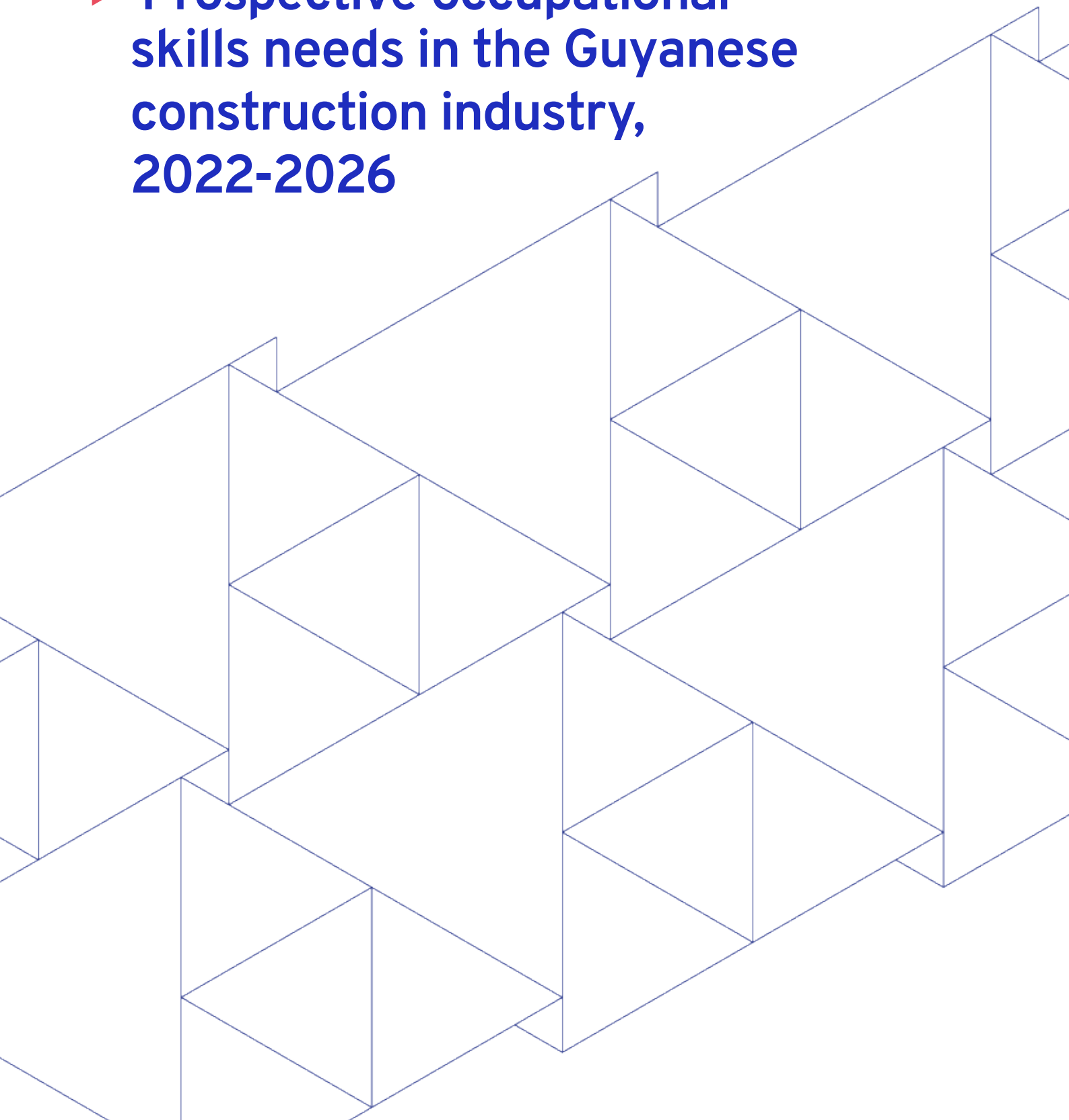




International
Labour
Organization



► **Prospective occupational
skills needs in the Guyanese
construction industry,
2022-2026**



Prospective occupational and skills needs in the Guyanese construction industry, 2022-2026

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► Foreword

The present study, generously financed by the United States Department of State: Bureau of Population, Refugees and Migration, is the result of dedicated collaboration between the International Organization for Migration (IOM) Office for Guyana, and the International Labour Organization Office for the Caribbean and supported by the Ministry of Labour of the Government of Guyana. It stems from a reflection on potential employment opportunities for both national and foreign workers in a booming economy and aims to address a specific information gap concerning skills needs in the construction industry.

Focusing on the construction industry, the study combines a background analysis of the local, and to some extent, international human resources trends accompanied by the collection of original data from companies directly operating within it. It provides valuable information about the profiles that required in the short and medium term, and details on the competencies accompanying those as well as perception of availability of the latter. Preferred hiring methods, a glimpse at current educational options and further insights from industry professionals complete the analysis.

The bulk of the information collected, analyzed, and synthesised in the study originates from a dedicated survey conducted in Guyana over the months of August and September 2022. In addition, an analysis of the published web-based vacancies and interviews with representatives from the private sector, the Government of Guyana and academia corroborate and substantiate the findings.

The study was coauthored by the team of the consultancy firm Blindspot led by Miguel Macias, and by Diego Rei, Employment and Labour Market Policies Specialist at the ILO Caribbean Office. Research, data collection and methodological assistance was provided by Richard Rambarran. The process would not have been possible without the commitment and efforts of IOM colleagues Nkayo Drepaul and many colleagues from the IOM Regional Office.

The International Organization for Migration in Guyana and the ILO Caribbean Office also wish to thank all the stakeholders who contributed to the study by devoting time and resources to answer survey questions, attend interviews or share available data. In particular, the assistance of Dhaneswar Deonarine, Chief Labour Office of the Ministry of Labour in Guyana is duly acknowledged.

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North America and the Caribbean

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ILO Decent Work Team and
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► List of acronyms

BoIT	Board of Industrial Training
CTVET	Council for Technical and Vocational Education and Training
CXC	Caribbean Examination Council
GHG	greenhouse gas
GDP	Gross Domestic Product
GY\$	Guyanese dollars
IMF	International Monetary Fund
O&G	Oil and gas
IOM	International Organization for Migration
ISIC	International Standard Industrial Classification
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
IT	Information technology
LFS	Labour force survey
ILO	International Labour Organization (ILO)
LCDS	Low Carbon Development Strategy
STED	Skills for Trade and Economic Diversification
TVET	Technical vocational education and training
USD	United States dollars
VTI	Vocational training institutes

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▶ Executive summary

- ▶ Guyana is expected to become one of the top producing oil and gas economies globally within the decade. Together with oil and gas, other sectors such as construction will be dramatically affected by the oil led economic expansion. The study provides an analysis of potential occupational and skills needs in the industry. The latter is of particular interest considering construction is traditionally labor-intensive, it may employ a substantial number of workers in elementary occupations, and it has strong forward and backward production linkages to the whole economy.
- ▶ The construction sector (including real estate) contributed to approximately 16 per cent of the country's GDP over the past ten years and accounted (q3, 2021) for nine per cent of the total employment in the country, with an overwhelming majority of workers being men (96.2 per cent). Elementary occupations represented slightly less than 30 per cent of the total employment, while 'craft and related trades workers' represented the majority (62 per cent). The sub sector of 'architectural and engineering activities' employed (by Q3 2021) exclusively (highly) skilled technical and professional workers.
- ▶ The challenges for the local construction industry in terms of human resources are several and can be summarized as: (i) inadequacy of available profiles exacerbated by the evolution of the market towards new products thereby causing a lack of qualified human resources during the execution (notably adhering to green technology), supply, and commercialization phase; and (ii) limited number (headcount) of workers available in the country.
- ▶ Findings from a dedicated survey about occupational and skills needs in the next five years answered by 46 companies (employing an estimated 18 per cent of the total workers in the construction industry) and operating in a diverse range of activities, suggest the following:

In relative terms, the main **occupational profiles in demand** for the next five years in the industry appear to be those of 'building frame and related trades workers (23 per cent)', 'engineering professionals (15 per cent)', 'mobile plant operators (10 per cent)', 'heavy trucks and bus drivers (10 per cent)', followed - with an incidence of less than 10 per cent - by 'sheet and structural metal workers', 'moulders and welders, and related workers', 'architects, planners, surveyors and designers', 'transport and storage labourers and metal processing and finishing plant operators'.

- By expected **number of hirings**, survey respondents indicated a potential growth - over the next five years - of up to 590 new 'building frame and related trades workers', 355 'heavy trucks and bus drivers', 242 'engineering professionals; and 208 'mobile plan operators'.
- Total employment is expected to grow by 21 per cent over the next year (+ 892 workers) with respect to the current total employment (headcount 4,155) and 50

per cent (+ 2126 workers) over the next five years. If a similar growth rate is applied to employment within the whole industry (estimated at about 22,500 workers in q3 2021), we speculate that, notwithstanding market dynamics, at least 10,000 new jobs should be created directly in the “most in demand” occupations for the construction industry and potentially more if other occupations are considered.

- **Ninety-five per cent of all the workers performing jobs in “most in demand” occupations are currently 25 years of age or older.** This is caused by a combination of three factors: (i) younger generations tend to not be attracted to work in construction, (ii) since most of the current construction developments are associated with the oil and gas industry, and there is an associated high injury and monetary risk (loss of material, equipment) associated with unperforming a job, employers have a strong preference for workers with previous working experience (even in trades or basic occupations such as for welders or mechanics); (iii) employers are somehow not keen to take the chance with younger workers as the skills gaps associated with transferable skills (i.e. not technical ones) represent a perceived risk.
- **Forty-nine per cent of jobs** in “most in demand” occupations **require either a higher technical or a higher degree** of education and training.
- Overall, **women representation** as workers in the “most in demand” jobs within the responding companies is merely **3 per cent**.
- The most common **method of recruitment** for occupations identified as “most in demand” is **“word of mouth” followed by print media and social media**.
- In terms of **skills** associated with the most in demand occupations, 55 per cent of the skills highlighted as “most important” (technical, IT or transferrable) are considered **widely available** in Guyana. Only 27 per cent of the technical skills indicated as necessary for the most in demand occupations were considered scarce in the country (but generally available abroad). IT skills are the ones showing the deepest gap as only 39 per cent of the skills perceived as widely available in Guyana.
- **Equipment maintenance** represents the **technical skill** most in demand while at the same time it is considered scarcely available in the country. This is associated with the recent undertaking of new imponent projects, the utilization of new machines therein and the lack of suitable preparation for their maintenance. In terms of IT skills, while **general use of MS Office Suite type of software and hardware is perceived as problematic, a specific gap is identified in the use of Autocad**. **Not so extended** gaps seem to exist in terms of **transferrable skills** amongst which time management, business conduct and communication appear to be the ones perceived as most scarce.

- ▶ Comparing potential hirings, occupational profiles and skills needs emerging from the survey and the number of graduates from Guyana tertiary and vocational training institutions, suggest that:
 - There are more or less pronounced gaps in the number of graduates and the numerical needs of the responding companies but - if one was to consider the entire population of the construction companies and the overall needs of the economy - those gaps (even if of different depths) would be universal. Engineers, metal work engineers and heavy-duty machine operators appear to be occupations which will suffer considerably from the quantitative discrepancy between the industry needs and number of graduates. In addition, health and safety professionals appear to be one category almost completely not supplied by the current educational system.
 - If graduates in disciplines relevant to the construction industry are usual residents of regions with limited potential, there might be a (strong) case to investigate or implement relevant policies which could facilitate the internal migration of qualified labour. This consideration may be particularly valuable in the case of graduates obtaining degrees that are potentially useful in high demand occupations but are residing out of region 4 and 6. Examples could be graduates in electrical installations and engineering from regions 2, 3, 5, 7, 10, (approximately 120 per year) and heavy-duty equipment from regions 2, 3, 8, 9, 10 (approximately 180 per year).

- ▶ As recommendations for future actions, the findings from the study allow for the following recommendations:
 - As the shortage of IT skills (and to a lesser extent the transferrable ones) appears to be the most concerning one, notwithstanding the need to ensure availability of fully fledged curricula preparing students in several competencies, **inclusion of relevant IT skills into curricula** must be carefully considered.
 - Expansion of the offer of training to respond to the need of the fields most in demand (especially engineering, heavy machinery operations, electrical applications) will have to be gauged against the capacity of the system (facilities, teachers, financial resources) and possibly consider easily executable solutions to expand the offer of education in selected trades including (i) the development of a private market for selected trades in which the capacity of expansion from the public sector may not go at the same speed as required in the market; and (ii) provide recognition of prior learning services to informal on-the-job training currently provided in the construction industry.
 - **Construction related equipment maintenance** appears to be a **critical (technical) skill in demand and lacking in Guyana**. Any revision of curricula and investment in training equipment will most likely have to consider this issue.

- The preference within the industry for older workers hints at the relative importance of **working experience in addition to training**, a crucial element which will have to be considered once the design of educational responses. As a result of the interviews, such working experience is often associated with transferrable skills which appear to be mostly lacking by younger workers. Curricula development in higher and technical education will have to do better with respect to this element.
- **Guidance on educational and career choices which may have positive repercussion on acquisition of construction relevant skills, notably by women** is to be **enabled**. The above findings on job prospects associated with certain degrees will help shape not only the educational offer, but also the educational and career guidance one.

► Introduction

During the last decade, Guyana has become one of the fastest-growing economies in the world. While the COVID-19 pandemic led to a non-oil Gross Domestic Product (GDP) contraction of -7.3 per cent in 2020, the economy recovered quickly, reaching growth rates of 19.9 per cent in overall GDP and 4.6 per cent in non-oil GDP in 2021. These growth rates were particularly thanks to the construction and services sectors. By 2022, overall GDP growth rate is projected to be 57.8 per cent, with an expected growth of 30 per cent per year until 2026 (IMF, 2022).

Guyanese economic performance is primarily driven by developments in its flourishing oil and gas (O&G) sector,¹ however, other sectors, such as construction, will be dramatically affected by the oil led economic expansion.² Indeed, simply considering direct productive linkages infrastructures are or will be needed along the oil and gas value chain, including facilities for the extraction and processing of hydrocarbons as well as roads and ducts for transportation; more indirectly, the intensification of oil and gas activities will mobilize larger groups of both temporary and permanent workers to oil-producing or refining regions, thereby increasing the demand for housing, hotels, commercial property, and office buildings, among others.

For the sake of analyzing potential employment opportunities within the whole economy, focusing on construction is particularly useful if one considers that the industry is labour-intensive and may employ a substantial number of workers in occupations associated with low(er) skills level.³ In addition, the sector has strong forward and backward production linkages, so its dynamics have the potential to generate multiplier effects through its supplier network.

The present study was realised between August and October 2022 via a collaboration between the International Organization for Migration (IOM) and the International Labour Organization (ILO), in consultation with the Government of Guyana. The analysis presented is meant to support

¹Significant hydrocarbon deposits were discovered in Guyana's ultra-deep waters last decade. Estimations suggest that the country has more than 9 billion barrels of recoverable high-quality crude oil reserves; hence, the Guyana economy is expected to become one of the top oil and gas economies globally. Within the next five years, the country is projected to surpass Kuwait, the United Arab Emirates, or Saudi Arabia in its per capita production (Mackenzie, 2020).

² We intend construction encompassing residential buildings, but also infrastructure. The latter is highly relevant as the oil and gas sector will drive significant investments.

³With the due caveats associated with any broad generalization, here and elsewhere in the study the framework of reference is the practice adopted by ILOSTAT (based on ISCO 08) associating occupations (by the broadest ISCO categories) with four skills levels, each linked to a given educational attainment (as per ISCED 11 classification). Specifically: skill level 3 (higher education not awarding a first university degree, ISCED category 5) and 4 (university or postgraduate university degree, ISCED categories 6, 7, 8) are associated with 'Managers', 'Professionals' and 'Technicians and associate professionals'; Skill level 2 (first and second stages of secondary education (ISCED categories 2 and 3) is associated with 'Clerical support workers', 'Clerks', 'Service and sales workers', 'Service workers and shop and market sales workers', 'Skilled agricultural, forestry and fishery workers', 'Skilled agricultural and fishery workers', 'Craft and related trades workers', 'Craft and related trades workers', 'Plant and machine operators, and assemblers' and skill level 1 comprising primary education (ISCED category 1) is associated with 'elementary occupations'. For further reference see [here](#) and [here](#).

the Government of Guyana, local stakeholders, employers and workers' representatives, educational institutions, and academia to assess and, to the extent possible, anticipate the labour demand and skills needs within the construction sector. The study also provides an overview on how those needs are or could be addressed via the present educational infrastructure. Combined, the results are intended to guide the design of policy responses, some of which are suggested in the recommendations section.

This report is organized in three parts:

1. **Chapter 1** provides an analysis of the construction industry combined with a summary of the challenges for the general labour market in Guyana. Reflections on local and global trends affecting human resource requirements in the construction industry are presented accompanied by selected evidence.
2. **Chapter 2** presents the detailed results of the investigation on occupational profiles and skills gaps together with an overview of the methodology utilized. It also provides an overview of the current educational offer in Guyana and how it could match current and future skills requirements is presented.
3. **Chapter 3** suggests some solutions and possible way forward for the private and public sector, regarding the development, attraction and retention of needed human resources.

▶ Chapter 1. Setting the stage

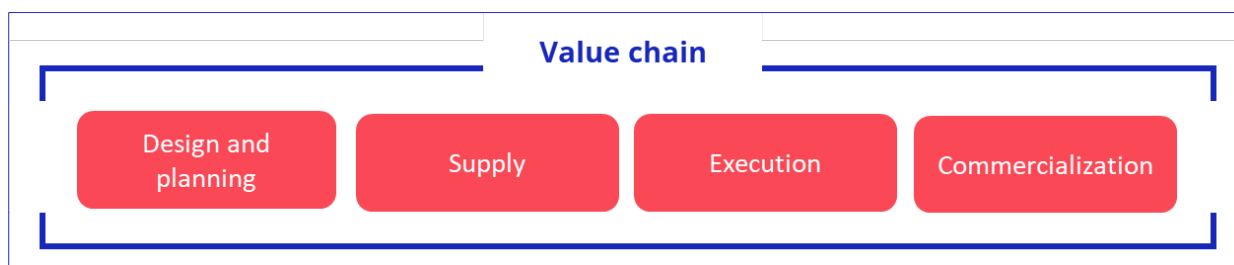
This first chapter of the report provides an overview of three elements directly affecting the demand and supply of labour within the construction industry. First, it presents an overview of the standard organization of the construction value chain highlighting the main employment implications within each stage. Second, it offers a brief profile of the status of the construction industry in Guyana. Third, it provides some general challenges accompanying the supply of labour within the Guyanese labour market.

The construction value chain

In the present study we consider the value chain as the range of activities required to bring a product or service from conception, through the intermediary phases of production and delivery, to final consumption. A brief introduction of the main features of the construction value chain helps to identify job creation potential as well as the related skills needs.

The process within the construction value chain includes four main facets: design and planning; supply; execution; and commercialization.

▶ **Figure 1. Construction value chain**



Source: Own elaboration

Design and planning

At this stage, the architectural plans, work and budgets for the development of the project are carried out, having as central axes the technical, legal, financial, and human capital plans that would be developed during the construction process.

Employment implication. The potential for job creation at this stage is reduced and limited to professional workers. Some of the most demanded occupations in design and planning are architects, designers, civil engineers, lawyers, human resources professionals and financial planners.

Supply

This is the stage where the construction company and its suppliers acquire raw materials and related services. By then a series of productive chains are triggered, possibly prompting further economic development, especially when the use of local suppliers is prioritized.

Employment implication. Common jobs at this stage are plant operators (for the manufacturing of construction materials), truck drivers, transport, and storage labourers and specialized, shop clerks and salespersons.

Execution

This activity includes the process of building a property or some type of infrastructure. To do so, developers and construction companies can either hire or outsource labor. At this stage, the companies that supply construction materials also play a critical role, generating employment in the logistics and transportation processes.

Employment implication. This is the more labour-intensive stage of the value chain with a diverse demand for labour including civil engineers, architects, surveyors, designers, bricklayers, welders, carpenters, joiners, painters and related workers, construction labourers and concrete placers.

Commercialization

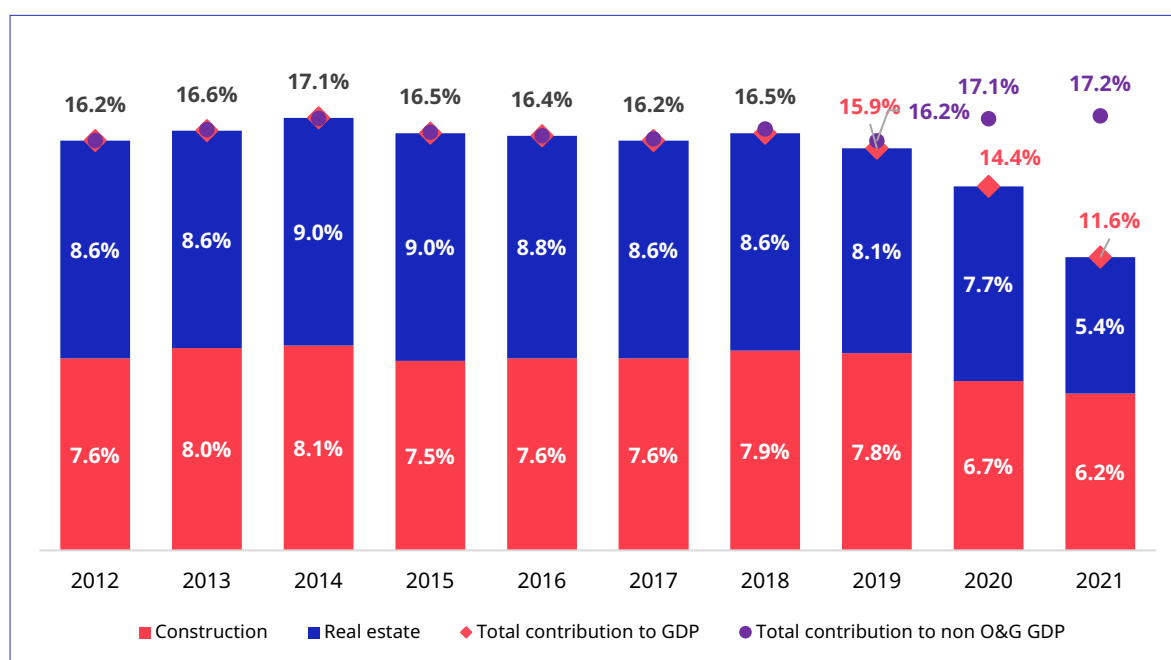
At this stage, the properties/infrastructure are marketed or delivered, depending on the nature of the contract. Construction in Guyana today tends to be driven mainly by industrial projects, so a broad real estate market has not developed. The economic impact of oil activity is, however, increasing and all signs point in the direction of a greater demand for real estate, which will -in turn- imply the development of new skills and profiles.

Employment implication. Agents, brokers, and salespersons are the main profiles sought after at this stage. If Guyana is to follow global trends, the increase in complexity of the products and services offered for both residential and business buyers will demand professionals who can explain, in detail, those and develop customized solutions. Theoretical knowledge associated with sale related expertise will become vital thereby possibly leading to new professional figures who are able to manage different stages of the process from project management to paperwork, financing, installation, and maintenance. In addition, the likely increase in purchasing power per capita in Guyana could require those professionals to be able to manage teams executing conditioning or improvement services on existing properties.

The construction industry in Guyana

Economic weight. The construction sector including real estate contributed to approximately 16 per cent of the country's GDP over the past ten years⁴. While the relative share decreased since 2019 because of the expanded weight of the oil and gas activities, the industry remains a cornerstone of Guyanese economy, accounting for 17.2 per cent of non-Oil and Gas GDP in 2021³.

► **Figure 2. Contribution of construction-related activities to GDP (including and excluding oil and gas, 2012-2021, Guyana)**

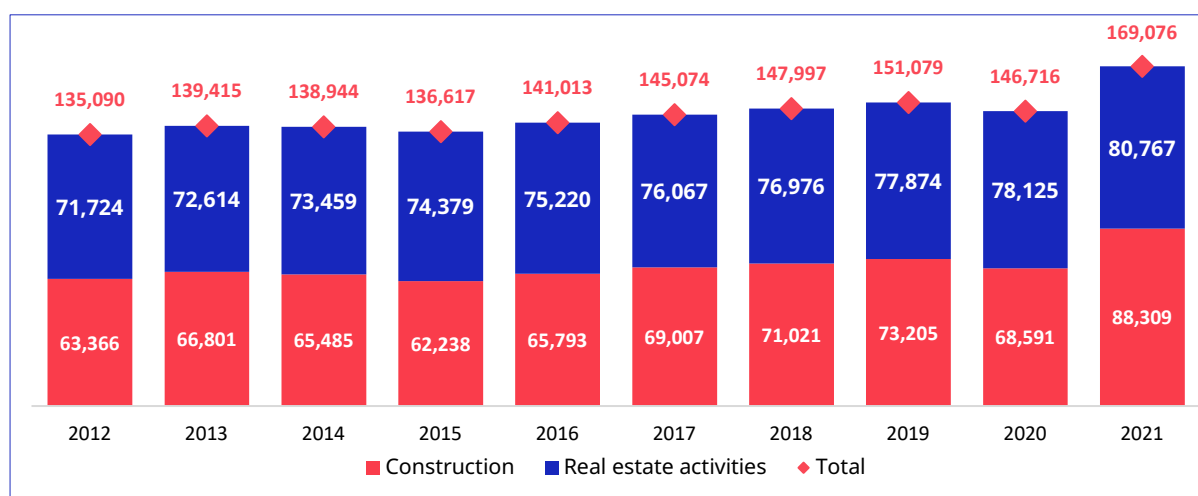


Own elaboration (Bureau of Statistics of Guyana, 2022)

While real estate has shown a relatively steady growth rate of 2 per cent in the last few years, the construction sector grew by 29.8 per cent in 2021 compared to 2020 (Bureau of Statistics, Guyana, 2022). Given the plans for further public investment, it is projected to grow by 10.5 per cent in 2022 (Guyana Chronicle, 2022).

⁴ Authors' own elaboration based on (Bureau of Statistics, Guyana, 2022).

► **Figure 3. Gross Domestic Product of construction related activities (GY\$ Millions)**



Own elaboration (Bureau of Statistics, Guyana, 2022)

The Government has allocated GY\$96.1 billion of its GY\$552.9 billion 2022 Budget to the Ministry of Public Works, which is responsible for the country's infrastructure. Development plans include the construction of new roads, highways, harbours, ports, bridges, low-income houses, and houses for young professionals, as well as multiple investments for the transition to cleaner and more sustainable energy sources. In addition, in September 2022 the Government called for proposals to design, finance, and build a 30,000-barrel-per-day (bpd) oil refinery, the construction of which is expected to begin by the first half of 2023, with a project completion date set for two years after.

Employment. As per the third quarter of 2021, the construction industry⁵ accounted for 9 per cent of the total employment in the country, with an overwhelming majority of workers being men (96.2 per cent)⁶. Three quarters of the construction labour force consisted of employees and the remaining of self-employed workers.⁷

► **Table 1. Employment profile construction sector in Guyana (q3 2021)**

Total employment in construction (Headcount)	22,300
As percentage of total employment in the economy	9.0
Of which men (%)	96.2

⁵ Here and throughout the rest of the report **construction industry** is identified, consistently with International Classifications of Economic Activities (ISIC) rev 4 by the combination of **three subsectors: 'construction of buildings', 'civil engineering' and 'specialized construction activities.'** Note that in Guyana 90 per cent of the employment in the construction sector is concentrated in the two sub industries 'Construction of buildings' and 'Civil engineering'. In addition, at times, where relevant for the analysis, the sub industry '**Architectural and engineering activities; technical testing and analysis**', normally categorized as a 'service' under ISIC level 71, is cited. As shown in Table 1, the numerical consistency of employment in such sub industry is limited.

⁶ The highest relative female employment participation rate by sub industry occurs in 'architectural and engineering activities', where women occupy 39 per cent of the jobs.

⁷ Self-employed include own account workers, employers and members of producers' cooperatives.

Total employees in construction (thousands)	16.758
Of which men (%)	96.2
As percentage of total employment in construction	75.1
Total employment in International Standard Industrial Classification (ISIC) sector 'Architectural and engineering activities; technical testing and analysis' (thousands)	235*
As percentage of total employment	0.9*
Of which men (%)	61*

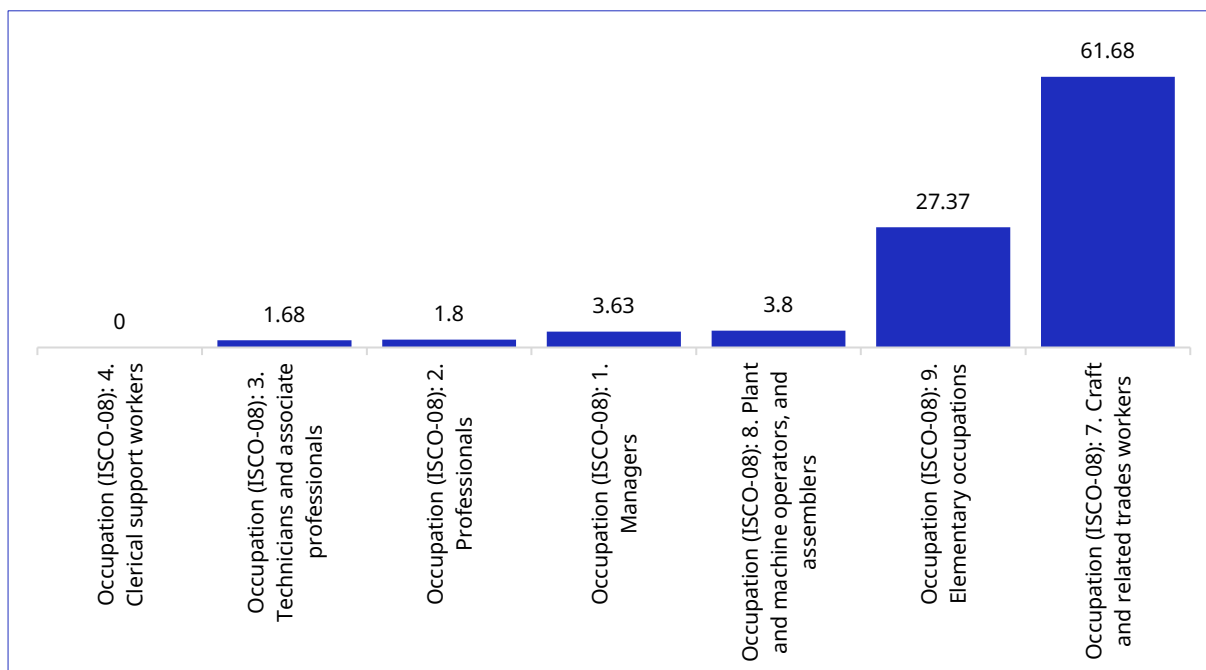
Source: Authors' own elaboration based on Guyana Labour Force Survey q3 2021.

*Figures are indicative only as small sample size may limit significance

Conversely, the service activities linked to architectural and engineering, technical testing and analysis (ISIC sector 72) contributed minimally to total employment in the country.

Figure 4 shows that within the construction industry elementary occupations⁸, including low manual work, represent slightly less than 30 per cent of the total employment, while 'craft and related trades workers'- a category which typically includes workers who apply specific technical and practical knowledge and skills - represent most of the workers in the industry accounting for 62 per cent of the total.

► **Figure 4. Breakdown of employment in the construction industry by occupation (1 digit ISCO classification 08) q3 2021**

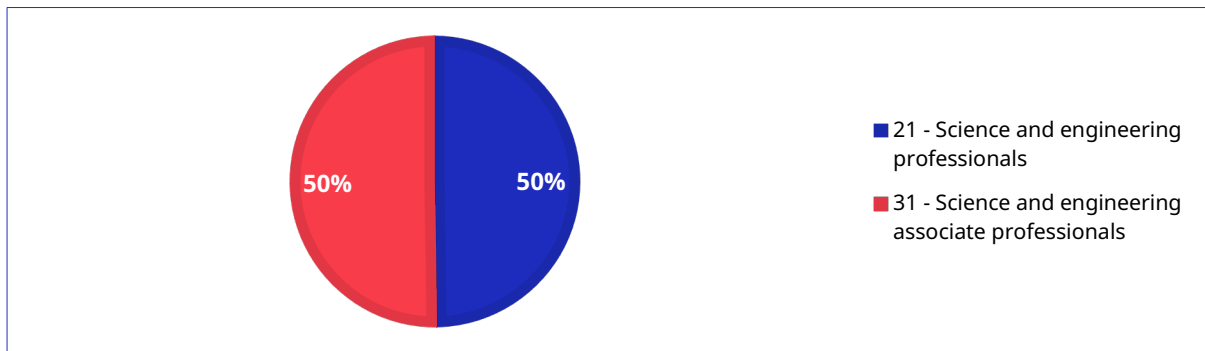


Source: own elaboration based on Guyana Labour Force Survey q3 2021

⁸ Occupations are expressed as ISCO-08 minor groups.

The above depiction of occupations is altered when considering the occupations typically found within the service activities associated with the construction industry, namely “architectural and engineering activities, technical testing and analysis”. There, the categories: “science and engineering professionals” and “technicians and associate professional” represent each 50 per cent of the jobs (see figure 5).

► **Figure 5. Breakdown of employment in “Architectural and engineering activities; technical testing and analysis” by 2 figures ISCO classification (q3 2021)**



Source: own elaboration based on Guyana Labour Force Survey q3 2021

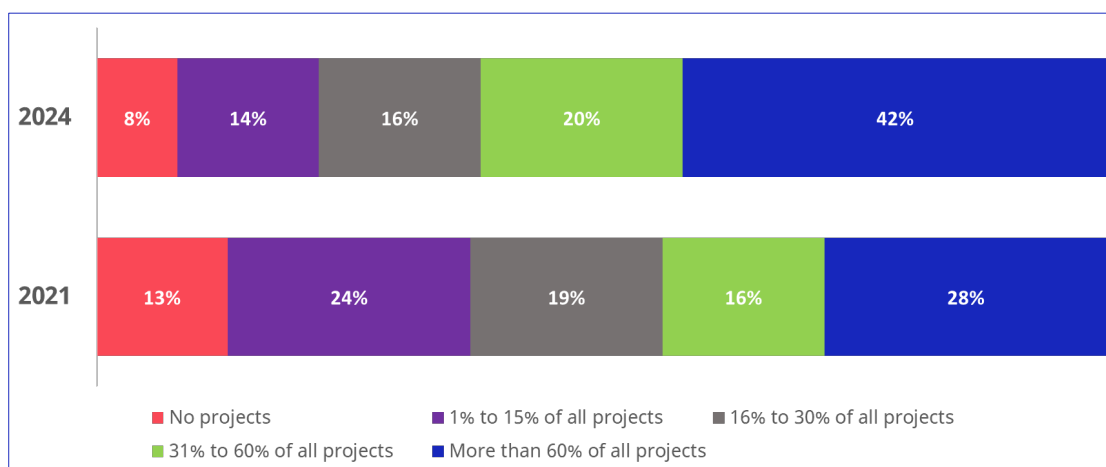
Shift to sustainable construction. The construction industry and its buildings are responsible for 39 per cent of all greenhouse gas (GHG) emissions in the world; 28 per cent is the result of the operation of the buildings, and 11 per cent from the construction processes. Buildings consume approximately 36 per cent of the energy used globally (UN Environment, 2017). Additionally, 16 per cent of global water consumption and 9 per cent of the water taken from natural sources are estimated to be utilized by the construction sector (Gholamreza & Abdolvand, 2019). By its very nature, the construction industry requires large amounts of natural resources, which has negatively affected the environment. If traditional construction practices continue to be used, the environmental impact may be irreparable, which makes adopting sustainable practices in the industry increasingly imperative.⁹

A survey conducted by the World Green Building Council (WGBC) and Dodge Data & Analytics, with the participation of more than 1,200 industry professionals,¹⁰ shows that in 79 countries covered there is a clear growth trend for sustainable construction (World Green Building Council and Dodge Data and Analytics, 2021). The survey estimates that by 2024, 42 per cent of those surveyed would have 60 per cent or more of their project portfolio oriented towards sustainable construction.

⁹ in this paper, sustainable construction is intended as the practice of creating structures and using environmentally responsible and resource-efficient processes throughout a building's life-cycle.

¹⁰ It includes professionals from architecture, engineering, contractors, and real estate investors.

► **Figure 6. Share of construction ‘sustainable’ portfolio, 2024 vs 2021, selected construction companies, real estate developers and investors.**



Source: (World Green Building Council and Dodge Data and Analytics , 2021)

While Guyana has not yet adopted regulations on sustainable construction, the country has stated its commitment toward sustainability through the Low Carbon Development Strategy 2030 (LCDS) which contains some elements associated with green housing, such as self-generation through solar photovoltaic domestic panels or availability of financing for green products and services. The LCDS also states that *“Sustainable Planning and Urban Development policies must be implemented in conjunction with sustainable designs that integrate environmental, economic, and social sustainability,”* revealing signs of potential regulatory changes.

The above scenario hints that while *greening elements* may not yet be a priority for local industry leaders, the transition to greener construction models shall happen as quick as regulation prescribes it. It will be driven not necessarily by regulatory changes, but by what appear to be changes in the final product driven by compliance with corporate guidelines (companies deciding to “go green”) and endeavours for more profitable investment.¹¹ Such shift will require reskilling of workers in targeted occupations, and possible increase in the number of activities of involved economic units, not only in construction itself, but in construction waste management, manufacturing of green materials, and installing technologies.

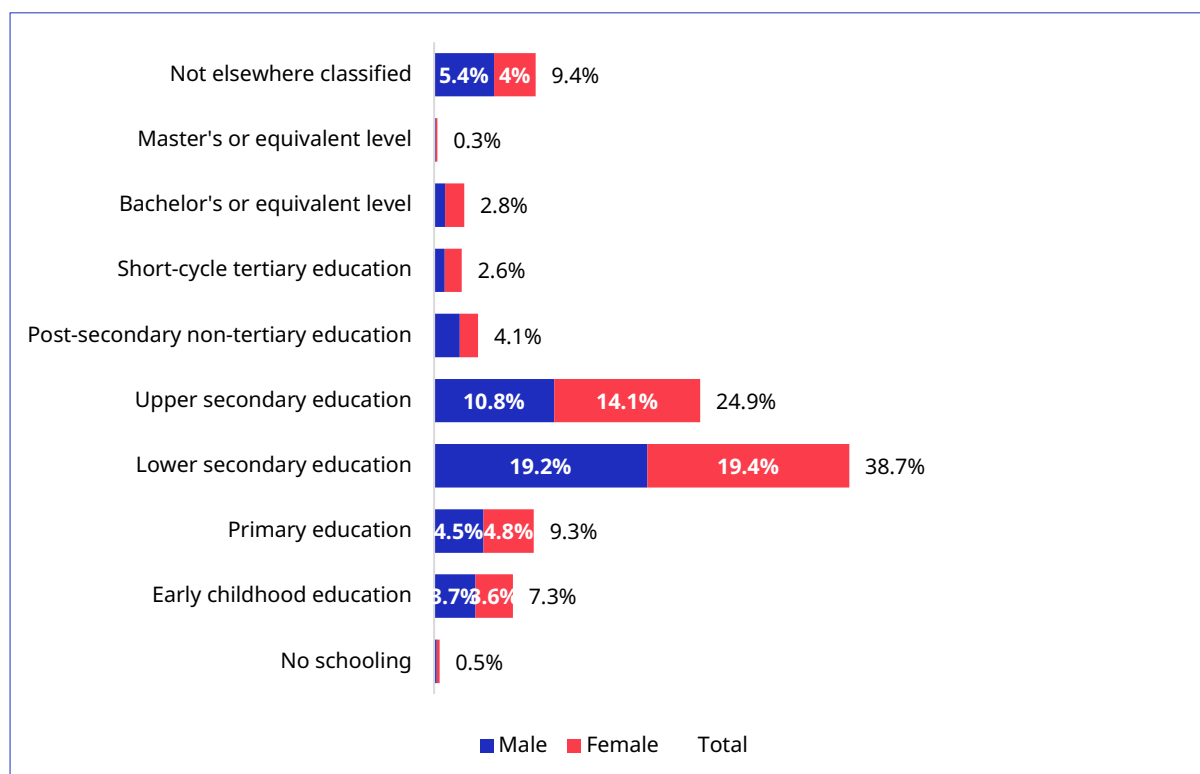
Guyana’s labour market challenges

Availability of qualified human resources. According to the International Monetary Fund (IMF, 2019), one of the key weaknesses that the Guyanese economy would have to overcome to fully benefit from the oil boom is the issue of skilled labour shortage. Although construction operations employ a wide range of jobs, including manual, an important proportion of the job openings require at least a higher technical or vocational degree. In contrast, gross school

¹¹ Considering the changes in the real estate market GBC and DDA (2021) claim that sustainable houses and buildings will become the standard in the future and increase capital gain at a greater rate than conventional estate.

enrolment ratio at tertiary level for Guyana is just about 12 per cent, lower than the 22 per cent for Caribbean Small Island states.¹² Figure 7 shows the distribution of educational attainment (thousands) for the total working age population as derived from the labour force survey performed during the third quarter of 2021. Over 80 per cent of the total working age population did not complete education beyond upper secondary education.

► **Figure 7. Educational Attainment (ISCED) - working age population (15+) Guyana. Q3 2021**



Source: Own elaboration based on data from Guyana Labour Force Survey (Bureau of Statistics, Guyana, 2021)

It is also noteworthy to mention that it is estimated that between 1965 and 2000, almost 90 per cent of Guyanese nationals with a tertiary-level education and 40 per cent of those with a secondary level education emigrated from Guyana (Mishra, 2006). The continuation of such trend may affect the labour supply available to the construction industry.

Latest estimates show that Guyana has a net migration rate of -7.712 and is predominantly a country of emigration, with most of its diaspora residing in the United Kingdom, the United States of America, Canada and the Anglophone Caribbean countries.¹³ The emigration rate of the country is among the top 20 in the world, as 40 per cent of Guyana's citizens reside abroad.¹⁴

¹² See <https://data.worldbank.org/indicator/SE.TER.ENRR?locations=S3>

¹³ Migration in The Caribbean: Current Trends, Opportunities and Challenges. San José, Costa Rica: IOM. Available at www.rosanjose.iom.int/SITE/sites/default/files/working_papers_en_baja_20.06.17.pdf.

¹⁴ World Migration Report 2020. Geneva, Switzerland: IOM. Available at www.publications.iom.int/books/world-migration-report-2020

Quantitatively limited workforce. Although certainly worrisome, the quality of available human capital is not the only constraint; quantitatively, Guyana's labour force is not big enough to serve the expected growth of the economy. The labour demand driven by the oil and gas sector, and its support services for the forthcoming years is estimated to be 260,000 workers (IOM, 2021), while it is worth noting that the national potential labour force¹⁵ is estimated to be 39,342 (Bureau of Statistics, Guyana, 2021). With the population expecting to remain constant, even under a hypothetical scenario of perfect conditions where all unemployed, underemployed, and discouraged workers are trained, retrained, and upskilled, to become employed, demand will still outstrip supply in the medium-term (IOM, 2021).

Potential gender imbalances. Another main challenge to overcome in the Guyanese labour market is the profound gender asymmetry. Indeed, the employment-to-population ratio for women is 43.2 per cent compared with a 56.3 per cent for men. A similar path is identifiable for the unemployment rate with the women's rate at 19.1 per cent compared with 13.3 per cent for men (Bureau of Statistics, Guyana, 2021).

Informality. The informal employment rate in the construction sector in Guyana is estimated at 77.7 per cent¹⁶ for all workers with a spike of up to 79.9 per cent for men and a substantially lower incidence for women (24 per cent). This is possibly due to women's strong representation in clerical and office occupations while men tend to be more employed in construction elementary occupations which are traditionally more likely to be object of informal employment.¹⁷ It should be noted that construction labourers are usually paid by piece rate. In addition, these types of practices have a considerable impact on job stability and limit workers' access to training and education, collective bargaining, and can even represent lower incomes compared to formal workers.

The high incidence of informality in this sector, combined with a boost in other economic activities, can trigger labour shortages as workers may be pulled toward other sectors with better conditions.

To summarize, given the current profile of the Guyanese labour force and the dynamic of the local labour market:

- ▶ Companies involved in the construction value chain are likely to be confronted with challenges in finding suitable qualified candidates because of: (i) inadequacy of available

¹⁵ Potential labour force is defined as all persons of working age who are neither in employment nor in unemployment and either carried out activities to "seek employment", even if they are not "currently available" but would become available within a short subsequent period or did not carry out activities to "seek employment," but wanted employment and were "currently available".

¹⁶ Authors' own elaboration based on Guyana LFS q3 2021.

¹⁷ Men account for more than 90 per cent of workers in "non-professional" i.e. - as per ISCO 08 - technical and elementary occupations. Those include 'Building and Related Trades Workers' (95.9 per cent); 'Electrical and Electronics Trades Workers' (97.7 per cent); and 'Labourers in Mining, Construction, Manufacturing and Transport' (92.6 per cent).

profiles exacerbated by the evolution of the market towards new products during the execution (notably adhering to green technology), supply, and commercialization stage; and (ii) limited number (headcount) of workers available in the country.

- ▶ Accounting for the current gender dynamics and increasing construction specific qualifications of women may, on paper, contribute to a double objective: addressing the scarce availability of qualified human resources for the construction industry and enhancing overall women's performance in the labour market (participation, employment, income generation). However, if the traditional gender imbalance in employment in the construction sector is maintained, favouring employment of men, the overall impact on labour market outcomes will have to be assessed as gaps in labour market participation, employment rates and possibly wages between men and women may increase *unless* women are able to benefit from employment opportunities in other industries.

▶ Chapter 2. Research findings

Research design

As a preliminary activity, a comprehensive **desk review** was completed looking at secondary data sources, including Government's public information, reports published by cooperation agencies, academic journals, national legislation, policy documents, newspaper archives, and national data sets. This stage was useful to provide context on the sector structure, identify the most demanded occupations and main challenges in the industry and adjust the data collection tools and sample. The findings of this stage are presented mostly in Chapter 1.

Once the general stage was set, a dedicated **skills demand survey** was prepared and disseminated amongst companies within the construction value chain to gather information on dimensions of interest focusing on the most demanded positions and the skills associated with those (see Annex 1 for full details). The design of this questionnaire partially reflected the **STED methodology**¹⁸ developed by the ILO (ILO, 2020) and was adapted according to the findings of the desk review. The analysis was framed to the extent possible within the International Classifications of Economic Activities (ISIC) and the International Standard Classification of Occupations (ISCO).

The survey was distributed to 61 companies selected due to their involvement in the construction sector. The companies are members of the Guyana Private Sector Commission and/or of the Georgetown Chamber of Commerce and Industry. In addition, seven companies from the informal sector were also contacted. Out of a total of 68 companies, 46 (6 from the informal sector) completed the questionnaire with the assistance of an enumerator. Further details on the survey design are presented in Annex 1. The total headcount of workers employed in the responding companies is 4,155. This represents 18 per cent of estimated 22,555 workers in the construction industry in Guyana.¹⁹

The main advantage of proceeding with such methodology is linked to cost and time of execution.²⁰ The main potential drawback is selection bias and partial representativeness. To address the latter, the following was adopted: (i) whenever possible, the results are presented as aggregated rates as it is less likely to have bias associated with relative shares rather than with absolute numbers. In other words, the relative shares are more likely to be robust across the

¹⁸ Skills for Trade and Economic Diversification (STED) is the ILO's development cooperation methodology to assist partner countries in meeting the skills needs of the tradable sectors that they expect to play an important role in leading economic and social development (ILO, 2020).

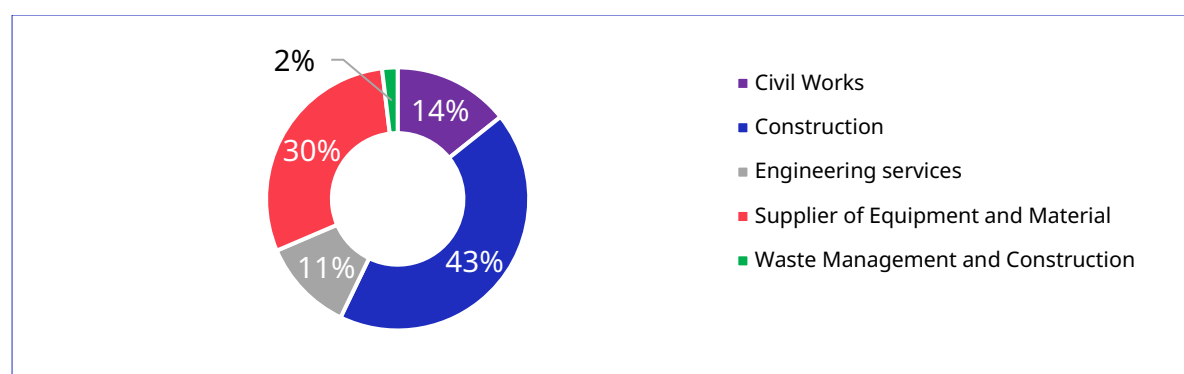
¹⁹ According to the calculations made in the "Current employment in the construction industry in Guyana" section in this report.

²⁰ Leaving aside intrinsic difficulties linked to determining a probabilistic sample of reference from a not clearly defined population, even with formal invitation from national authorities and informal access to private sector associations obtaining answers to this kind of establishment survey proved difficult.

whole industry rather than stemming from selection of a particular respondent; (ii) the results of the survey presented in the paper were cross checked with targeted interviews to assess (subjectively)/triangulate the robustness. When the latter was not warranted, results were omitted; (iii) whenever absolute numbers derived from survey response are presented, it is indicated that those reflect only the responding companies; (iv) when projections to the whole industry are presented those are based on a relatively robust assumption. Specifically as our sample of companies represents about 20 per cent of the total employment in construction, general conclusions are drawn applying that weighting and even then, conservative thresholds are utilized.

In terms of economic activities, those 46 companies appear to be fairly diversified. As described in Figure 8, 43 per cent of the participant firms declared “Construction” as their main economic activity followed by supply of equipment and materials (30 per cent) and civil works (14 per cent).

► **Figure 8. Main economic activity of responding company**



Source: Own elaboration based on information from the skills demand survey (n=46)

After initial screening, the survey findings were elaborated upon and checked for robustness through in-depth interviews with business owners, other key informants, and sector experts.

Finally, an overview of the educational offer in Guyana was performed to determine the suitability of the current system to respond to the market’s demand in both TVET and higher education.

Skills demand survey

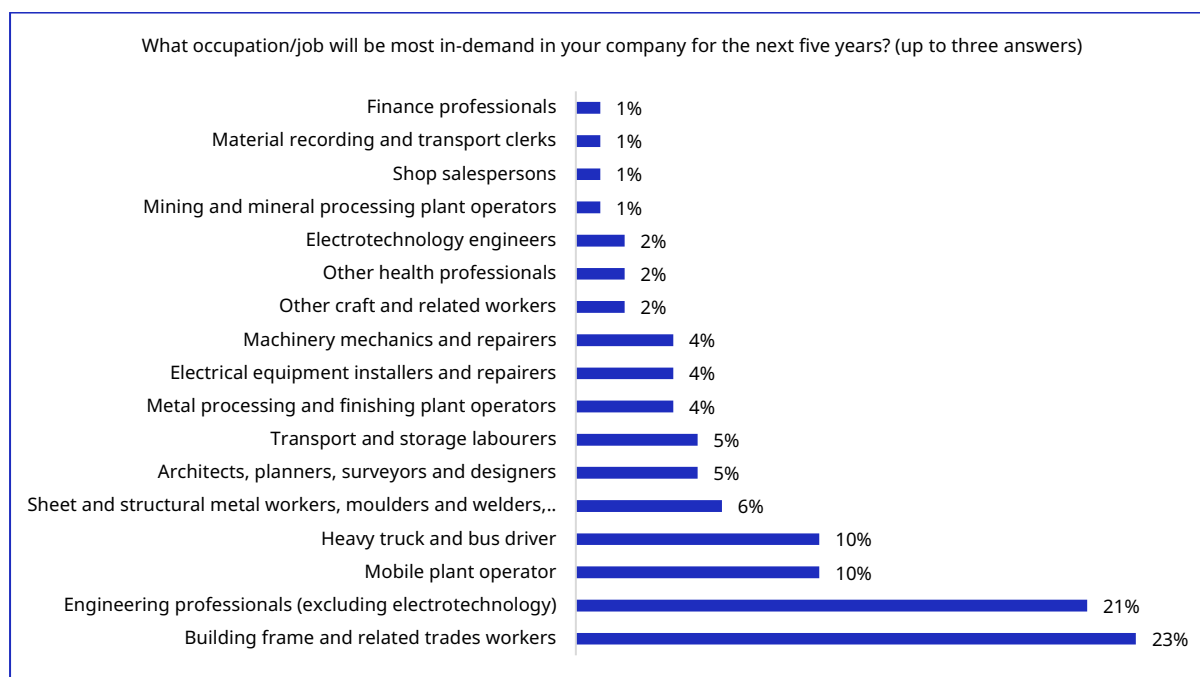
To ensure the most universally valid and detailed interpretation of the findings after verification with the respondents, profiles and the jobs analyzed were categorized consistently with the ISCO 08 Occupational Classification of Occupations at minor group level.²¹

²¹ ISCO is structured in four hierarchical levels. 1. Major groups; 2. Sub major groups; 3. Minor groups; and 3. Unit groups. At the Minor groups level, each unit group is made up of several "occupations" with a certain degree of similarity in terms of skills level and specialization.

Profiles sought

Out of the answers provided by the 46 respondents to the question “**What occupation/job will be most in-demand in your company for the next five (5) years?**”, 17 occupations/jobs were identified of which only seven (7) profiles gathered over 80 per cent of the total answers. ²²

► **Figure 9. Most in demand occupations**



Source: Authors’ own elaboration based on information from the skills demand survey

Expected hirings

Responding companies indicated that a total of **892** full time positions within the next year and **2,126** within the next five years are expected to be filled with profiles corresponding to the twenty-one (21) occupations identified as “most in demand” (See Table 2).

Breaking down those expected hirings by occupation, the following emerge: (i) within both next year and the next five years, the most sought-after profiles will be same: building frame and related trades workers (237 full time equivalent jobs (FTEs) next year and 590 FTEs within the next five years), followed by heavy truck and bus drivers (120 FTEs next year and 590 FTEs within the next five years) and engineering professionals (excluding electrotechnology) (108 FTEs next year and 242 FTEs within the next five years). Within Annex 2, the reader can find a detailed description for each of the top ten occupations by expected hirings.

²² While participants were asked to rank the first, second and third most in demand occupations (in case they have more than one, i.e. **up to three answers per company**), during the follow up interviews, several participants claimed that most of the positions identified were equally important, hence the reason why this study does not rank the occupations.

Some of the expected hirings are interestingly in line with those expected within the Guyanese oil and gas sector²³: civil engineers, construction labourers and metal workers are needed to build and adapt the infrastructure for pipelines, wells and storage and their skills.

► **Table 2 Expected hirings (FTEs) for most in demand occupations**

What is the expected number of new hirings (full time employees) for the most in-demand occupation in your company within the next year/5 years?		
Occupations	Expected hirings within the next year	Expected hirings within the next five years
Building frame and related trades workers	237	590
Heavy truck and bus drivers	120	355
Engineering professionals (excluding electrotechnology)	108	242
Mobile plant operators	100	208
Architects, planners, surveyors and designers	90	170
Metal processing and finishing plant operators	70	150
Sheet and structural metal workers, moulders and welders, and related workers	41	120
Transport and storage labourers	37	85
Other health professionals	25	50
Shop salespersons	20	50
Machinery mechanics and repairers	13	25
Electrical equipment installers and repairers	10	20
Material recording and transport clerks	5	15
Other craft and related workers	4	15
Mining and mineral processing plant operators	3	15
Electrotechnology engineers	7	13
Finance professionals	2	3
Grand total	892	2,126

Source: Authors' own elaboration based on information from the skills demand survey

The figures presented above would entail a growth of 21 per cent of total employment in the companies who answered the survey (headcount 4,155) within the next year and 50 per cent over the next five years.²⁴

If the potential estimated growth in employment found through the survey is projected to the whole sector²⁵, notwithstanding any uncertainty linked to such exercise, we could obtain a rough

²³ See ILO (2022) "Prospective occupational and skills needs in the Guyanese oil and gas industry 2022-2026 (forthcoming)

²⁴ The projected growth may be even more substantial as an increase in employment within the occupations listed in Table 2 will be associated with the growth of other occupations such as human resources professionals, legal counsels, and technology professionals which are not quantified in the study. In addition, employee related services such as catering or transportation also experience an increase in the demand and, therefore, growth in their respective workforces.

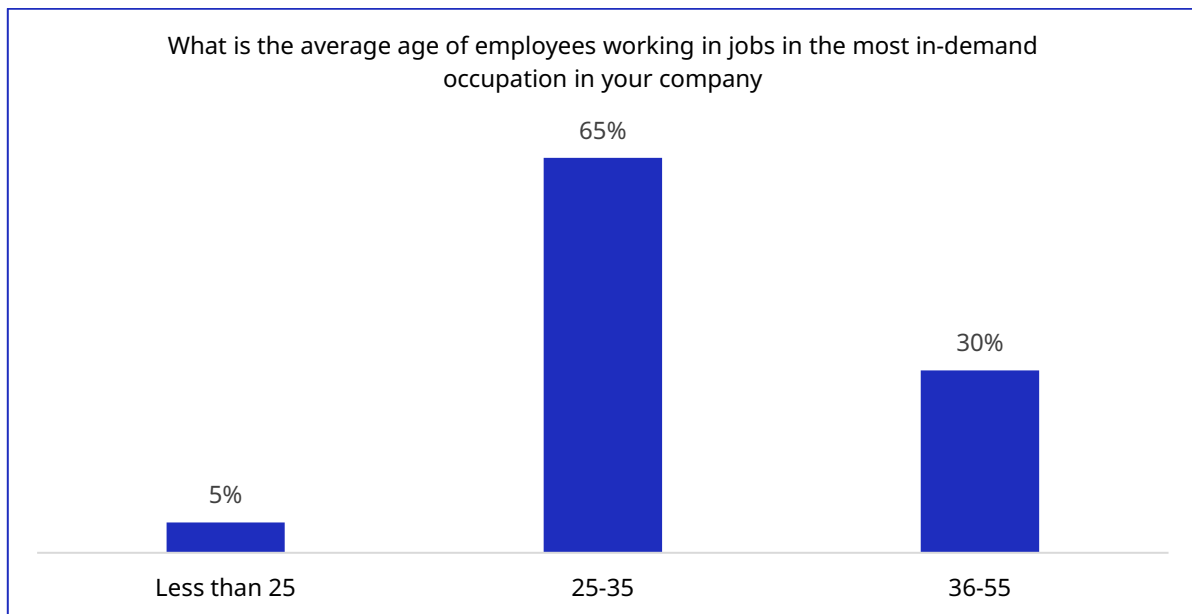
²⁵ Forty-six firms responding represent approximately 18 per cent of total employment in the construction sector, see paragraph above "research design and Annex I.

estimate of about 8,000 FTE jobs (only within the ‘most in demand occupations’ created across the whole industry over the next five years). Such figure does not include jobs in other occupations not categorized as ‘most in demand’ and does not include any projection associated with the refinery construction, a very recent development (October 2022) and as such not part of this investigation.

Average age

The survey findings show that at present, 95 per cent of all the workers performing jobs in “most in demand” occupations are currently 25 years of age or older. Further analysis via interviews with business representatives point towards few possible explanations: (i) younger generations tend to not be attracted to work in construction; (ii) since most of the current construction developments are associated with the oil and gas industry, and there is an associated high injury and monetary risk (loss of material, equipment) associated with unperforming a job, employers have a strong preference for workers with previous working experience (even in trades or basic occupations such as for welders or mechanics); (iii) employers are not keen to take the chance with younger workers as the skills gaps associated with transferable skills (i.e., not technical ones) represent a perceived risk.

► **Figure 10 Average age of the employees currently working in the “most in demand” occupations**



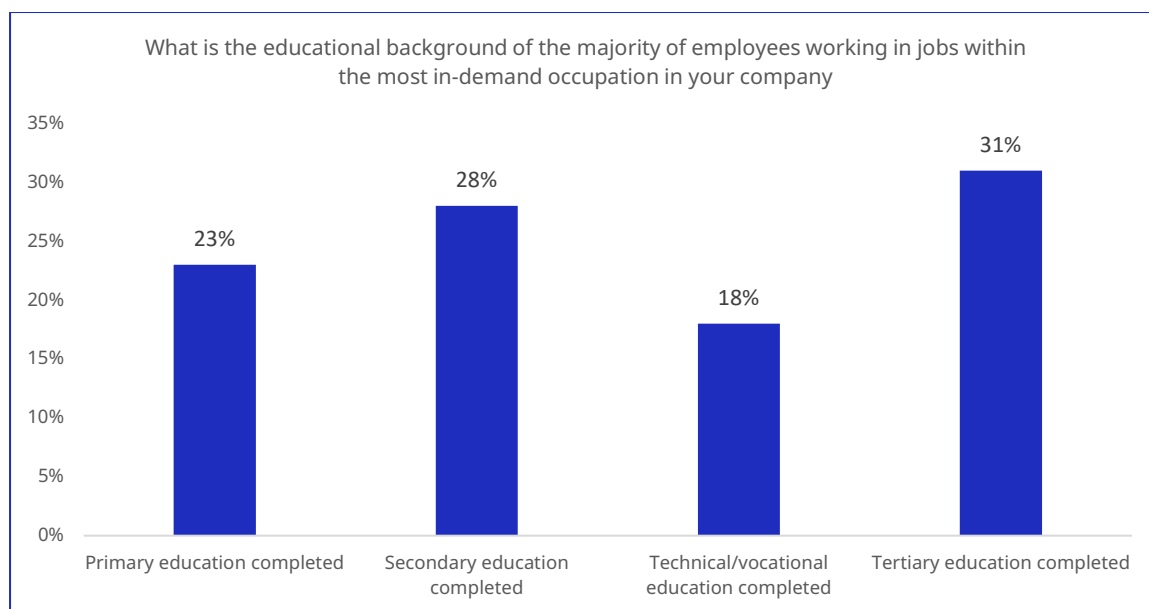
Source: Authors’ own elaboration based on information from the skills demand survey (n=105)

Educational background

Forty-nine per cent of future hirings in “most in demand” occupations will require competencies that are, at present, associated with either technical or higher education. Under the reasonable assumption that such feature is maintained one could foresee a marked need to upskill the future

labour force (for reference, currently, in Guyana only 10 per cent of the population have a post-secondary degree and only 3.1 per cent hold a bachelor and/or master's degree).

► **Figure 11. Educational level currently associated with “most in demand” occupations.**



Source: Authors' own elaboration based on information from the skills demand survey (n=105)

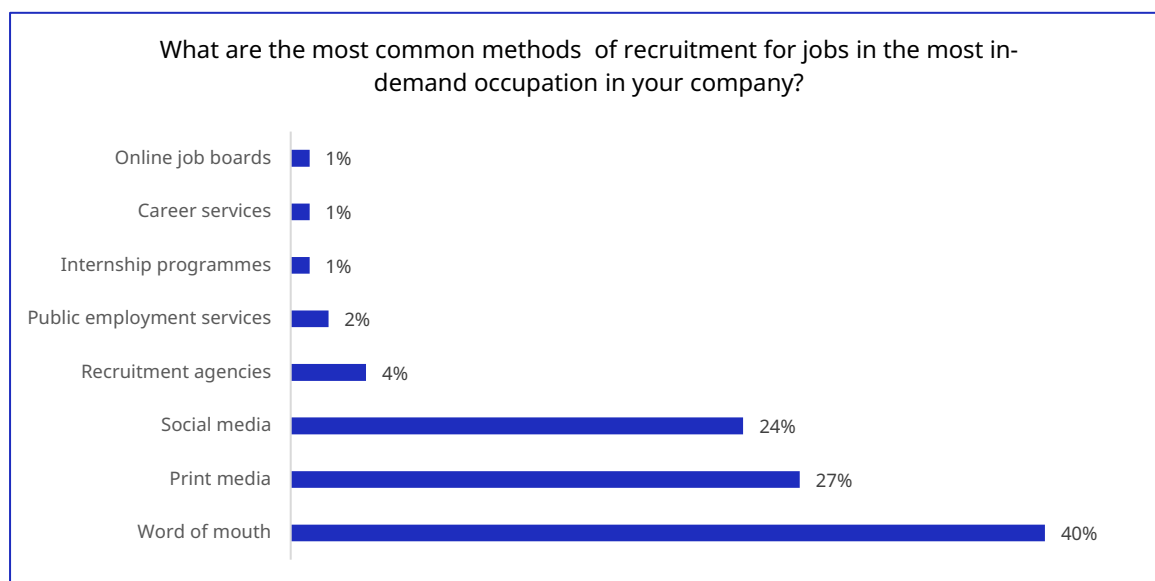
Gender

Currently, women workers are, on average, merely three per cent of the total workforce employed in “most in demand” occupations. However, that average figure is even more skewed if one considers that for 3 out of 4 of the most in demand occupations there is no employment of women at all.

Method of recruitment

The most common method of recruitment for occupations identified as “most in demand” is “word of mouth” followed by print media and social media. Only 2 per cent of the jobs corresponding to the occupations identified as “most in demand” are filled via public employment services.

► **Figure 12. Sources of recruitment in “most in demand” occupations.**



Source: Authors' own elaboration based on information from the skills demand survey (n=105)

Skills sought

General trends. After providing estimates on the profiles most in demand in the next years, the survey asked respondents about the skills associated with each of those. Specifically, upon initial screening of data, further information was sought on three macro skills categories: technical²⁶, IT²⁷ and transferable²⁸ skills. In addition, respondents were asked to provide an assessment of the current availability of those skills in Guyana and abroad.

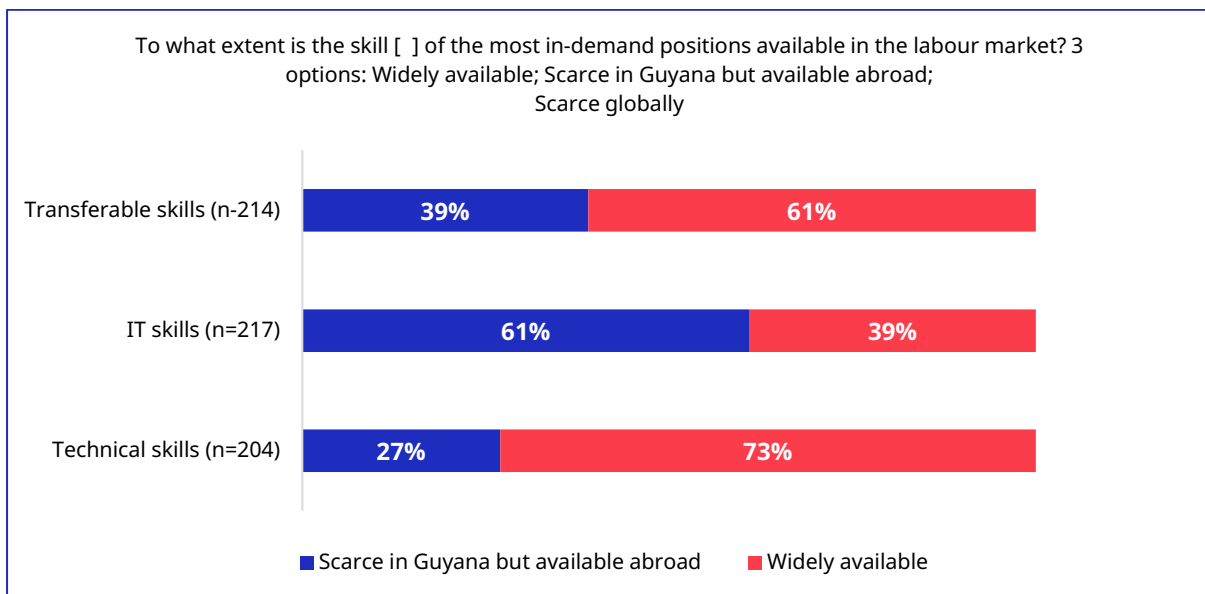
A numerical analysis of the skills considered associated with most in demand occupations indicates, as shown in Figure 10, that only 27 per cent and 39 per cent of the technical and transferable skills were considered scarce in the country (but generally available abroad). Sixty one per cent of the IT skills, conversely, are considered lacking.

²⁶ Technical skills are those skills that are particular to the specific occupation. They include specialist knowledge needed to perform job duties; knowledge of particular products or services produced; ability to operate specialized technical tools and machinery; and knowledge of materials worked on or with, with the exception of information technology skills.

²⁷ Information Technology skills are the ones related to the use of software, hardware of any other tech related capability (e.g., programing, data analytics, data visualization).

²⁸ Transferable skills that the ones relevant to a broad range of occupations and can be easily transferred from one job to another (e.g., problem-solving, teamwork, physical skills, and any other behavioral skills).

► **Figure 13. Availability of skills in "most in demand" occupations.**



Source: Authors' own elaboration based on information from the skills demand survey. While the 46 companies studied were requested to share the top three most important technical, IT and transferable skills for each "most in demand occupation", most of the companies only identified one or two. In this graph "n" represents the total number of answers provided by the 46 companies for each type of skills.

The analysis of the above picture indicates that IT skills associated with occupations in demand in the construction industry appear largely the most common ones while, interestingly the gaps in terms of technical skills appear secondary.




Technical skills

The companies surveyed were asked to list the two most important technical skills associated with the most in demand occupations (*"Please list the two most important technical skills for the most in-demand position in your company"*, free text answers). Two hundred and four (204) skills were mentioned and amongst those 8 represented 41 per cent of all the answers. Table 3 provides a further analysis, providing, on the left, a brief description about what the skill itself entails (in the words of the respondents) and on the right the perceived availability in Guyana (100 per cent indicating that all the respondents who mentioned the skill and gauged it as widely available in Guyana) and the occupations associated with such skill.

► **Table 3. Summary of most important technical skills required by “most in demand” occupations²⁹**

Skill	Equipment Maintenance	Perception of availability in Guyana (100% =all respondents claim the skill is ‘widely available’)	50%
Description		Occupations linked with this skill	
Refers to the capacity to inspect, diagnose and solve problems with machines or buildings. They are also used to perform basic repairs or take preventative measures to ensure the life and functioning of various types of equipment.		<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Machinery mechanics and repairers • Other craft and related workers • Mining and mineral processing plant operators • Metal processing and finishing plant operators • Heavy truck and bus drivers • Mobile plant operators 	
Skill	Measurement	Perception of availability in Guyana	85%
Description		Occupations linked with this skill	
Refers to the general capacity to transform drawn information into descriptions and quantities, undertaken to value, cost, and price construction work.		<ul style="list-style-type: none"> • Architects, planners, surveyors and designers • Building frame and related trades workers • Metal processing and finishing plant operators 	
Skill	Blueprint Interpretation	Perception of availability in Guyana	83%
Description		Occupations linked with this skill	
Refers to the capacity to understand two-dimensional drawings that provide a detailed visual representation of how an architect wants a building to look.		<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Building frame and related trades workers • Sheet and structural metal workers, moulders and welders, and related workers 	
Skill	Drafting	Perception of availability in Guyana	91%
Description		Occupations linked with this skill	
Refers to the capacity to transform an original design into usable schematics, diagrams, workflow layouts and other technical drawings.		<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Architects, planners, surveyors and designers • Building frame and related trades workers 	
Skill	Defensive driving	Perception of availability in Guyana	80%
Description		Occupations linked with this skill	
Refers to the capacity to anticipate dangerous situations, despite adverse conditions or the mistakes of others when operating a motor vehicle		<ul style="list-style-type: none"> • Heavy truck and bus drivers 	
Skill	Electrical installation and maintenance	Perception of availability in Guyana	75%
Description		Occupations linked with this skill	
Refers to the capacity to design and install electrical systems in all types of commercial, residential, and industrial projects, while carrying out maintenance and repairs		<ul style="list-style-type: none"> • Electrotechnology engineers • Electrical equipment installers and repairers 	
Skill	Equipment Operation	Perception of availability in Guyana	88%
Description		Occupations linked with this skill	
Refers to the capacity to control the machinery used during the construction process such as bulldozers, excavators, rollers, trenchers, compactors, and other equipment.		<ul style="list-style-type: none"> • Building frame and related trades workers • Sheet and structural metal workers, moulders and welders, and related workers • Electrical equipment installers and repairers • Metal processing and finishing plant operators • Transport and storage labourers 	
Skill	Project Management	Perception of availability in Guyana	88%
Description		Occupations linked with this skill	

²⁹ Survey question: “Please list the two most important technical skills for the most in-demand position in your company”. In addition, respondents were asked to briefly describe what the technical skill entails and about availability “To what extent are the two (2) most important technical skills for the most in-demand positions available in the labour market”.

Refers to the knowledge of planning and organizing techniques to manage a project in order to achieve a predefined goal or outcome.	<ul style="list-style-type: none"> Engineering professionals (excluding electrotechnology)
 Less than 60%  between 60-80%  Over 80%	

While gaps are perceived for all the skills, equipment maintenance stands out as the individual technical area (skill) perceived as most lacking in the country. It should also be noted that 25 per cent of the respondents indicated perceived gaps in electrical installation and maintenance, possibly hinting at qualitative gaps between the courses offered (see next section) and the needs of the industry.

Information technology skills

The companies surveyed were also asked to list the two most important IT skills associated with the most in demand occupations together with a brief description of those and the perceived availability in the country. Only three (3) IT skills gathered 88 per cent of the 217 answers to the question “Please list the two most important IT skills for the most in-demand position in your company” and all of those are perceived as scarce in Guyana. Table 4 summarizes the collected information presenting in the left column a short description of the skill in the words of the respondents and in the right the percentage of the respondents who mentioned the skill and deemed it as widely available in Guyana and the occupations associated with the skill itself.

► **Table 4. Summary of IT skills required by “most in demand” occupations³⁰**

Skill	Microsoft Suite (Office, Teams, etc.)	Perception of availability in Guyana (100% =all respondents claim the skill is ‘widely available’)	34%
Description	Occupations linked with this skill		
Refers to the command of the Microsoft Suite, particularly Office and Teams. It is worth mentioning that even though this skill was consistently identified for both professional and non-professional occupations, the level of specialization is not expected to be the same. While an engineer is expected to be able to use Excel to process data, a general labourer will be expected to know how to use Word to submit a form or a simple report.	<ul style="list-style-type: none"> Engineering professionals (excluding electrotechnology) Electrotechnology engineers Architects, planners, surveyors and designers Other health professionals Finance professionals Material recording and transport clerks Shop salespersons Building frame and related trades workers Sheet and structural metal workers, moulders and welders, and related workers Machinery mechanics and repairers Electrical equipment installers and repairers Other craft and related workers Mining and mineral processing plant operators Metal processing and finishing plant operators Heavy truck and bus drivers Mobile plant operators Transport and storage labourers 		

³⁰ Survey question: “Please list the two most important IT skills for the most in-demand position in your company”. In addition, respondents were asked to briefly describe what the IT I skill entails and about availability “To what extent are the two (2) most important IT skills for the most in-demand positions available in the labour market”.

Skill	Use of hardware (PC, tablets, etc.)	Perception of availability in Guyana	20%
Description		Occupations linked with this skill	
Refers to the basic command of mainstreaming hardware such as PCs or tablets.		<ul style="list-style-type: none"> Architects, planners, surveyors and designers Other health professionals Material recording and transport clerks Shop salespersons Building frame and related trades workers Sheet and structural metal workers, moulders and welders, and related workers Electrical equipment installers and repairers Mining and mineral processing plant operators Metal processing and finishing plant operators Heavy truck and bus drivers Mobile plant operators Transport and storage labourers 	
Skill	Autocad	Perception of availability in Guyana	48%
Description		Occupations linked with this skill	
AutoCAD is a commercial computer-aided design (CAD) and drafting software application.		<ul style="list-style-type: none"> Electrotechnology engineers Architects, planners, surveyors and designers Machinery mechanics and repairers Other craft and related workers 	

Transferable skills

Finally, the companies were asked to list the two most important transferable skills associated with the most in demand occupations together with a brief description of those and the perceived availability in the country. Seven (7) individual skills gathered 85 per cent of the 214 answers to the question *“Please list the two most important transferable skills for the most in-demand position in your company”*. Communication (oral and written), time management and business conduct (intended as the capacity to perform with high standards of professionalism and include some other skills such as gravitas, punctuality, politeness, or assertive communication) are perceived as the most scarce transferable skills in Guyana. The following analysis provides some further insights on those.

► **Table 5. Summary of transferable skills required by “most in demand” occupations³¹**

Skill	Communication	Perception of availability in Guyana (100% =all respondents claim the skill is ‘widely available’)	56%
Description		Occupations linked with this skill	
Refers to the capacity to send messages that are properly an entirely received and understood by the target audience.		<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Electrotechnology engineers • Architects, planners, surveyors and designers • Other health professionals • Material recording and transport clerks • Building frame and related trades workers • Sheet and structural metal workers, moulders and welders, and related workers • Machinery mechanics and repairers • Electrical equipment installers and repairers • Mining and mineral processing plant operators • Metal processing and finishing plant operators • Heavy truck and bus drivers • Mobile plant operators • Transport and storage labourers 	
Skill	Time management	Perception of availability in Guyana	50%
Description		Occupations linked with this skill	
Refers to the capacity to coordinate tasks and activities to maximize the effectiveness of an individual's efforts.		<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Architects, planners, surveyors and designers • Other health professionals • Material recording and transport clerks • Building frame and related trades workers • Sheet and structural metal workers, moulders and welders, and related workers • Electrical equipment installers and repairers • Heavy truck and bus drivers • Mobile plant operators • Transport and storage labourers 	
Skill	Teamwork	Perception of availability in Guyana	74%
Description		Occupations linked with this skill	
Is the ability to work with others and to help others attain their full potential and achieve the shared goals.		<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Architects, planners, surveyors and designers • Building frame and related trades workers • Sheet and structural metal workers, moulders and welders, and related workers • Machinery mechanics and repairers • Electrical equipment installers and repairers • Other craft and related workers • Mining and mineral processing plant operators • Metal processing and finishing plant operators • Heavy truck and bus drivers • Mobile plant operators • Transport and storage labourers 	
Skill	Critical thinking	Perception of availability in Guyana	74%
Description		Occupations linked with this skill	
Is the ability to think clearly and rationally, understanding the logical connection between ideas.		<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Electrotechnology engineers • Shop salespersons 	

³¹ Survey question: “Please list the two most important transferrable skills for the most in-demand position in your company”. In addition, respondents were asked to briefly describe what the transferrable skill entails and about availability “To what extent are the two (2) most important transferrable skills of the most in-demand positions available in the labour market”.

		<ul style="list-style-type: none"> • Building frame and related trades workers • Sheet and structural metal workers, moulders and welders, and related workers • Electrical equipment installers and repairers • Metal processing and finishing plant operators • Truck and bus drivers • Mobile plant operators 	
Skill	Analytical skills	Perception of availability in Guyana	85%
Description	Occupations linked with this skill		
Refers to the capacity to extract key information from data and develop workable solutions for the problems identified in order to test and verify the cause of the problems and develop solutions to resolve them.	<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Architects, planners, surveyors and designers • Finance professionals • Building frame and related trades workers • Machinery mechanics and repairers • Electrical equipment installers and repairers • Other craft and related workers • Transport and storage labourers 		
Skill	Problem Solving	Perception of availability in Guyana	82%
Description	Occupations linked with this skill		
Problem solving is the process of identifying a problem, developing possible solution paths, and taking the appropriate course of action.	<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Architects, planners, surveyors and designers • Environmental, occupational health and safety professionals • Finance professionals • Administration professionals • Physical and engineering science technicians • Process control technicians • Ship and aircraft controllers and technicians • Cooks • Shop salespersons • Sheet and structural metal workers, moulders and welders, and related workers • Machinery mechanics and repairers • Mining and mineral processing plant operators • Heavy truck and bus drivers • Mobile plant operators • Ships' deck crews and related workers • Mining and construction labourers 		
Skill	Business conduct	Perception of availability in Guyana	60%
Description	Occupations linked with this skill		
Refers to the basic the capacity to perform with high standards of professionalism, this also includes as gravitas, punctuality, politeness and assertive communication.	<ul style="list-style-type: none"> • Engineering professionals (excluding electrotechnology) • Environmental, occupational health and safety professionals • Finance professionals • Sheet and structural metal workers, moulders and welders, and related workers • Mining and mineral processing plant operators • Mining and construction labourers 		

On matching of educational supply and labour market demand

To complement the analysis of the demand presented in the above sections, we provided an overview of relevant educational offer in Guyana. The goal is to have a general idea of how the current offer could contribute to acquiring skills which are sought in the construction industry,

while also comparing those raw numbers with some indications on the perceived quality of graduates.

Three main training options contribute to the development of skills and competencies needed in the construction industry. Higher education, Technical and vocational training, and on-the-job training

Higher education

The relevant offer of higher education degrees in Guyana is mostly limited to the University of Guyana³². To *preliminarily* assess the offer of higher education degrees vis-à-vis the future needs of the construction industry, Table 6 presents the number of graduates in selected subjects from the University of Guyana 2020 /2021 Graduation Convocation.

► **Table 6. Graduates by discipline and estimated job openings over the next five years. University of Guyana**

Discipline	Number of graduates (2020/2021)	Estimated needs within the construction industry professionals and highly qualified technicians.
Bachelor of Science Architecture	8	Between 90 (one year) and 170 (five years) for architects, planners, surveyors and designers and an estimated maximum of 200 for engineers ³³ over the next five years.
Bachelor of Science Civil and Environmental Engineering	53	
Bachelor of Science Electrical Engineering	21	
Associate of Science Architectural and Building Technology	22	
Associate of Science Civil Engineering	72	
Associate of Science Electrical Engineering	20	
Total architects and "construction related" engineers	196	
Bachelor of Science Industrial Engineering	18	
Bachelor of Science Engineering	12	
Associate of Science Industrial Engineering	17	
Associate of Science Mechanical Engineering	39	
Total other engineers	86	
Total all	282	

Source: University of Guyana 2020 /2021 Graduation Convocation.

A few conclusions can be drawn from the analysis of Table 6:

- **Undersupply of graduates in technical disciplines.** A somehow simplistic³⁴ but possibly useful exercise consists of comparing the number of graduates to the needs of the economy. At first sight, if one limits the analysis to the sample of respondents, the number of tertiary students graduating in relevant subjects (~282 per year) could cater -

³² University of Guyana is the institution offering most of the degrees relevant for the construction industry. The other colleges either public (Cyril Potter College of Education) or private focus on other disciplines, notably medical ones . See [here](#) for further details.

³³ Our survey does not allow to identify exactly how many engineers as such are needed but rather what occupations and their associated skills will be in demand. The estimate is based on assumptions of the level of skills required within each occupation.

³⁴ **The exercise is performed for indicative purposes only.** On the one hand, the number of graduates in 2021 is not a flawless predictor of future availability, on the other, the industry needs may be fulfilled via other means such as internal transfers or hiring of profiles not strictly adhering to needs or hiring foreign candidates. In addition, the figures retrieved as potential demand indicate the total demand over one and five years, not the annual demand for each of the next five years.

if sustained – to the estimated demand for qualified professionals (~270 over the next five years). If one considers the entirety of the construction industry (our sample represents 18 per cent of the total employment therein) **the graduate supply will likely be insufficient (or barely sufficient) for its needs**. Once the rest of the economy and interindustry competition³⁵ are considered, it is **almost warranted that the current offer of graduates in technical, construction-related, disciplines per year** (if maintained) will **undersupply the labour market**.

- ▶ **Qualitative mismatch.** Results from the skills demand survey (see Tables 3, 4, 5) suggest that there are (more or less) marked perceived gaps in terms of availability of *specific* skills in the industry, especially regarding **equipment maintenance, electrical installation and maintenance (technical skills) knowledge of Office Suite, computer literacy (IT skills) and** time management, business conduct and communication (**transferrable skills**). While it is not straightforward to conclude that current degrees do not sufficiently prepare graduates on those matters, it appears to be an area of reflection for curricula development. In addition, amongst future occupations, a specific one which may become in demand is **professionals (i.e., higher education graduates) in occupational health and safety** in the construction industry (50 of them will be needed in the next five years). Regarding those there appears to be a specific qualification gap: the job normally requires a higher education degree (see Annex 2) combined with relevant work experience but there are no specialized degrees currently offered in Guyana.³⁶
- ▶ **Future shift to greener processes.** Interviews showed that there is interest from Guyanese companies to adopt sustainable construction practices. Certifications in sustainable buildings and knowledge on energy efficiency and dry construction systems (steel framing) have been identified (although to a small extent) as needed skills through the skills demand survey. Notwithstanding these initial moves, when, as we argue in Chapter 1, such shift will happen more markedly, it will trigger a further mismatch between the skills acquired via higher education and the needs of the industry.

Technical and vocational education and training (TVET)

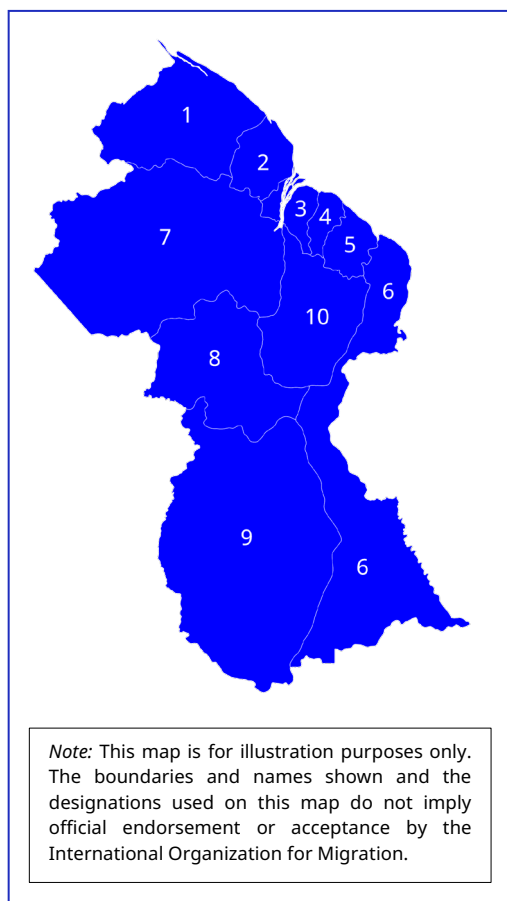
There are two main (and a handful of smaller) actors in Guyana providing vocational education: the Board of Industrial Training and the eight Technical and Vocational Institutes under the

³⁵ For example, engineering graduates are (or will be) in high demand in other sectors of the economy, notably within the oil and gas one. Findings from a parallel ILO study indicate that oil and gas companies are generally interested in engineering profiles, without being too demanding on the actual subject of specialization.

³⁶ Certainly, elements of occupational safety and health may be incorporated in various curricula, for instance, courses offered by the Department of Petroleum and Geological Engineering. However, the demand survey allowed to identify a specific need for fully fledged professionals in the field.

Council for Technical and Vocational Education and Training (CTVET) within the Ministry of Education. They offer similar types of degrees, with few distinctions.³⁷

► **Figure 14. Map of Guyana's regions**



In terms of field of study, many of the courses offered by either vocational training institutes or the BoIT may, *in principle*, respond to the current occupational and skills requirements for the construction industry. Specifically the eight technical colleges under the aegis of the Ministry of Education have, between 2018 and 2022, offered courses on carpentry (region 3, 4, 5, 6, 10), electrical installation and engineering (region 3, 4, 5, 6, 10), metal work engineering (region 3,4,5), plumbing (region 3, 4, 5, 6), welding (region 3, 4, 5, 6, 10), masonry (region 4, 5, 6) , architectural drawing (region 4, 6), building and civil engineers diplomas (region 4). The BoIT offered as per 2021 courses in possibly even more specialized disciplines like solar installation (region 1, 2, 4), shade house gardening (region 1, 2), electrical installation (region 2, 6, 7, 10) general building construction (region 2, 6), heavy duty equipment operation (region 2, 3, 4, 6, 8, 9, 10), refrigeration & ac repairs (region 2, 6), welding & fabrication (region 2), interior design (region 4), joinery (region 4, 9).

To have a better understanding of the potential numerical match between vocational training students and future demand in the construction industry, we proceeded to compare, not only the offer in terms of academic subjects, but the actual outcome in terms of graduates. This is particularly important if one considers the non-secondary problem of drop-out in vocational training.³⁸

³⁷ (i) Courses from the Board of Industrial Training (BoIT) allow, upon successful completion, to achieve National Vocational Qualifications awarding degrees. Conversely, courses offered by the various Technical Vocational institutions are certified under the Caribbean Vocational Qualification Framework (and thus can be referenced throughout the Caribbean for employment and educational purposes)³⁷; (ii) the duration of courses offered by the Technical Vocational Institutes normally ranges between two and four years (for specific courses). Contrarily, courses at the Board of Industrial Training run for a duration of four to six months, or, exceptionally, 9 months; (iii) the offer by the BoIT is more geographically broad, covering region 1, 2, 7 and 8 in additions to regions 3, 4, 5, 6, 9 and 10 covered by the Vocational Institutes; (iv) programmes offered by the Technical Vocational Institutes can be categorized as “diploma” or “certificate” with the former targeting the more advanced learners who have gained passes at the Caribbean Examination Council (CXC) or other technical qualification. There are also some other training providers with various affiliation producing a limited number of graduates which are not considered for this analysis.

³⁸ An analysis of administrative data comparing students and graduates of selected construction-related trades in the Vocational Training Institutes suggests a dropout rate of at least 30 per cent.

Table 7 and 8 provide a snapshot of the number of 2021 graduates (for Vocational Training Institutes) and “beneficiaries” (for the BoIT³⁹) vis a vis the projected demand for selected occupations in the construction industry.

► **Table 7. Graduates by discipline and region (2021, vocational training institutes) and estimated job openings construction industry (technical occupations) over the next five years**

Discipline	Region	# of graduates (all levels, 2021)	Prospective job openings (total of relevant occupations) (as per result of company survey) ⁴⁰ technicians and manual labour.
Carpentry	3	7	Between 241 (one year) and 605 (five years). ⁴¹
	4		
	5		
	6	2	
	9	10	
	Total	19	
Electrical installation and engineering	3	24	Between 125 (one year) and 279 (5 years) (including electrical equipment installers and repairers, engineering professionals (excluding electrotechnology), electrotechnology engineers)
	4	92	
	5	18	
	6	39	
	10	8	
	Total	181	
Metal work engineering	3	1	Between 110 (1year)-270 (5 years) (including Metal processing and finishing plant operators and sheet and structural metal workers, moulders and welders, and related workers)
	4	27	
	5		
	Total	28	
Plumbing	3	1	Between 241 (one year) and 605 (five years). ⁴²
	4	18	
	5		
	6		
	Total	19	

⁴⁰ The numbers presented in this column are derived by adding expected hirings as collected via the demand survey. However, as more than one job opening may require the skill, the total number of potentially relevant job openings is derived by adding all the expected hirings in all the occupations. For instance, for carpentry, the total number of potential job openings is given by adding building frame and related trades workers and “other craft and related workers” as occupations which may utilize the skill set. However, those very same job openings could be filled by carpenters or by other trade professionals.

⁴¹ There is no separate indication for needs for carpentry profiles so the comparison between graduates and industry needs is made considering “building frame and related trades workers” and “other craft and related workers” as occupations which may utilize the skill set.

⁴² There is no separate indication for needs for plumbing. One may consider building frame and related trades workers and other craft and related workers as occupations which may utilize the skill set.

Welding	3	7	Between 110 (1year)-270 (5 years) (including metal processing and finishing plant operators and sheet and structural metal workers, moulders and welders, and related workers)
	4	30	
	5	4	
	6	5	
	10	17	
	Total	63	
Masonry	4	21	Between 241 (one year) and 605 (five years). ⁴³
	5	4	
	6		
	Total	25	
Architectural drawing	4	21	Between 90 (one year) and 170 (five years) ⁴⁴
	6		
	Total	21	
Building and civil engineers diplomas	4	66	Between 90 (one year) and 170 (five years) ⁴⁵
	Total	28	

Source: Authors' elaboration based on data from Ministry of Education and labour demand survey.

⁴³ There is no specific indication for needs in the carpentry joinery field. One may consider building frame and related trades workers and other craft and related workers as occupations which may utilize the skill set.

⁴⁴ Estimate refers to the need for "architects, planners, surveyors and designers".

⁴⁵ Estimate refers to the need for "architects, planners, surveyors and designers".

► **Table 8. Graduates by discipline and region (2021, Board of Industrial Training) and estimated job openings construction industry (technical occupations) over the next five years**

Discipline	Region	# of students (all levels, 2021)	Prospective job openings (total of relevant occupations) requiring the skills (as per result of company survey) technicians and manual labour.
Solar installation	1	20	Between 241 (one year) and 605 (five years). ⁴⁶
	2	10	
	4	54	
	Total	84	
Shade house gardening	1	10	No specific indication
	2	10	
	Total	20	
Electrical installation	2	25	Between 125 (one year) and 279 (5 years) (including electrical equipment installers and repairers, engineering professionals (excluding electrotechnology), electrotechnology engineers
	6	11	
	7	9	
	10	34	
	Total	79	
General building construction	2	11	Between 241 (one year) and 605 (five years). ⁴⁷
	6	15	
	Total	36	
Heavy duty equipment operation	2	18	223 (one year) to 578 (five years) including "heavy truck and bus drivers, mobile plant operators and mining and mineral processing plant operators".
	3	15	
	4	44	
	6	80	
	8	85	
	9	12	
	10	50	
	Total	304	
Refrigeration & AC repairs	2	16	No specific indication
	6	15	
	Total	31	
Welding & fabrication	2	15	Between 110 (1year)-270 (5 years) (including metal processing and finishing plant operators and sheet and structural metal workers, moulders and welders, and related workers)
	Total	15	

⁴⁶ There is no specific indication for needs in the carpentry joinery. One may consider building frame and related trades workers and other craft and related workers as occupations which may utilize the skill set.

⁴⁷ There is no specific indication for needs in the carpentry joinery. One may consider building frame and related trades workers and other craft and related workers as occupations which may utilize the skill set.

Interior design	4	10	Between 90 (one year) and 170 (five years) ⁴⁸
	Total	15	
Joinery	4	15	Between 241 (one year) and 605 (five years). ⁴⁹
	9	8	
	Total	23	

Source: Authors' own elaboration based on data from Board of Industrial Training and labour demand survey

An analysis of Tables 7 and 8 allows for the drawing of some tentative while potentially important conclusions:

- ▶ **Numerical match.** Notwithstanding the intrinsic limitations of such an exercise, from a purely numerical standpoint, there seems to be **gaps between future demand in the construction industry and graduates with degrees offered by national vocational training institutions.** As an example, with respect to courses linked to metal work, the current number of graduates from courses in **'metal work engineering' (28 from VTIs) and welding (15 from VTIs and 63 from BoIT)**, a total of 106 students, will have to satisfy a demand by the responding companies between 110 (over one year) and 270 (in 5 years). Such figures do not account for the rest of the companies in the construction industry (which did not answer the survey) and for any other sector of the economy.
- ▶ **Qualitative match.** The mentioned quantitative mismatch is accompanied by a qualitative one. Table 3, 4 and 5 above highlight the perceived skills gaps for technical, IT and transferrable skills. **Equipment maintenance, electrical installation and maintenance, knowledge of Microsoft Office Suite, computer literacy, time management, business conduct and communication** result as the skills perceived as most scarce by the respondents giving concrete indications about curricula design and, possibly, expansion of offer.
- ▶ **Geographical distribution.** If graduates in disciplines relevant to the construction industry are usual residents of regions with limited potential, there might be a (strong) case to investigate or implement relevant policies which could facilitate the internal migration of qualified labour. For instance, at this stage, it is relatively safe to assert that the major construction investments over the next five years will be undertaken in region 4 (residential and commercial dwellings linked to housing oil companies' staff and accessory services) and region 6 (oil refinery and related infrastructure). Graduates from other regions of the country may find it suitable to look for jobs within those and choose to permanently (or semi permanently) change their residence or commute if conditions are met. Housing, transportation, safety,

⁴⁸ Estimate refers to the need for "architects, planners, surveyors and designers".

⁴⁹ There is no specific indication for needs in the carpentry joinery. One may consider building frame and related trades workers and other craft and related workers as occupations which may utilize the skill set.

and childcare will be policy areas which may directly affect the shifts. This consideration may be particularly valuable in cases for **graduates obtaining degrees that are potentially useful in high demand occupations but are residing out of region 4 and 6. Examples** could be **graduates in electrical installations and engineering from regions 2, 3, 5, 7, 10, (approximately 120 per year) and heavy-duty equipment from regions 2, 3, 8, 9, 10, (approximately 180 per year).**⁵⁰

- **Gender breakdown.** While exact figures about national breakdown of graduates in “construction industry relevant” vocational training disciplines by sex are not presented in detail, from analysis of available data on graduates (for VTIs) and beneficiaries (for BoIT), a few trends emerge. Specifically:
- Some courses/degrees are male dominated although still showing non null attendance by women. Those include carpentry, electrical installation, heavy machinery operation, joinery, metal work, plumbing, refrigeration/AC repairs welding.
 - In general, women concentrate attendance in only few vocational training courses relevant to the construction industry such as interior design and shade house gardening.
 - Amongst the degrees offered by the BoIT, some (electrical installation, general building construction) are more gender balanced in terms of attendance and, in some regions, women may represent the majority of students.

The above suggests the existence of rigid barriers not only in employment (see Chapter 1) but also in educational choices linked to construction related trades. Aside from individual preferences, an effective education of the public concerning employment opportunities and skills requirement within the construction industry may alter the educational choices and lead to a better educational and employment outcome. The latter, however, may be linked to several other factors including safety at work, housing, and the availability of childcare.

On the job training

Construction companies interviewed as part of this study agreed on how complex it can be to find trained staff in Guyana. Even people with higher education tend to have room for improvement in both foundational knowledge (mostly in technical areas) and in general business acumen (including business conduct). For non-professional occupations, on the job training is considered pivotal to prepare the new entrants to perform the job, since most of the people working in trades related to construction do not have any formal education in the sector. In addition, the size and complexity of construction projects that the country is experiencing is

⁵⁰ Note that it may be plausible that some reverse causality be at stake. In the absence of an available and qualified workforce, developers may not consider engaging in certain construction projects, especially those that are small or mid-size where mobilization of external labour is not cost effective. The availability of educational facilities may, in turn, influence the availability of qualified a workforce in certain regions. From the analysis of Tables 4 and 5 it appears that for certain disciplines the bulk of the graduates/beneficiaries is located in region 4 and 6.

recent, some tools, standards and machines represent new knowledge for a large group of construction workers.

Conclusions and policy implications

Overall, the data presented in this section (on matching of educational supply and labour market demand) suggest the following:

- ▶ On paper, there appears to be a quantitative gap between courses offered, number of graduates, subjects, and future demand in the construction industry the extent of which is not simple to determine.
- ▶ Such gaps may be exacerbated to the extent that graduates in construction relevant disciplines may be in demand in other areas of the economy. While virtually impossible to quantify the danger, it is worth highlighting that in the next five years there will be a **high demand by the oil and gas industry for engineers.**
- ▶ **Qualitative gaps do exist.** Lack of skills amongst the graduates is not necessarily reflected in credentialling terms (number of graduates/students in each subject required by the market) but rather in terms of quality of available skills which is deemed insufficient by the market (see Tables 3, 4, 5). This particularly relevant if one considers the finding stemming from interviews that most of the people working in trades related to construction do not have any formal education in the sector and increased complexity of some of the tools, standards and machines progressively being introduced in projects.

▶ Chapter 3. Recommendations

- **Consider local capacity and industry's urge when adopting solutions for the expansion of education supply.** Expansion of the offer of courses, seats, graduates in the fields most in demand (especially in engineering, heavy machinery operations, electrical applications) will have to be gauged against the capacity of the system (facilities, teachers, financial resources) and possibly consider easily executable solutions to expand the offer of education in selected trades and in the very short term, to respond to the one-year projected labour demand. Solutions may include (i) development of the private supply of training for selected trades where the capacity of expansion from the public sector may not go at the same speed as required in the market; and (ii) provision of recognition of prior learning services to informal on-the-job training currently provided in the construction industry.
- **Incorporate construction related equipment maintenance** within any revision of curricula and any decision regarding investment in training equipment will most likely have to consider the issue. The skill appears to be a critical (technical) one currently lacking in Guyana.
- **Embed IT and transferrable skills within any revised curricula linked to construction.** Specifically, it appears to be **crucial to supply graduates to the construction industry endowed with not yet available IT and transferrable skills.** The latter results being a key improvable feature for **younger workers.**
- **Incorporate findings from this study -and from any future dialogue with the industry- within educational and career guidance tools notably to the benefit of young women.** The findings on job prospects associated with certain degrees shall help shape, not only the educational offer, but also the educational and career guidance one. Available or future tools (public employment services, job orientation at school, online resources) providing information on careers and qualification requirements shall incorporate information concerning employment in construction and clearly outline the educational offer instrumental to acquire a job in the industry. A better guidance is arguably a necessary condition for increased uptake by women of certain educational path. However, it is worth emphasizing that aside from individual preferences, an effective education of the public concerning employment opportunities and skills requirement within the construction sector may be **linked to several other factors including cultural norms, (physical) safety at work, housing, transport, and availability of childcare** which will have to be considered from the outset.
- Given current identified scarcity and the immediate need to fill labour shortages, and while the Government works in building its national skills and capacities, the Government of Guyana can consider the creation of policies and mechanisms to facilitate the recruitment of labour from both national and foreign sources. To address the limitations currently being experienced, and to maximize labour and economic growth potential, a comprehensive and

complementary approach towards filling labour gaps can be developed through interministerial dialogue among relevant ministries and other key actors, including the private sector and labour groups. Additionally, further engagement in regional dialogue with CARICOM neighbours, utilizing existing mechanisms, or through the creation of bilateral mechanisms in line with Community Law can further relieve the short and medium term constraints.

► Annex 1 – Skills demand survey

Data collection period: From July to September 2022

Collection method: The survey was distributed digitally through a selection of a sample of construction companies, with a diversified scope. This formal and informal business of different sizes.

Method of Sampling: Non-probabilistic deliberate-type sampling. This type of technique consisted of selecting firms to participate in research based on specific characteristics (in this case be part of construction value chain), rather than randomly. The survey was distributed to 61 companies selected due to their involvement in the construction sector. The companies are members of the Guyana Private Sector commission and/or of the Georgetown Chamber of Commerce and Industry. In addition, seven companies from the informal sector were also contacted. Out of a total of 68 companies, 46 (6 from the informal sector) completed the questionnaire with the assistance of an enumerator. The total headcount of workers employed in the responding companies is 4,155. This represents 18 per cent of estimated 22,555 workers in the construction industry in Guyana (q3 2021). While this percentage may not fully accurate as it refers to 2021, and since construction and employment therein has increased in the country, it still gives a precise enough idea to draw some general conclusions from the findings of the study.

Survey structure: Questions were organized in two sections:

1. Characterization of the firm
 - Contact information of the respondent
 - Main business
 - Headcount

2. Examination of the most in demand occupations (participants were asked to respond the first, second and third most in demand occupations)
 - Expected hirings of workers in this occupation (In the next year and next five years)
 - Sources of recruitment for hirings in this occupation
 - Average age of incumbents of workers in this occupation
 - Average percentage of female workers in this occupation
 - Common nationality of workers in this occupation
 - Educational background expected for workers in this occupation
 - Expected tenure of workers in this occupation
 - Most relevant technical, information technology and transferable skills for workers in this occupation
 - Availability of most relevant skills previously identified in local labour market

Number of responses: 46

Given the exploratory purpose of the study and the non-probabilistic nature of the sampling technique, it is not possible to perform a statistical reliability calculation. However, as an indicative figure, the total headcount of the companies studied is 4,155. This is 18 per cent of the estimated 22,555 workers of construction (Bureau of Statistics, Guyana, 2021) described in the sector profile (Chapter 1). While this percentage may be subject to changes and requires a greater statistical precision, considering the accelerated growth of employment in construction in the country, it still gives a precise enough idea to draw some general conclusions from the findings of the study.

► Annex 2 – Occupation profiles

Building frame and related trades workers

Definition: Building frame and related trades workers construct, maintain and repair buildings; erect and repair foundations, walls and structures of brick, stone and similar materials; and shape and finish stone for building and other purposes; and perform miscellaneous construction and building maintenance tasks.

Tasks performed usually include: constructing, maintaining and repairing buildings and other structures by using traditional and/or modern building techniques; constructing and repairing foundations, walls and structures of brick, stone and similar materials; breaking quarried stone into slabs or blocks; cutting, shaping and finishing stone for building, ornamental, monumental and other purposes; erecting reinforced concrete frameworks and structures as well as finishing and repairing cement surfaces; cutting, shaping, assembling and maintaining wooden structures and fittings; performing miscellaneous construction and building maintenance tasks. Supervision of other workers may be included.

Examples of jobs in this occupation		Next year	Expected hirings				
<ul style="list-style-type: none"> House builders Bricklayers and related workers Stonemasons, stone cutters, splitters and carvers Concrete placers, concrete finishers and related workers Carpenters and joiners 			Within the next 5 years	Average percentage of female workers			
		237	590	38%			
Education background		Area of study					
		<ul style="list-style-type: none"> NA 					
Sources of recruitment							
Online Job boards	Recruitment agencies	Public employment services	Internship programmes	Word of mouth	Career services	Social media	Print media
0%	0%	0%	0%	57%	0%	17%	27%
Top technical skills		Top IT skills		Top transferable skills			
Skill	Local availability	Skill	Local availability	Skill	Local availability		
Blueprint interpretation	85%	Microsoft Suite (Office, teams, etc.)	0%	Time management	56%		
Measurement	90%	Use of hardware (PC, tablets, etc.)	0%	Communications	50%		

Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

Engineering professionals (excluding electrotechnology)

Definition⁵¹: Engineering professionals (excluding electrotechnology) design, plan and organize the testing, construction, installation and maintenance of structures, machines and their components, and production systems and plants; and plan production schedules and work procedures to ensure engineering projects are undertaken safely, efficiently and in a cost-effective manner.

Tasks performed usually include: planning and designing chemical process systems, civil engineering projects, mechanical equipment and systems, mining and drilling operations, and other engineering projects; specifying and interpreting drawings and plans, and determining construction methods; supervising the construction of structures, water and gas supply and transportation systems, and the manufacture, installation, operation and maintenance of equipment, machines and plant; organizing and managing project labour and the delivery of materials, plant and equipment; estimating total costs and preparing detailed cost plans and estimates as tools for budgetary control; resolving design and operational problems in the various fields of engineering through the application of engineering technology.

Examples of jobs in this occupation		Expected hirings					
<ul style="list-style-type: none"> Civil engineers Geoscientist Mechanical engineers Industrial and production engineers Logistics and materials coordinators 		Next year	Within the next 5 years	Average percentage of female workers			
		108	242	7.6%			
Education background		Area of study					
Graduate degree	0%	<ul style="list-style-type: none"> Mechanical, electrical, industrial or similar engineering Civil engineering Geologists and Geophysicists 					
Undergraduate degree	100%						
TVET degree	0%						
Highschool degree	0%						
Elementary Education	0%						
Sources of recruitment							
Online Job boards	Recruitment agencies	Public employment services	Internship programmes	Word of mouth	Career services	Social media	Print media
3%	0%	3%	3%	42%	0%	25%	25%
Top technical skills		Top IT skills		Top transferable skills			
Skill	Local availability	Skill	Local availability	Skill	Local availability		
Project management	85%	Microsoft Suite (Office, Teams, etc.)	62.5%	Communications	62%		
Equipment maintenance	50%	Autocad	55%	Critical thinking	57%		
Blueprint interpretation	100%			Problem solving	100%		
				Leadership planning and organization	0%		
		Specialized HSE software	50%	Research	33%		
					100%		

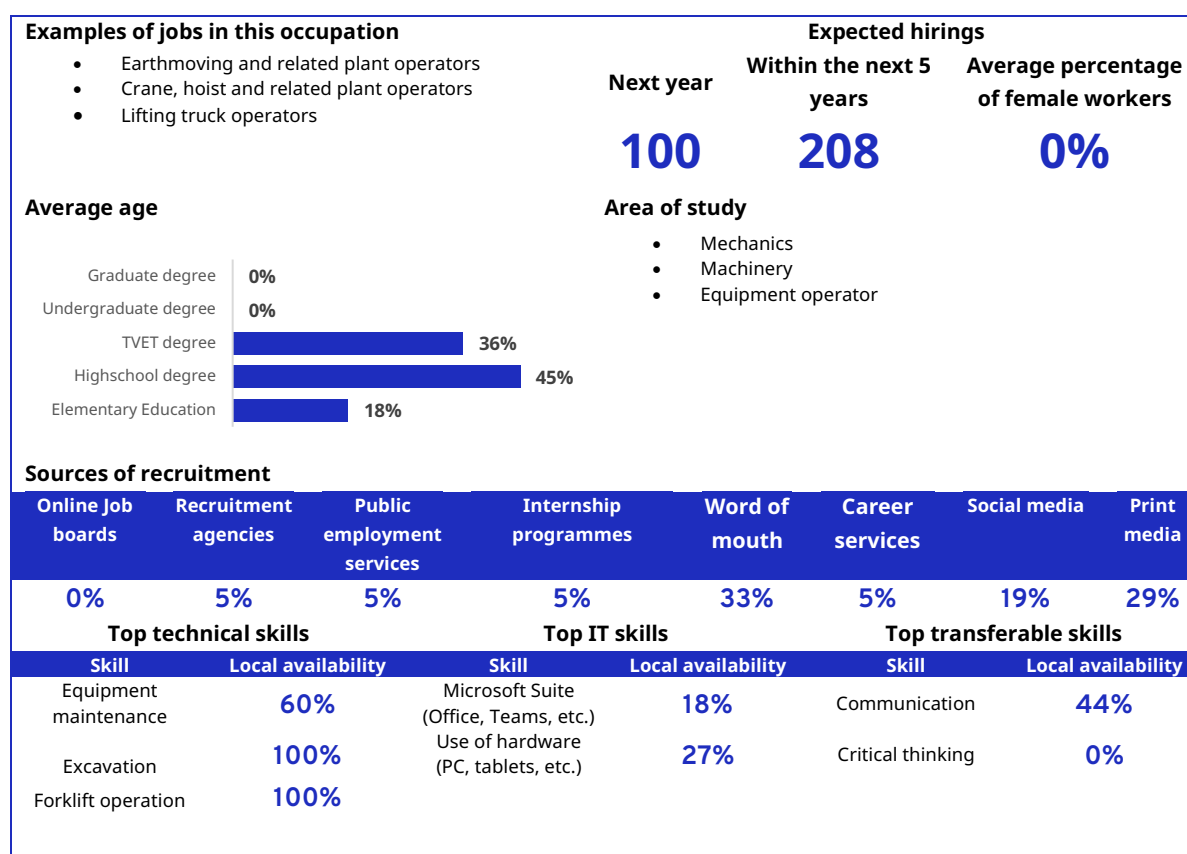
⁵¹ All the definitions used in this section are referencing ISCO-08.

Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

Mobile plant operators

Definition: Mobile plant operators drive, tend, operate and monitor special-purpose motorized machinery or equipment used for clearing or preparing land; digging, moving and spreading earth, rock and similar materials; and lifting or moving heavy objects.

Tasks performed usually include: preparing and positioning plant for operation; adjusting speed, height and depth of implements; driving and operating mobile plant; operating attachments to lift, swing and release trees, logs, earth and other heavy objects or materials; operating and monitoring lifting trucks and stationary or mobile cranes in construction, transportation and storage operations; servicing machinery and performing minor repairs.

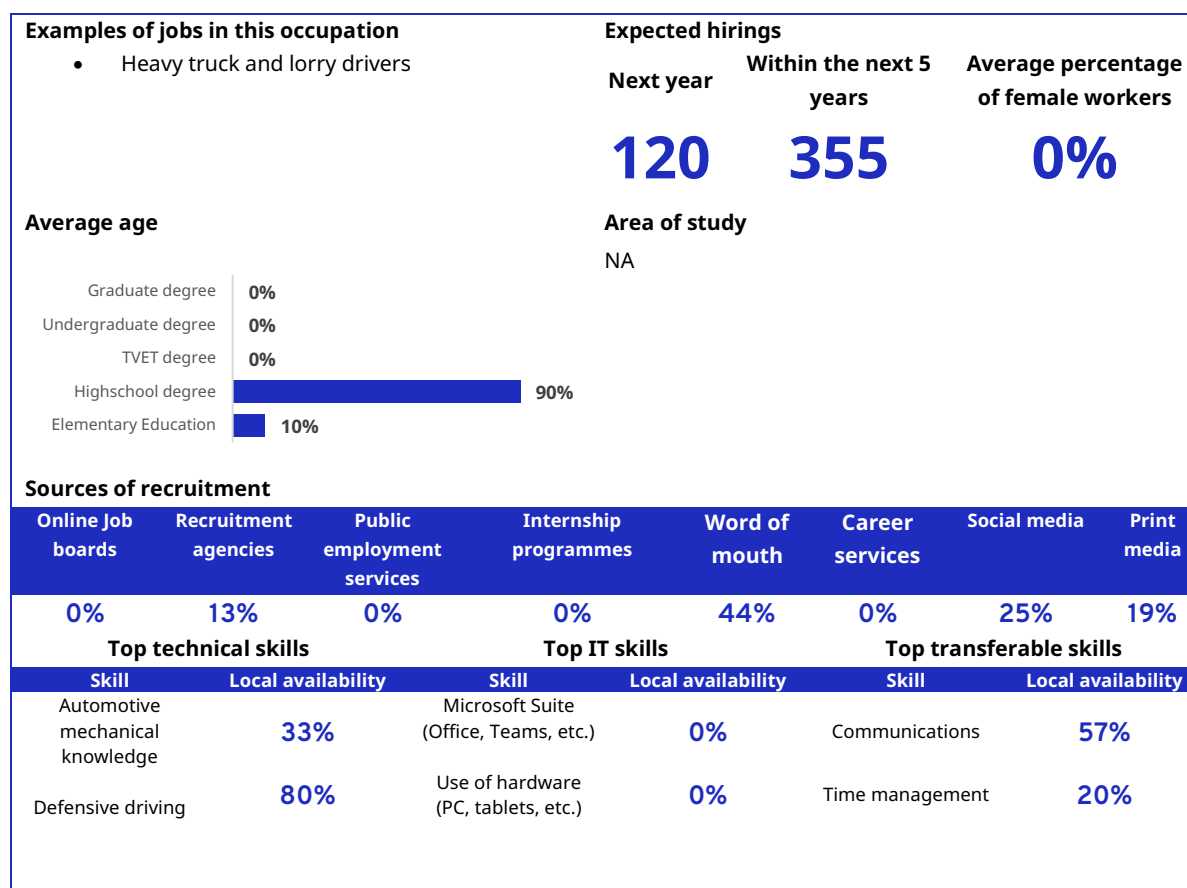


Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

Heavy truck and bus drivers

Definition: Heavy truck and bus drivers drive and tend heavy trucks, lorries, buses or street tramcars to transport goods, liquids, heavy materials, mail or passengers.

Tasks performed usually include: driving and tending heavy trucks, lorries, buses or street tramcars in order to transport goods, liquids, heavy materials, mail or passengers.



Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

Sheet and structural metal workers, moulders and welders, and related workers

Definition: Sheet and structural metal workers, moulders and welders, and related workers, make moulds and cores for casting metal, weld and cut metal parts, make and repair articles of sheet metal, and install, erect, maintain and repair heavy metal structures, tackle, cable-cars and related equipment.

Tasks performed usually include: making moulds and cores for casting metal; casting, welding and shaping metal parts; making and repairing articles of sheet metal such as sheet steel, copper, tin or brass; installing, erecting, maintaining and repairing heavy metal structures as well as tackle, cable cars and related equipment.

Examples of jobs in this occupation <ul style="list-style-type: none"> • Metal moulders and coremakers • Welders and flame cutters • Sheet metal workers • Structural metal preparers and erectors • Riggers and cable splicers 		Expected hirings					
		Next year 41	Within the next 5 years 120	Average percentage of female workers 0.01%			
Average age		Area of study <ul style="list-style-type: none"> • Welding • Industrial technician 					
Sources of recruitment							
Online Job boards	Recruitment agencies	Public employment services	Internship programmes	Word of mouth	Career services	Social media	Print media
0%	13%	0%	0%	38%	0%	25%	25%
Top technical skills		Top IT skills		Top transferable skills			
Skill	Local availability	Skill	Local availability	Skill	Local availability		
Fabrication	50%	Use of hardware (PC, tablets, etc.)	33%	Communication	50%		
		Microsoft Suite (Office, Teams, etc.)	40%				

Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

Architects, planners, surveyors and designer

Definition: Architects, planners, surveyors and designers plan and design landscapes, building exteriors and interiors, products for manufacture, and visual and audio-visual content for the communication of information. They conduct survey work to precisely position geographical features; design, prepare and revise maps; and develop and implement plans and policies for controlling the use of land.

Tasks performed usually include: determining the objectives and constraints of the design brief by consulting with clients and stakeholders; formulating design concepts and plans that harmonize aesthetic considerations with technical, functional, ecological and production requirements; preparing sketches, diagrams, illustrations, animations; plans, maps, charts, samples and models to communicate design concepts and other information; analysing photographs, satellite imagery, survey documents and data, maps, records, reports and statistics; undertaking research and analysing functional, spatial, commercial, cultural, safety, environmental and aesthetic requirements.

Examples of jobs in this occupation <ul style="list-style-type: none"> • Building architects • Landscape architects • Product and garment designers • Town and traffic planners • Cartographers and surveyors • Graphic and multimedia designers 		Expected hirings					
		Next year	Within the next 5 years	Average percentage of female workers			
		90	170	.01%			
Average age		Area of study					
<ul style="list-style-type: none"> Graduate degree 0% Undergraduate degree 80% TVET degree 20% Highschool degree 0% Elementary Education 0% 		<ul style="list-style-type: none"> • Architecture • Cartography • Industrial Design 					
Sources of recruitment							
Online Job boards	Recruitment agencies	Public employment services	Internship programmes	Word of mouth	Career services	Social media	Print media
0%	8%	0%	0%	38%	0%	23%	31%
Top technical skills		Top IT skills		Top transferable skills			
Skill	Local availability	Skill	Local availability	Skill	Local availability		
Drafting	100%	Use of hardware (PC, tablets, etc.)	100%	Communication	100%		
		Microsoft Suite (Office, Teams, etc.)	100%				

Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

Transport and storage labourers

Definition: Transport and storage labourers propel cycles and similar vehicles and drive animal-drawn vehicles to transport passengers or goods, drive animal-drawn machinery, handle freight and baggage, and stock shelves.

Tasks performed usually include: propelling cycles and similar vehicles to transport passengers or goods; driving animal-drawn vehicles to transport passengers or goods; driving animal-drawn machinery; carrying out freight handling by hand; stocking shelves and display areas in stores.

Examples of jobs in this occupation		Expected hirings					
<ul style="list-style-type: none"> Freight handlers Shelf fillers Logistics coordinator Materials coordinator 		Next year	Within the next 5 years	Average percentage of female workers			
		37	85	0.04%			
Average age		Area of study					
		<ul style="list-style-type: none"> Industrial engineering Logistics and supply chain technicians 					
Sources of recruitment							
Online Job boards	Recruitment agencies	Public employment services	Internship programmes	Word of mouth	Career services	Social media	Print media
1%	4%	2%	1%	40%	1%	24%	27%
Top technical skills		Top IT skills		Top transferable skills			
Skill	Local availability	Skill	Local availability	Skill	Local availability		
Forklift operation	100%	Use of hardware (PC, tablets, etc.)	20%	Business conduct	77%		
		Microsoft Suite (Office, Teams, etc.)	20%	Communication	100%		

Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

Mining and mineral processing plant operators

Definition: Mining and mineral processing plant operators monitor and operate plant machinery and operate hand tools to extract rock and minerals from the earth, process minerals and stone, drill wells and bores, and manufacture and finish cement and stone products.

Tasks performed usually include: setting up, operating and monitoring a variety of mining and mineral processing plant and machinery such as drilling rigs and auxiliary machines and equipment, continuous mining machinery, and cutting, crushing, grinding, pumping and mixing plant and machinery; operating washing, separating, extracting and combining equipment to remove waste and recover minerals; operating plant and machinery to make cement, concrete, artificial stone, and precast concrete and stone products; monitoring the performance of a variety of plant and machinery, detecting malfunctions and taking corrective action; performing plant and machinery maintenance, repairs and cleaning; and maintaining production records.

Examples of jobs in this occupation <ul style="list-style-type: none"> Mineral and stone processing plant operators Well drillers and borers and related workers Cement, stone and other mineral products machine operators 		Expected hirings		Average percentage of female workers			
		Next year	Within the next 5 years				
		198	370	11%			
Average age		Area of study					
		NA					
Graduate degree	0%						
Undergraduate degree	0%						
TVET degree	0%						
Highschool degree	100%						
Elementary Education	0%						
Sources of recruitment							
Online Job boards	Recruitment agencies	Public employment services	Internship programmes	Word of mouth	Career services	Social media	Print media
0%	0%	0%	0%	0%	0%	100%	0%
Top technical skills			Top IT skills		Top transferable skills		
Skill	Local availability	Skill	Local availability	Skill	Local availability		
Equipment maintenance	100%	Microsoft Suite (Office, Teams, etc.)	100%	Communication	0%		
Forklift operation	100%	Use of hardware (PC, tablets, etc.)	100%	Teamwork	0%		

Source: Authors' own elaboration based on information from the skills demand survey and ISCO 08 classification (examples of jobs).

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