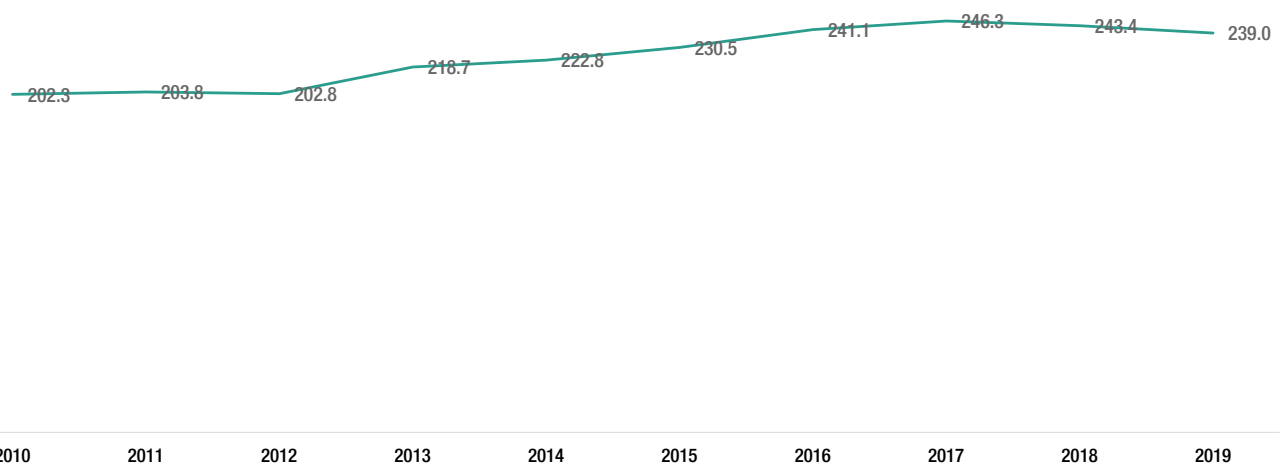


Fig. 68 | Value Added by the Construction Sector (2010-2019) (in USD billion)

Source: UNCTAD

Post the Pandemic and the 2021 Tokyo Olympics, the number and volume of construction and infrastructure projects in Japan has been picking up. The Japanese construction industry is expected to grow by 3.2% in 2022, following that expansion by 4% in 2021. Overall, the industry is expected to grow at a CAGR of approximately 5% in 2020-27¹⁷⁹. However, Japan's investment in public works has been dropping especially in comparison to other developed economies. Japan's total investment in infrastructure plummeted about 40% between 1996 and 2019, while spending increased fourfold in the U.K. and by 2.3 times in the U.S. in the same period.⁷ The expenditure is expected to pickup as Japan spent Yen 9.3 trillion on Public Work related

expenditure in 2020 which is higher than the amount spent in the past decade¹⁸⁰. Japan's Gross Fixed Capital Formation was 3.1% of its national GDP in 2021, which was higher than the largest economies US, UK and Germany. Japanese government is also planning a fund of Yen 15 trillion (USD 115 billions) for making infrastructure disaster proof over next five years¹⁸¹.

Key sub-sectors in the construction industry are commercial construction, industrial construction, infrastructure construction, energy and utilities construction, institutional construction, and residential construction. Infrastructure sector is the largest construction sub-sector in Japan. The commercial and residential sub sectors see project

implementation largely during 2022 with mixed-use developments. Major rail-road projects are planned as a part of the infrastructure sub-sector. The institutional sub-sector is prioritizing the healthcare sector to cater to the aging population¹⁸².

In the coming years, Japan will see higher investments in infrastructure construction due to its recently enacted National Land Resilience Policy, 2018 brought in to ameliorate the effects of recurring disasters. In 2033, 60% of all road bridges and 40%

of tunnels would be 50 years old¹⁸³. There have been a few accidents involving some of the aging infrastructure which prompted the government to initiate a large-scale maintenance and upgrade process, however it has faced setbacks such as shortage of skilled labour and funding.¹⁸⁴ The budgets of FY2019 and FY2020 were increased as temporary and special measures, which was further extended to 2026 in order to strengthen against large-scale earthquakes and for the preservation of aging infrastructure.¹⁸⁵

Most construction projects will be located in Tokyo

USD 150 billion have been set aside for disaster proofing of the existing infrastructure. In addition to this, other construction sector activity is expected

to take place in Tokyo through redevelopment of urban areas.

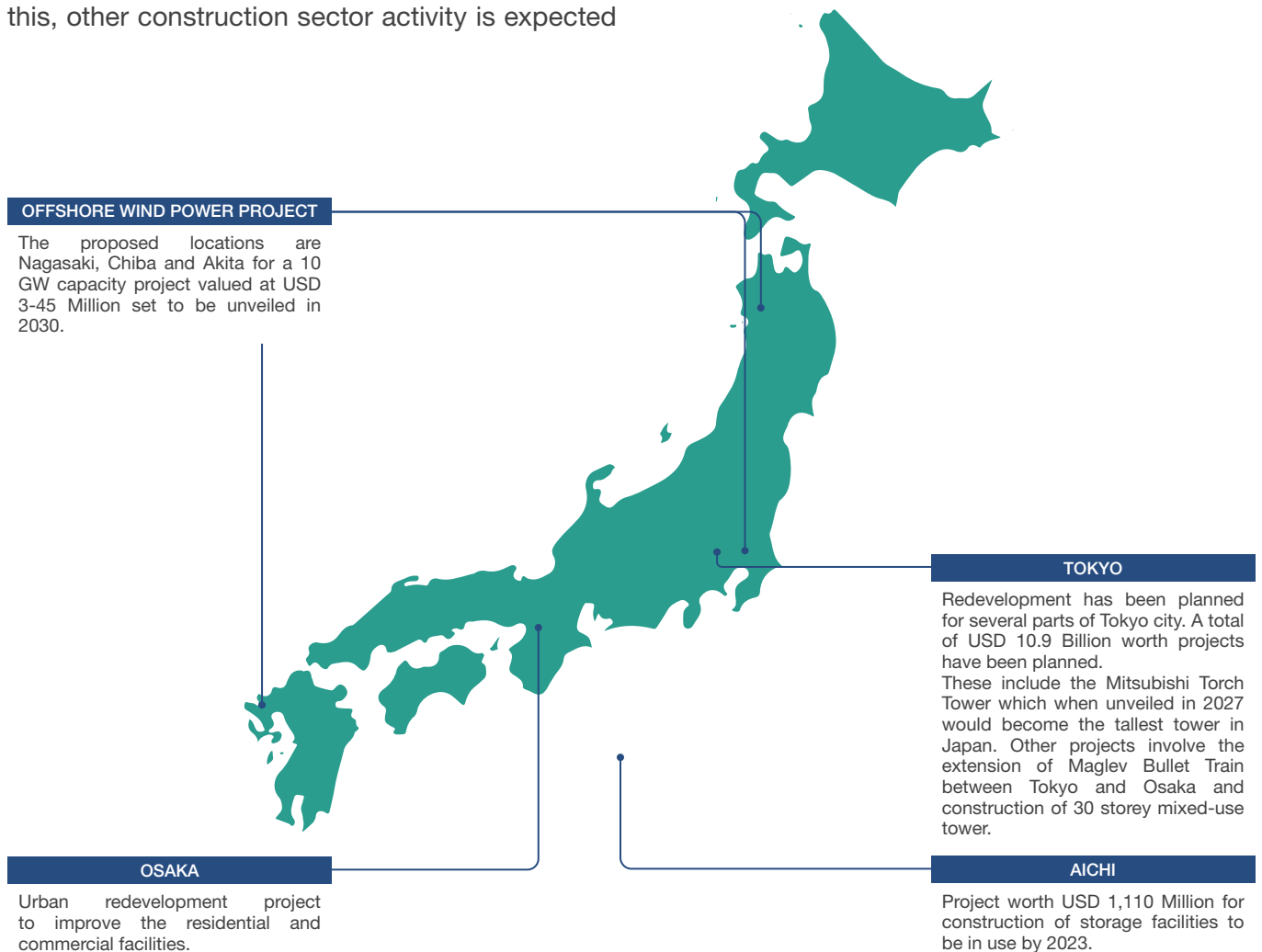


Fig. 69 | Major Construction Hotspots in Japan

NATIONAL PROJECTS ^{187 188}			
PROJECT NAME	DESCRIPTION	PROJECTED VALUE	EXPECTED COMPLETION
Mitsubishi Torch Tower¹⁸⁹	Inspired by a flaming torch at 390 meters in height it will become the tallest skyscraper of Japan	USD 4.77 Billion	2027
Disaster Proofing of Existing Infrastructure	In line with the National Land Resilience Policy moving towards maintenance of existing infrastructure in the face of worsening natural disasters	USD 115 Billion	2021-26
Logiport Nagoya	Construction of a four-storey, logistic facility to improve the logistics and storage facilities in the region.	USD 1110 Million	2023
JR Koiwa Station North Exit District Type One Urban Redevelopment	The project aims to build a 30 storey above ground mixed use tower in Tokyo.	USD 559 Million	2027
Kobe Nagata Logistics Center	The project provides improved logistics and storage facilities in the area.	USD 435 Million	2023
Hirakatashi Station Area Type One Urban Redevelopment	The project improves the residential and commercial facilities in the region	USD 392 Million	2025
Offshore wind Power Projects	Four zones have been identified and a tender process has been initiated with a target to increase the share of renewable energy in its total power mix to 36-38% by 2030.	USD 3 - 45 Million (2040)	2030-31
Linear Motor Car Project	A Maglev bullet train project proposed to run between Tokyo and Osaka.	USD 14 Million	Phase 1: 2027 Phase 2: 2037

Fig. 70 | Key Construction Projects in Japan

Japan's TVET is well developed

The Ministry of Education, Sports, Culture, Science and Technology (MEXT) and the Ministry of Health, Labour and Welfare (WHLW) are primarily responsible for the provision of and oversight of the VET sector in Japan. MEXT is in charge of upper secondary specialized schools as well as general comprehensive schools, which includes some vocational schools such as colleges of technology. MHLW is primarily in charge of conducting trade skill and qualification tests as well as public vocational training. In order to increase students' preparedness for the workforce, the Ministry of Economy, Trade, and Industry (METI) also provides

career education in the K-12 and higher education settings¹⁸⁶.

Compared to the OECD average of 42%, just 22% of Japanese upper secondary students choose vocational and education training programmes on average. In Japan, engineering, manufacturing, and construction are the most commonly preferred fields, accounting for 43% of upper secondary vocational graduates, compared to 33% on average throughout the OECD countries. In Japan, all upper secondary vocational students are engaged in school-based program where at least 75% of the coursework is imparted in a classroom setting.

3.6.b. Japan's Construction Workforce: Supply Side

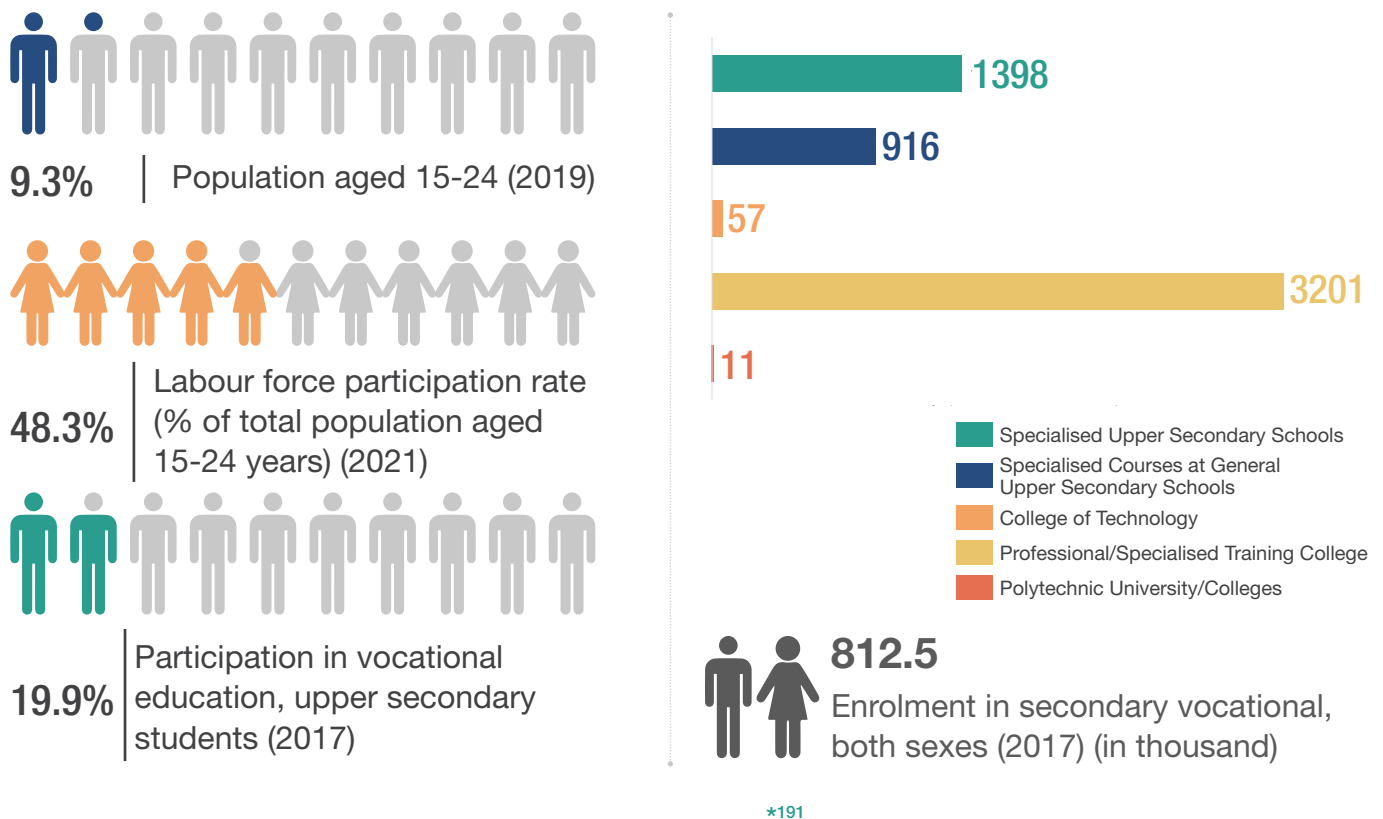


Fig. 71 | Technical and Vocational Education and Training

Source: UNESCO, International Centre for Technical and Vocational Education and Training

Technical, Vocational Education and Training (TVET) is offered in TVET institutes, Polytechnic colleges and higher education and high schools (upper secondary) as depicted in figure 56. The three broad categories of TVET institutes comprises Schools, Public Vocational and Training Centers and Private Organisations. The private organizations' training is typically broken down into three categories: (1) corporate training; (2) training/courses for occupational licensing; and (3) other skill development programs¹⁹⁰. Additionally, private businesses also conduct on the job training and off the job training to strengthen the skilling capabilities of the workers.

However, it is important to note that Japan does not have a uniform licensing national framework. Some licenses are linked with the schooling system, some are nationally legislated while some are private licenses granted by the private organizations.

Employers and firms in Japan look for broader general and basic skills. There is a famous concept that has evolved in the country referred to as Gakushi-Ryoku, or bachelor's abilities that covers four domains: general skills, attitude and aptitude, extensive learning experience, knowledge and comprehension, and creative thinking.

Skill Training Institutes and Courses Offered

SKILL TRAINING INSTITUTES	COURSES / CERTIFICATIONS
Akamonkai Japanese Language School	<ul style="list-style-type: none"> Specified Skilled Worker Employment Class¹⁹³
JCLI School	<ul style="list-style-type: none"> Specified Skilled Worker Employment Class¹⁹⁴
Osaka College of Technology ¹⁹⁵	<ul style="list-style-type: none"> Architectural Course Carpentry Skills Architect special course
Japanese Association for Construction Human Resources ¹⁹⁶	<ul style="list-style-type: none"> Specified skilled workers program <ul style="list-style-type: none"> Construction machinery and construction Scaffolding Plumbing Carpentry Offshore Civil Engineering Reinforcement construction Formwork construction

Fig. 72 | Skill Training Institutes and Courses Offered in Japan

The Japanese government has introduced a system called Vocational Ability Development Measures (VADM) to assess the occupational skills and industrial competencies of the students passing out of the polytechnic institutions. The Vocational Ability Development Measures are composed of the following five programs: National Trade Skill Testing; In-house certification testing; Creation of vocation capability evaluation standards (VCES); YES-program (Support for young employee's fundamental skill development); and Skill Examination system (by MEXT)¹⁹².

The MHLW in collaboration with the Japan Vocational Ability Development Association (JVADA) has also developed Vocational Capability Evaluation Standards (VCES) called "Syokugyo Nouryoku Hyoka Kijun" that systemised skills and knowledge required in the labour market.

Challenges with the TVET sector

There are several problems, such as: weak TVET legislation in Japan, an unorganized education and training system that hampers uniform skilling patterns, strong on the job training and off the job training mechanisms also have a negative impact on recruiting and reduce the value of certifications.

Construction Sector Employment and Composition of Construction Sector Workforce

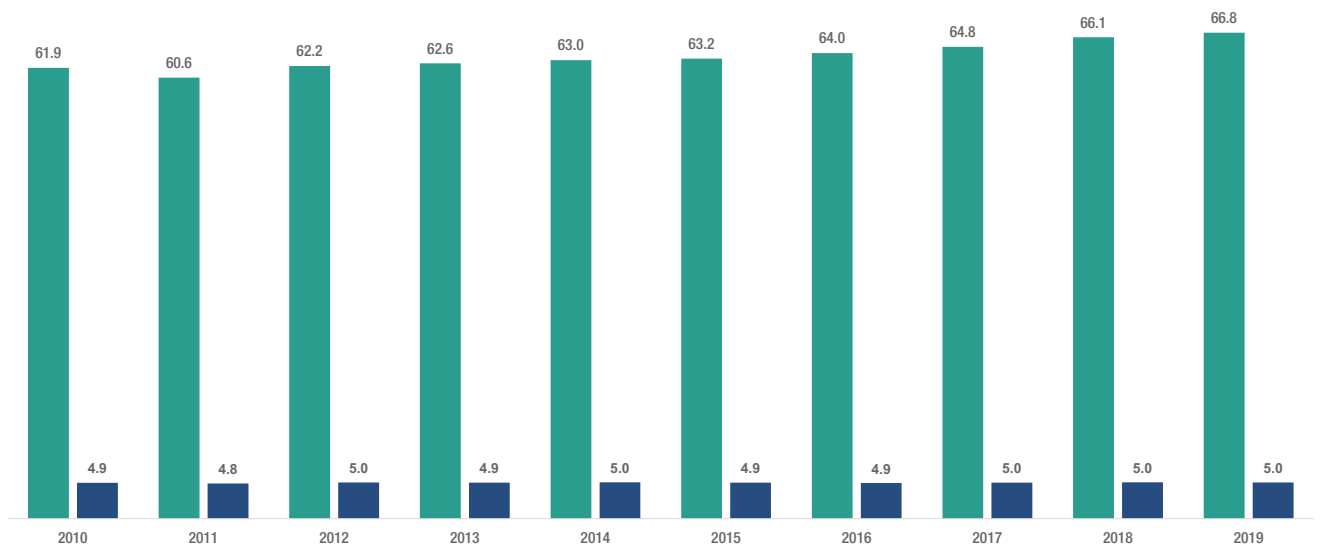


Fig. 73 | Total labour force and the construction labour force (2010-2019) (in millions)

Source: : ILOSTAT, 2010-2019

■ Total Labour Force
■ Construction Labour Force

The share of construction workers to the total labour force has seen a minimal rise from 2010 to 2019.

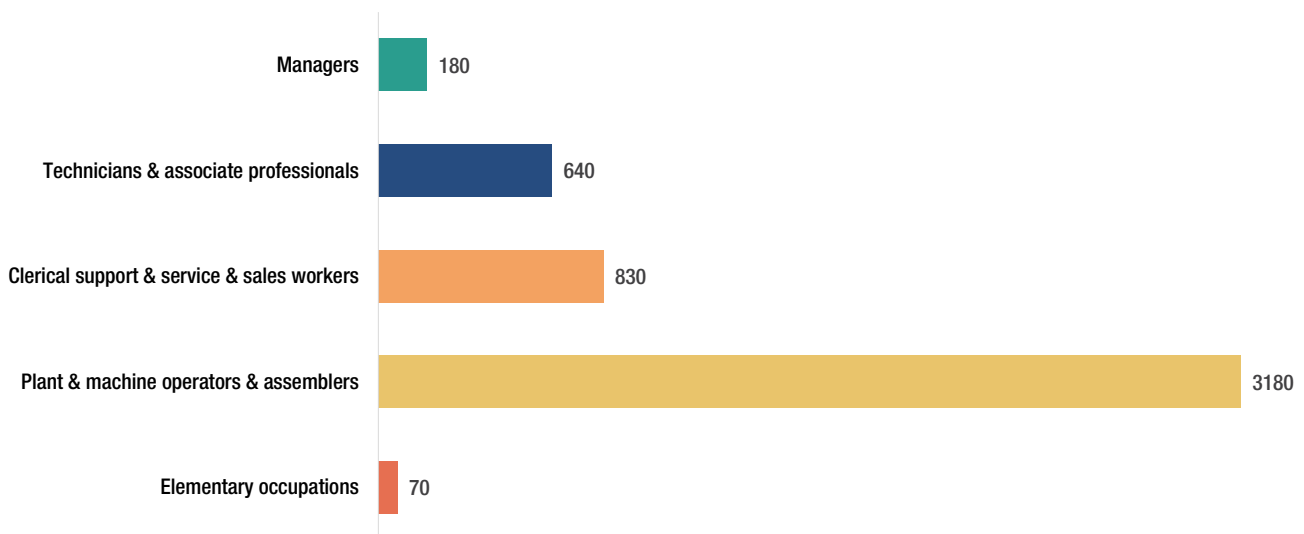


Fig. 74 | Composition of Japanese Workforce in 2020 (in thousands)

Source: ILOSTAT

The present composition of the Japanese workforce is heavily concentrated in the plant and machine operating staff, with a paucity of specialized workers and elementary workers. As of 2017, Japan had nearly 55,000 foreign workers in the construction industry alone, which was an increase of 400% from 2012. However, a major hurdle to liberalization

of workforce immigration is that migrant workers are allowed to reside in Japan for 3-5 years. Although a law passed in 2015 allowed returning workers another 2 to 3 years, there is still a need for new legislation that will address the labour deficit and allow foreign workers to work longer in Japan.

Endnotes

- 1 Gross domestic product: GDP by type of expenditure, VA by kind of economic activity, total and shares, annual. (n.d.). [Dataset]. UNCTAD. <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=95>
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