SURVEY RESEARCH LANKA (PVT) LTD

ASSESSMENT OF SKILL DEMAND NEEDS AND SKILL GAPS IN MANUFACTURING AND ENGINEERING SERVICES SECTOR IN SRI LANKA

Three sectors covered in the study;

Rubber & Plastic industry

Metal related industry

Engineering service sector

2019

1 Executive Summary

The study focuses on detailing the skill needs and skill gaps in 3 sectors of Manufacturing and Engineering service sector in Sri Lanka. To accomplish the objectives of the study, a comprehensive research was carried out using a mixed research approach which consisted of both secondary and primary data analysis. The research design had three phases; desk review, qualitative phase and a quantitative research. Both skill suppliers and who demand skills in the industry were interviewed in the study. A total of 252 companies were interviewed representing three selected industries, namely Rubber & Plastic industry (62 establishments), Metal related industry (129 establishments), and Engineering service sector (60 establishments).

The overall study findings revealed that all three selected industries equally experience the poor quality and quantity of skills as critical concern. The gap in the quantity of skilled employees seems to be the burning issue expecting immediate solutions. Hence the study revealed the following;

As per the latest updated statistics available at TVEC, 3 forces(Navy, Army & Air Force) , CEB training center, a total of 17,066 students passed out in the 2018 after having completed courses that are related to Rubber & Plastic, Metal & Engineering Service-related sectors. The skilled employees' requirement for the three industries is estimated to be at 42,362 per annum. In addition to this, annual departure for foreign employment related to these industries in a year estimated to be 10,000 (Sri Lanka Bureau of Foreign Employment). Therefore, the total estimated demand is at 52,363 whilst the total supply is only 17,066 per annum which creates a gap of 35,296.

Mechanical and maintenance engineering technicians, is the highest demanded category in the country, 'technicians – general' is the category with highest departure for foreign employment in a year. The highest passed out batch in 2018 consist of 'Mechanic (Other Machinery)', whereas the highest demand is for 'Mechanical and maintenance engineering technicians' (56% of the total required cadre) while the highest annual departure category is also 'technician-general'.

Considering the very low supply of the Rubber and Plastic industry related skilled employees currently, the total skilled cadre required to fill the existing gap would be approx.2,919 per annum skilled employees. 'Tyre making and vulcanizing machine operators' is the highest demanded skilled category occupation in the Rubber & Plastic Industry. This is followed by 'Factory worker – Rubber', 'Latex Product Operator', 'Factory worker – Plastic', 'Plastic Extrusion' and 'Plastic Bottle/cup blowing machine operators'.

The estimated skilled employees' gap for Metal related industry and Engineering service sector is 32,377 after considering the current supply. The highest demanded skilled job category for Metal industry is 'Welders and Flame cutters' followed by 'Aluminum fabricators'. For Engineering service sector 'Mechanical and Maintenance Engineering technicians' are the highest demanded skilled job, followed by 'Electrical Engineering technicians', 'Welders', 'Refrigeration and Air Conditioning technicians'.

Many companies are tabling the existing skills requirement in the market when questioning about the emerging skills but not necessarily very new talents that they foresee as future needs. This is because the existing skill requirements are very challenging to source, hence they mention it as emerging skills. The highlighted emerging skills requirements are; 'Injection Moulding Machine Operators', 'Packers', 'Plastic Cutting', 'UPVC /Aluminium Welders', 'Lathe & Milling Machine Operators', 'CNC Machine Operators', 'Elevators' , 'Electricians', 'Technicians', 'Welders and Macaronic Engineering', 'Pipe Fitters', 'Electricians, Steel Modification', 'Cutters and Welders', 'Lathe & Milling Machine Operators', 'Industrial Engineering', 'Research & Development and Innovation' 'Multi-skilled Craftsman', 'Skilled Workers with smart technology'.

As an immediate solution to the scarcity of skilled workforce, companies tend to recruit unskilled employees and train them on the job. Although the companies' expectation is to train them and sustain them in the company, from candidates' side it was just a stop gap filler for them. It would have not been their desired destination to have a career in the industrial sector. Therefore, retention of such recruits is always challenged. Recruits from vocational training centers also tend to leave once they start experiencing the job, and the key reasons for this trend are; working environment, lack of comfort in the work place like odd odors in the factory (Rubber and plastic) and non-ac environment, unwillingness to work long hours, lack of fitment to the job or the industry (attitude). Further, poor pay and other benefits, prioritizing recruiting from adjacent areas, employers prioritizing recruiting unmarried people also contribute to the same.

People's 'preference towards white collar jobs as opposed to blue collar jobs', 'Higher salary expectations without having the right skills, experience and/or qualifications by candidates', 'not comfortable with the working environment due to the sound, smell and noise', 'youth seek for easy money through convenient jobs such as riding three wheelers' and 'the inability to stick to one job' – lack of endurance are other attitudinal and societal trends cause the skills gap in the market from companies point of view.

Linear conventional approach to be implemented to recruit skilled employees to the industrial sector

Currently we have at least a fragmented segment in the market that is willing to go through the process of exploring such natured skilled occupations. But the challenge is posed when considering the future resource requirements of such industries, since the future generations will have more options, more expectations and more benefits they seek when doing a job – or simply opt out from working for anyone and do something on their own. In some of the benchmarked countries such as Japan and Singapore, the youngsters are given the opportunity to try out the possible skilled occupations during their learning/job exploring period and pick the options they wish to pursue. Once candidates have gone through experiencing the job, they can be given the required theoretical knowledge by vocational training and experts in the industry. This method is experimented and executed currently in Sri Lanka by CEB and from employers point of view, this method was accepted as a benchmark method to be considered.

Re-evaluation of the standards of training given by the training centers

From the Engineering service sector and Metal related industry company interviews, it was identified that the skills of passed out from Ceylon-German Technical Training Institute have been found to be high in standards and meets expectations of the three industries. Some of the companies recommended that all vocational trainings should borrow this learning as a benchmark and produce skilled workers to the market that will meet industry expectations. To identify changing needs and expectations of industry sector companies, it is vital to gather data of these trends frequently and provide access to skill suppliers for their immediate attention. This results in the supplied skills would to become very relevant and timely. Therefore, a proper Information Management System (IMS) to gather current occupation skilled gap statuses by occupation would make this possible. This IMS can be created to capture and update details like current staff strength by occupation, next year requirement by occupation, emerging skill needs, current skill gaps in the talent they require or any other important data for regular decisions required for the betterment of the industry.

Elevate the industrial skilled job reputation in the market

Despite the actions taken to revamp the title of the courses and the designations of the skilled worker positions in the industry to enhance the attractiveness, yet the perception towards these jobs are not

aspirational for the youngsters. It's probably the emotional level connection that is required to bridge this gap and only changing the outlook would not be sufficient with the fast changing and highly exposed new generation. Building a culture of appreciating people who work in the industrial sector, infuse the thinking that the contribution one could make to the growth of the country etc... by attaching to the sector are some of the long term interventions needed to enhance the emotional affiliation towards the jobs.

Develop a shared platform for demand and supply (individuals) can be connected

There are qualified people who are willing to contribute to the industrial sector but never got a chance or platform to connect with companies. Example, people who retire early from three forces who probably would have NVQ and are looking for a job will go unnoticed as there are no platforms to connect them with relevant companies. The vocational training centers/ any other national level authority can be the central hub for maintaining a registry of existing talents who are qualified and pursue a job in the industrial sector in the market. Once such database is created, all companies in the sector irrespective of their size or ownership (public/private), they should be able to find the required talent to fill the skilled worker gaps. Appropriate database management and communication systems about this intervention is critical to make this a success. This can be further extended by creating a policy for some large companies to refer to this database first to check on locally available skilled workers before they source from other countries, like some other western countries limit sourcing employees from other countries if the talents match the company expectation do exist within the country already (anywhere).

A thorough preparation process of candidates by Vocational training centers

The companies in the industry are concerned about the individuals who come for interviews although they have vocational training certifications when it comes to how they face the interviews, their skills of using (demonstrating) safety & manufacturing equipment, quick adoption to work, culture fit, etc. Attitude towards work and working environment are also frequently observed concerns among them. Most critical concern is that companies do complain that their machines needed to be repaired often as the employees do not know how to operate them in right methods. Therefore, it is important to have a process of preparing candidates before they are sent for any interviews or OJT. Sometimes, remote assistance and mentoring would enhance their motivation to perform and continue in the job.

Safety first policy for companies

Poor state of safety equipment used by companies is seen as a de-motivator as what companies observe in employees. On the other side, companies also observe that although the safety equipment is given for employees, they do not use them as much as they should be using. As a spillover effect of this behavior, it could create a perception in the society that the industry sector is not safe and hence it is rejected as an aspired job. To arrest this negative perception, government should make it compulsory for companies to offer safety equipment to all the employees. Companies should always make it mandatory for employees to use the safety equipment in work. An awareness campaign would be helpful to bring about the benefits of using safety equipment as responsible social entities (for companies) as well as for individuals. Further, micro and small companies in the industrial sector should be encouraged to be Safety First! by providing safety equipment at a concessionary rate by the government.

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4 Key Words

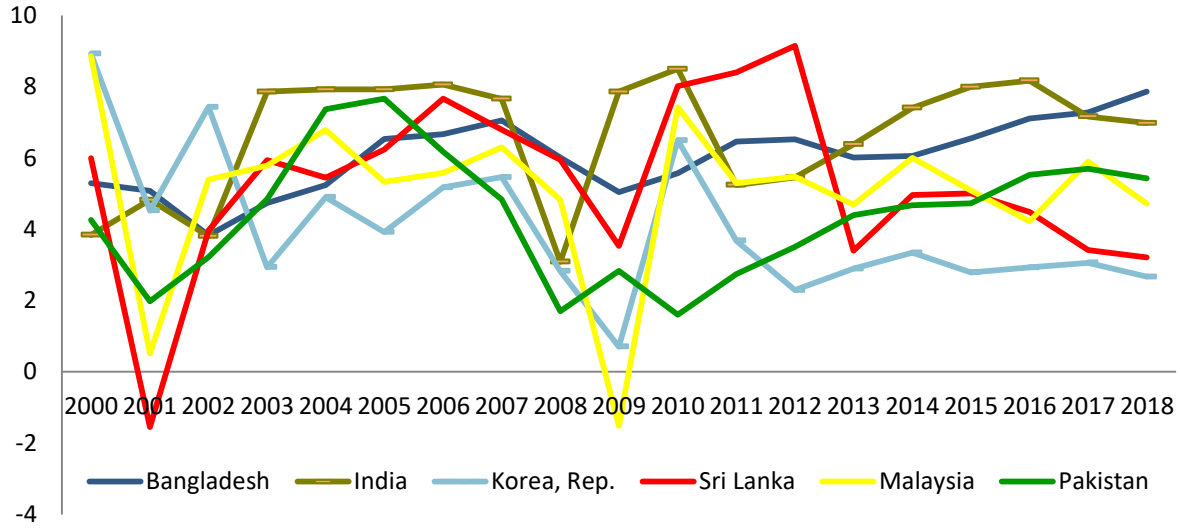
- MESSCO - Manufacturing and Engineering Services Skills Council
- Three selected industries - Rubber & Plastic industry, Metal related industry & Engineering service sector
- ISCO – International standards classification of occupations
- OJT – On the job training
- Skilled employee– the ability to carry out the given tasks and duties independently
- Skill Supply – Total prospective talents generated by training institutes in the country targeting the skilled employee requirement
- Skill Demand – Total skilled worker category employee requirement by employers and the demand for foreign employment
- Skill Gap – The gap between quantity of skill supply and skill demand
- Skill level[1] – a function of the complexity and range of tasks and duties to be performed in an occupation, which is measured by the minimum level of formal education and trainings required for competent performance of tasks and duties in an occupation
- Skill level considered for assessing skill demand
- A job – a set of task or duties performed or meant to be performed by one person
- Occupation – a set of jobs whose main tasks and duties are characterized by a high degree of similarity
- BOI – Board of Investment
- CEB – Ceylon Electricity Board
- TVEC - Tertiary & Vocational Education Commission
- Skill needs – quantity of skilled employees required for different skilled category occupations
- Quality of skills – expected quality of skilled employees
- Quantity of skills - quantity of skilled employees
- NVQ – National Vocational Qualification
- UPVC – Unplastical PVC
- CNC Machine Operators – Computer Numerical Control Machine Operators
- 3 Forces - Navy, Army & Air Force

[1] As defined by ISCO

5 Introduction

In recent years, Sri Lanka has posted some of the lowest economic growth rates in South Asia, which is an all-time low after 2001. Nevertheless its position is better than some of the East Asian Countries such as Korea (Refer Figure 1). Yet, Sri Lanka's per capita income has been on the rise reaching to USD 4,060 in 2018 was lower than the middle income country average, amounting to only one third of Malaysia's and close to one ninth of the Republic of Korea's. Nearly 58% of the employed Sri Lankans are earning low wages in poor working conditions in informal employment (Source: Department of Census and Statistics, 2017) and 52% of the working Sri Lankans belong to the rural households of Sri Lanka in 2017 (Department of Census and Statistics, 2017). If Sri Lanka's economy is to continue to expand into higher value added sectors and reduce poverty, it needs to become more efficiently driven. An empirical investigation on Productivity, Innovation and Growth in Sri Lanka, cite that access to skilled labour is one of the key dependent factors for increasing productivity and innovation leading to growth in Sri Lanka. (Dutz and O'Connell,2013). Thus major skills shortages and mismatches appear to be holding back the country's development efforts.

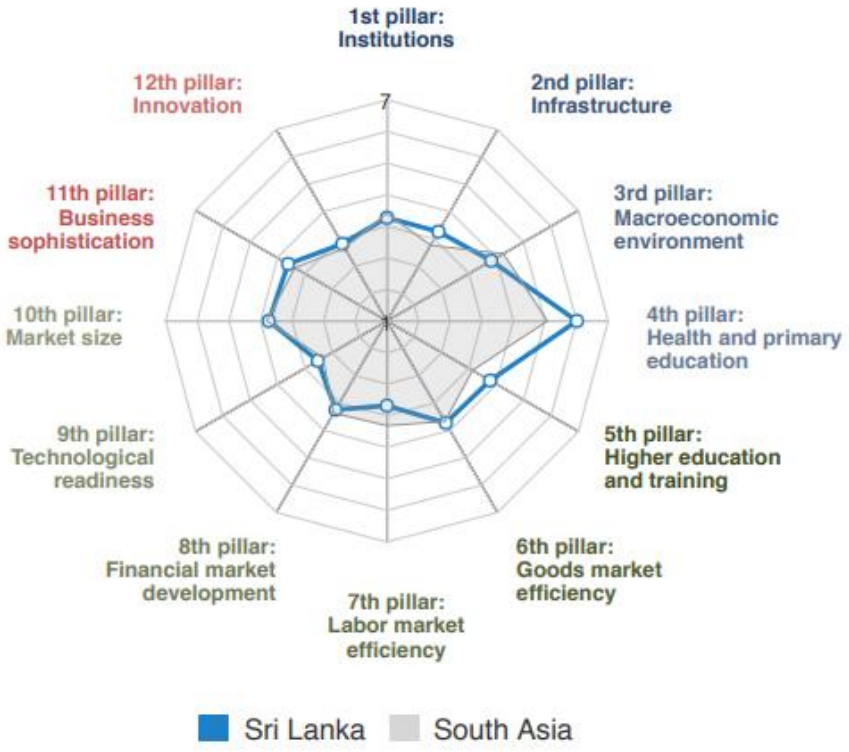
Figure 1: Annual GDP Growth



Source: World Bank, World Development Indicators Database, 2018

The present paper uses secondary sources and primary data to identify the information gaps related to the demand and supply of skills in 3 key industrial sectors in Sri Lanka. The sectors are as follows; Rubber and Plastic Industry, Engineering Services (Electrical, Electronics) and Metal Industry. These sectors have been identified as key growth drivers in several key policy documents such as the Public Investment Program (National Planning Department, 2019) and the Skills Sector Development Program of Sri Lanka 2014-2020. Accordingly, this paper aims to inform a more rigorous, survey based assessment of skills gaps in the 3 priority sectors that is being implemented concurrently, which will in turn inform policy designed to facilitate the demand oriented provision of these skills by the private and public sectors.

Figure 2: National Growth Driving Factors



Source: WEF (2017-18)

The post conflict comparative assessment of Sri Lanka's relative competitiveness reveals that the country is currently transferring from being a factor driven to efficiency driven stage of development. This is mainly driven by education and training & development of necessary skills in the relevant sectors. Figure 2 depicts this improvement in key growth driving factors such as higher education & training, goods market efficiency, financial market development, and market size, have witnessed marginal shifts during 2017-18.

Sri Lanka's economy should grow by 7% this year; meanwhile, inflation is predicted to end the year far below market expectations. There are even signs that the nation is investing in the infrastructure required to make it an economic hub in South Asia. In the World Economic Forum's Global Competitiveness Index 2017-18, Sri Lanka ranked 85 among 137 countries, losing its rank of 65 in 2013-14. Nevertheless, it places it ahead of other emerging economies such as Kenya, Greece and Ukraine.

In this backdrop, the overall objective of SSDP is to improve the quality, relevance and accessibility of skill training provision in Sri Lanka. The objective and outcomes are to be achieved through the implementation of 5 interrelated strategies including;

1. Improving quality
2. Improving relevance
3. Improving access
4. Improving recognition for vocational training
5. Introducing supportive policies, systems and structures

By considering importance and contribution of different industries, MESSCO has identified three sectors namely Rubber and Plastic Industry, Engineering Services (Electrical, Electronics & Telecommunications), and Metal Industry as priority areas to be supported under the SSDP interventions.

With a significant contribution of 27% to GDP and 18% of total employment, the industrial sector in Sri Lanka is the prime force of value creation in the economic development of the country. Technology enhancement is witnessed globally as well as in the sub-continent tremendously and it is created lots of opportunities and challenges for each industry. In Sri Lanka, Vocational Training institutes are also playing a significant role in creating skilled people that need different industries through their training programs. But, expected skill levels are different from industry to industry as well as occupation to occupation. On the other hand, finding a skilled person for a particular occupation is difficult for some industries due to the gap between demand and supply of skills in the market which is a significant challenge for the growth of these industries of the country.

As a progressive step to explore possibilities and opportunities to fill existing skill gaps in the industrial sector of the country, exploration of quality and quantity of skill requirement by industrial sector has been identified as a research requirement and that scope was based for this research. However, as mentioned above, this research is limited to Rubber and Plastic, Engineering Services (Electrical, Electronics & Telecommunications) and Metal Industries only.

6 Research Objectives

- To ascertain evidence of skill gaps and whether the skill produced by the Vocational Training Providers conform to the requirements and demands of the Manufacturing and Engineering Service Industries in Sri Lanka and identify skill gaps in each of the said occupational areas.
- To identify the emerging skills required by the identified 3 sectors.
- To diagnose reasons for existing skill gaps

7 Research Design and Methodology

After reviewing the research objectives, following factors were considered in deciding a rigorous and pragmatic research approach.

The target group –Two target groups were considered for this study;

a. The first target group was senior managers /owners / Human Resource Managers of selected companies.
b. The second target group was the senior level officials in training institutes

Having unstructured conversations using research materials which has both open ended and close ended questions were identified as an important consideration when deciding on the research approach. Therefore, both Qualitative and Quantitative research methodologies and techniques were used in this study. Further, having a thorough knowledge on industry skill demand and supply trends was a significant part of the study and hence literature review via a desk research was conducted in this study. As a result, it was a mixed research approach applied for this study which consisted of a desk research, qualitative one to one discussions and quantitative face to face interviews.

Sample size of a study like this is a critical factor to be considered at the design stage. When deciding on the sample size 2 critical factors were considered;

1. While confidence level and margin of error are the factors deciding the sample size, allocated investment was also taken into consideration, but still ensured minimum sample requirement that should be covered in order to represent each industry.
2. The recommended sampling technique for the study was stratified random sampling to ensure representation of important strata such as Small, Medium, Large enterprises. However in the absence of the database of companies that were classified under these strata, purposive sampling technique was applied for this study, where the companies who had given approval to access data were included in this study. Nevertheless, the representation of strata was ensured.

Geographical coverage of the sample spread was guided by the manufacturing establishment distribution provided by the census and statistics department (manufacturing establishment registered with the ministry of industries and the state-owned industrial establishment). Accordingly, it assured that more than 60% industry related companies are concentrated in Western province. Therefore, the sample coverage was ensured from Western Province and other part of the country approximately 70:30 respectively.

Other than the above consideration it was identified that the most updated and industry accepted sources to be referred in the literature review stage.

7.1.1 Desk Research

The Desk research was executed at the prelude stage mainly to gather data and statistics regarding trends of selected 3 industries and its contribution to the country's Economic growth. The desk research was completed with the macro view of the country's Economic trends and significance of the role that should be played by Rubber & Plastic, Metal related and Engineering Services industries. Therefore, both unpublished and published policy documents and administrative reports, related recent newspaper articles were referred for the desk review. As one of the key objectives of the desk research was to gain an understanding of skill supply side trends in the country, most of the data sources referred were obtained from vocational training institutes. Additionally, below listed are the other data sources referred;

1. http://www.sme.lk/index.php/en/template
2. Ministry of Industry & Commerce
3. http://www.industry.gov.lk/web/index.php/en/reports/general-reports/news-latters.html
4. Department of Census and Statistics
5. Annual Reports of different companies in three selected sectors
6. Board of Investment (BOI) Sri Lanka
7. Sri Lanka Export Development Board
8. Rubber Development Department - https://www.rubberdev.gov.lk/rubber-sector/
9. International Standard Classification of Occupations - ISCO
10. Ministry of Science, Technology, Research, Skill Development & Vocational Training and Kandian Heritage ,
    National Youth Corps, National Youth Service Council 2017
11. Eurostat

Due to lack of published data with most updated trends in the industry, the researcher interviewed following institutes and authorities to fill data gaps;

1. Sri Lanka Bureau of Foreign Employment
2. The Plastic & Rubber Institute of Sri Lanka
3. NAITA – National Apprentice and Industry Training Authority
4. DTET – Department of technical and Education Training
5. VTA – Vocational Training Authority
6. NYSC – National Youth Service Council
7. Urban Council and Pradeshiya Sabha

7.1.2 Qualitative Research

Key Informant Interviews (KIIs) were conducted among seniors in following listed institutes at this phase. The objective of this phase was to gather skill gap measuring parameters and variables that should be quantified at the quantitative stage. Parameters including, the contribution of the industries to the country development and economy, occupation categories that exist in the three industries currently and their importance level to the industries, emerging skilled occupation categories that they perceive to be which are critical to meet future industry requirements, industry experts and training providers perspectives on issues faced by the three selected industries with regard to skilled and unskilled employees. Other than that these discussions were helpful to understand some of the very relevant data sources that should be approached by the researcher to enhance the desk review and the sample frame of the quantitative phase of the study.

Accordingly, senior level officials from the following industry related bodies and training institutes were interviewed under this stage;

1. The Ministry of Industrial and Commerce
2. The Plastic & Rubber Institute of Sri Lanka
3. IESL – Institution of Engineers Sri Lanka
4. IIESL – Institute of Incorporated Engineers of Sri Lanka
5. Foundry Development and Services Institute
6. University of Moratuwa
7. NAITA – National Apprentice and Industry Training Authority
8. Ceylon Electricity Board Training Centre-Piliyandala
9. DTET – Department of Technical and Education Training
10. VTA – Vocational Training Authority
11. NYSC – National Youth Services Council
12. TVEC – Tertiary Vocational Education Commission

7.1.3 Quantitative Research

The main objective of quantitative study was to quantify the skill gap in the three selected industries. Therefore, employers of Rubber & Plastic, Metal related and Engineering Services were covered in this study. Human Resource Managers, Managers or Company Owners from the selected employers or companies were interviewed.

The sample coverage during the quantitative phase is 252 companies including 62 Rubber and Plastic Sector companies, 61 from the Engineering services and 129 Metal related industries.

Majority of the companies classified under the selected three industries are located in the BOI zones namely, Biyagama, Homagama, Kalutara, Ekkala, Galigamuwa, and Kundasala and hence it was covered.

A semi-structured questionnaire developed using the results of desk review and qualitative phase as a quantitative data collection tool. To validate the research tool, 13 companies were interviewed in a **pilot phase** before commencement of the main interview phase of the study. The findings of the pilot interviews were analyzed and discussed with MESSCO and preceded with the main phase. Required amendments to the research tool were incorporated for the main data collection phase.

The interviews were conducted in the most convenient language to the respondent; hence the research material was prepared in relevant languages. Experienced senior level researchers conducted interviews, to enable capturing any emerging topics that are relevant to this research at the discussion stage. As a result, other than the quantitative data that was covered, there were many vital qualitative data which was captured under this phase.

To make the interview process productive, the approval letters that was provided by MESSCO was used in order to get access to data and for interviews with companies.

As two key quality control measures, the business cards of the companies were collected by the researcher wherever it was available and there was a call back process to approve the authenticity of the final interviews before it was taken for data processing. At the data processing stage, logic checks were executed before data was taken for analysis. The analysis was carried out using the Statistical Package for Social Science (SPSS). Main data analysis variables considered for the study were;

1. Overall Manufacturing and Engineering Service sector level
2. By each industry level - Rubber and Plastic industry, Metal related industry and Engineering service sector.
3. The scale of the companies within industries –Micro & small, medium and large scale companies.

8 Study Limitations

The research intended to represent Rubber & Plastic, Metal related industries and Engineering Service in the country to assess the research objectives. To provide a picture that can be generalized to each sector, it is vital to ensure a right research design for the study. While a mixed approach was used as the research design in this study collecting and analyzing both secondary and primary data, following factors should be considered when making inferences from the findings of this study.

The data collected by the Ministry of Industry and Commerce, Pradeshiya Saba and Municipal Councils the universe of Small, Medium, Large Manufacturing companies into Rubber & Plastic (excluding companies involved in Rubber Tapping) having estimated to 507 total in numbers in the country. The number of companies into Metal related industry is estimated at approx. 2,421 companies and 1,589 for Engineering Service. These estimated universe sizes were accepted by MESSCO. Accordingly, 252 sample that was covered to represent all three industries confirms statistical validity at 95% confidence level and 6% Margin of Error (MoE). This means when deriving findings at an overall level from this study, there'll be +/- 6% error level that should be considered.

Considering the estimated universe, 62 Rubber and Plastic companies were selected to represent the industry which assures 12.5% MoE at 95% confidence level, 130 companies to represent Metal related industry that is at 8.3% MoE and 61 companies to represent Engineering Services at 12.4% MoE.

Therefore, when making recommendations under each industry level, the above mentioned error margins should be taken into consideration.

It was planned to apply stratified random method to ensure representative coverage of micro, small, medium, large scale companies in each industry. Due to unavailability of the universe size by these stratums, purposive sampling was applied to select the sample. Further, some of the selected companies did not allow access data or for interviews, hence companies who were willing to contribute for the study with adequate data and time for the interview was covered in the sample. Therefore, the study findings will be limited to make directional conclusions. In order to make precise conclusions with regard to the entire industry based on this study's findings, industry experts' consultation will be required.

Representation of micro, small, medium and large scale companies were covered in the sample to make the overall industry level inferences. In consultation with MESSCO, this study covered small, medium and large scale of Rubber and Plastic industry and Engineering Services and micro, small, medium and large of Metal related industries.

Lack of secondary data to assess the universe size of micro, small, medium, and large scale companies of the industry was a challenge. Therefore, the sample breakdown by these strata was done purposively and hence proportionate to population representation was not assured in the study. This is considered as a limitation of the study when extrapolating the findings in to the universe at the analysis stage.

Access to large scale companies was a challenge due to the tedious processes and confidentiality aspects. Since such large scale companies represent a substantial proportion of the said industries, not having their insights/inputs as part of the study was a significant barrier to represent the vital segment under each industry. Despite the proactive participation of companies who contributed to this study, the access was limited to the data required for analysis to precisely conclude some of the vital findings expected from this study. For an example specific occupation level skill requirement data was not revealed by some companies due to internal policies and confidentiality.

Although, Engineering service sector should ideally be represented by electrical, electronics and telecommunication sector companies, due to difficulty in obtaining approvals from hierarchies to access data, none of the telecommunication companies approached were covered in this study.

While skill requirement for industries are supplied by private sector institutes, government sector institutes and NGOs as well, skill supply has been measured in this study considering the database of student number completed their related courses at NAITA, DTET, VTA, MPMA, NIBM, SLIOP, UC, NYC, Sri Lanka Institute of Textile & Apparel, Ocean University of Sri Lanka, NYSC, UoVT – Ratmalana as of TVEC. Other than these sources, skill supply estimates gathered via interviews from the three forces and CEB training Centre was also used for skill gap estimation. The supply estimates gathered from interviews is considered as a limitation due to unavailability of supportive documents to confirm the estimate for its error level.

The study was conducted from May to August 2019 time period which was immediately after the Easter Sunday attack. This was a commercially sensitive time period for businesses and hence businesses confidence was very low. The growth plans and any future hiring requirements or most importantly emerging skill requirements was not very clear due to the uncertainty they operated in. Although, they probably had growth plans and had identified emerging skills internally, the majority of them were reluctant to reveal at the interviews. This was a barrier for the researcher to identify and diagnose future skill requirements and emerging skills for industries, hence limited analysis on future trends.

As per IIP Index, it was estimated a YoY de-growth of -16.5% and -15% for Rubber and plastic industry and Metal related industry in Q3 2019 and a growth of 18.8% for Engineering service sector. However, these growth figures describe the growth or de-growth of company revenue and hence directly applying to calculate future trends or skill requirements or gaps will not provide accurate estimation. Further, due to vastly fluctuating political and economic condition would impact changes in requirement in the industry and hence, it is challenging to make any forecasting based on this study.

Limited investment available for this research also played a role in constraining some of the areas of data collection and analysis.

9 Characteristics of the sample

The definition of micro, small, medium and large scale companies used for this study was borrowed from Asia Development Bank definitions. Accordingly, the companies with 200 or more employees were defined as large scale, companies with 26 to 199 employees were categorized as medium scale, companies with 5- 25 employees were defined as small scale and companies with less than 5 employees were defined as micro scale. Except for metal related industries where all four segments of businesses were covered, MESSCO decided to cover only small, medium and large scale companies under Rubber & Plastic industry and Engineering services.

To represent **Rubber & Plastic industry**, 11 large scale, 28 medium scale and 23 small scale companies were considered. Therefore, the total sample of 62 companies were covered under the Rubber & Plastic sector (Refer table 1).

The nature of business activities of these companies are mainly into manufacturing, export, refilling, recycling and packaging.

The 11 large scale companies had a total of 10,614 employees. Out of these 11 companies, 3 companies seem to have been 60 to 70 years in operation, 3 companies had 30 to 60 years in operation, 3 companies had 10 - 30 years in operation. There was one company which has been in the industry for less than 10 years.

Number of medium scale companies covered in the sample was 28 which counted to 1,492 employees currently. Number of years in operation of these companies varied from 40 to 50 years. There were 23 small scale companies with 327 employees in total. These small scale companies consist of establishments that have been in operation for one to two years as well as for 80-90 years.

The **Metal Industry** was represented by 10 large scale companies with a total of 5,353 employees, 30 medium sized firms with 1,734 employees and 43 small scale companies and 46 micro scale companies, with a total of 595 in cadre.

The large scale firms have been in operation ranging from 14 to 45 years whilst the medium scale firms are as new as 1 year and as old as 67 years. The micro and small companies covered consisted of 2 months old companies as well as 70 years old companies.

The nature of business activities of these companies are mainly into manufacturing and maintenance of metal related products.

To represent **Engineering Service sector**, 15 large scale companies, 18 medium scales and 28 small scale companies were considered which created a total sample of 61 companies under the Engineering service sector.

The nature of business activities of these companies are mainly into assembling and maintenance of machineries.

The 15 large scale companies had a total of 54,168 employees. Out of this, one had more than 25,000 employees, 6 of them were 1,000-8,000 and the rest was less than 1,000 employees. All large scale companies were 19+ years in operation, including one which has been in operation for over 140 years. The 18 medium scale companies had 957 employees in total ranging from 3 to 43 years in function. The small scale firms have 233 employees in total ranging from 3 to 21 mostly and there were two with just 1 employee. There were small scale firms as new as just one year and as old as 43 years as well.

Table 1: Sample composition

Industries	**Nature of activities**	**Scales**	**Number of companies covered in the sample**	**Total number of employees in the cadre**
Rubber and Plastic industry	Manufacturing, export, refilling and recycling and into packaging.	Small	23	327
		Medium	28	1492
		Large	11	10,614
Metal related industry	Manufacturing and maintenance of metal related products.	Micro	46	595
		Small	43	
		Medium	30	1734
		Large	10	5353
Engineering Service sector	Assembling and maintenance of machineries	Small	28	233
		Medium	18	957
		Large	15	54168
All industries		**Micro**	**140**	**1155**
		Small		
		Medium	**76**	**4183**
		Large	**36**	**70,135**
Total number of employees in the sample				**75,473**

10 Study Findings

10.1 Skill supply situation

The below table presents the total passed out student number in 2018 from both public and private sector training institutes as per data collected from the Tertiary & Vocational Education Commission (TVEC).

Table 2: Skills supply from TVEC

ISCO CODE	Types of courses	Total number of students completed the course and passed out in 2018
7239	Mechanic (Refrigeration & Air Condition Mechanic)	911
7136	Electrician	3514
7212	Welders	1806
7127	Refrigeration & Air Condition Mechanic	1567
7213[2]	Aluminium Fabricator	1375
3113	Electrical Engineering	581
3114	Electronic Appliances Technician	476
NA[3]	Electric Motor Winder	332
7239	Fitters	302
7411	Electrical /Electronic /Household Equipment/Mobile Phone Repairer	238
NA	Mechatronics	73
7127	Other A/C related Courses	82
7213[4]	Metal Fabricator	52
7223	Lathe Machine Operator	20
8219	Rubber & Plastic Production Assistant	30
8219	Gas and Reinforce Plastic Moulder	3
NA	Field Officer Rubber	4
	Total 2018	**11,366**

Source: TVEC

According to the above table 2, a total of 11,366 students complete above mentioned courses and become potential talent that can be recruited to the industry.

[2] ISCO code given for steal metal workers was used
[3] NA=Not available - ISCO code for this occupation category was not found
[4] ISCO code given for steal metal workers was used

Based on the data presented above, the least number of courses can be found related to Rubber and plastic industry and very less number of students passed out annually from those courses. On the other hand, many students passed out as Electricians followed by Welders and Refrigeration & Air Condition Mechanic. Around 1375 of Aluminum fabricators have completed their respective training courses in 2018.

In addition, from the statistics collected through TVEC, it was identified from the interviews with related industry and sector experts, there are around 3,200 personnel getting trained by the three forces and approximately a batch of 2,500 is trained by Ceylon Electricity Board (CEB) training centre in a year. In total about 5,700 would be added to the above estimated skill supply to arrive at the total annual supply accordingly. Therefore, the total estimated supply is counted to be 17,066 per annum (refer Table 3).

Table 3: Total estimated skill supply

Supply from TVEC in 2018[5]	11,366
Trained number from the three forces[6]	3200
Trained by CEB training center[7]	2500
Total estimation of supply	**17,066**

10.2 Skill demand situation

The total number of employees employed by all 252 companies covered in this study under Rubber and Plastic, Metal related industries and Engineering services is 75,473 (refer Table 1). The total number of employees consists of following major occupational groups;

1 Managers

2 Professionals

3 Technical and Associate Professional

4 Clerk & Clerical support workers

5 Service and sales workers

6 Skilled workers

7 Craft and related trade workers

8 Plant, and machine operators, and Assemblers

9 Elementary occupations

The above presented occupational groups 6,7 & 8 were considered as skilled worker categories for the demand estimation in this study. The definition of skilled worker occupation (major categories) are presented in the below table (refer table 4) and refer annexure for definitions of all the above stated

[5] Source: TVEC Database
[6] Source: Key Informant Interviews at Three Forces
[7] Source: Key Informant Interviews at CEB

major occupational categories. The definitions of these occupations have been defined by the Central Bank of Sri Lanka.

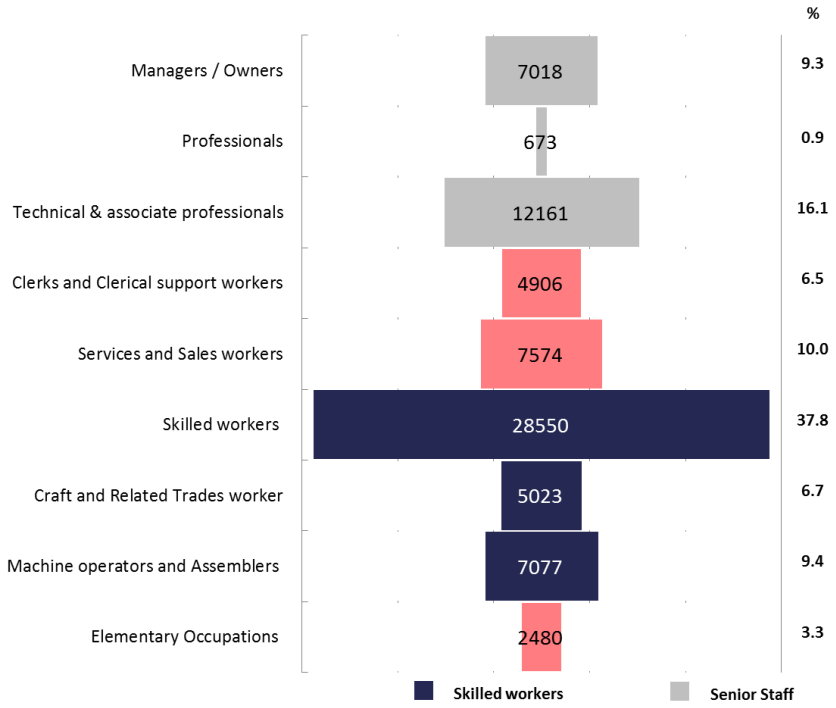
Table 4: Major occupation category definitions

OCCUPATIONS	DESCRIPTION
Skilled workers	This group includes occupations that require skill at least secondary education or equivalent critical skill and knowledge in the industry
Craft and Related Trade worker	This group applies their skill in the fields of mining and construction, making or repairing machinery, printing, processed food, textiles, or articles including handicrafts goods which involve the performance of complex physical duties that normally involve initiative, manual dexterity and other practical skill. Most of these occupations, such as builders, bricklayers, plumbers, or electronic mechanics require a substantial period of training
Machine operators and Assemblers (Production Workers)	This group operates and monitors industrial machinery and equipment, drives and operates motor vehicles and mobile machinery, or assembles products. Most occupations have not a standard of education but will usually have formal experience related training

Source: Central Bank of Sri Lanka

Within the 252 companies interviewed in this study, the total existing staff strength of skilled worker category is 40,650, which is 50.6% from the total cadre in the selected three industries (refer Figure 3).

Figure 3: The total employee breakdown of major occupation categories within the sample of 252 companies



However, the 252 companies interviewed claimed that they need 46,960 skilled workers in total to execute current workload. As a result, there is a shortage of 6,310 skilled worker occupation categories

in Rubber & Plastic, Metal and Engineering Service sector, which is 15.5% of the current skilled worker cadre (6310/40,650*100=15.5%).

The skilled worker occupation category staff required for the next two years' by the sample selected was estimated to be around 9864, which is 24.3% from the current cadre (9,864/40,650*100=24.3%). When calculating this skill requirement for one year, it would be 4,932 (refer Table 5). The demand estimation has been done including the skill requirement stated by 3 forces and CEB as well.

Table 5: Skilled worker occupation category current and future requirement analysis within the sample

Description	**Total staff size in 252 companies**	**Contribution from current cadre**
Skilled worker occupation category staff - current	40,650	100%
Skilled worker occupation category staff – required	46,960	115.5%
Additional required skilled worker occupation category	6,310	15.5%
The required additional skilled worker occupation category cadre for the next two years	9,864	24.3%
Estimated future requirement for one year	4932 (9,864/2 years)	12.1%

10.2.1 Analyzing the required skilled worker category staff by occupation

As discussed in table 5 above, companies in the sample had requested a total of 9,864 skilled workers for the next two years. This requested staff quantity has been broken down to specific occupations in table 7 below based on the data collected from the survey.

Accordingly, majority (56%) of the total cadre requirement is for Mechanical and maintenance engineering technicians. This amounts to 5,159 in numbers and the second highest demanded occupation category is welders and flame cutters followed by Electrical engineering technicians.

Table 6: Skilled worker requirement for the next two years by occupation types

Code	Occupation	Count	%
3115	Mechanical and maintenance engineering technicians	5159	56.4
7212	Welders and Flame Cutters	860	9.4
3113	Electrical engineering technicians	711	7.8
7127	Refrigeration and air conditioning technician	394	4.3
7213	Aluminum Fabricators	350	3.8
8231	Tyre making and vulcanizing machine operators	182	2.0
7213	Metal Fabricators	177	1.9
7223	Machine Operators / Lathe Machine Operators	130	1.4
7412	Electrical Mechanics and Fitters	112	1.2
	Factory Worker - Rubber	72	0.8
	Wires and cables related machine operators	52	0.6
8141	Latex product operation	49	0.5
8122	Casting machine operator	49	0.5
	Mechatronic Technicians	48	0.5
	Factory Worker - Plastic	45	0.5
7213	Sheet Metal Workers	41	0.4
7411	Building and Related Electricians	39	0.4
8142	Plastics Extrusion	35	0.4
8142	Plastic bottle /cup blowing machine operator	34	0.4
8142	Calendar machine operation	31	0.3
	Marine engineering technician	30	0.3
8141	Rubber press operator	29	0.3
	Multi Skilled worker	29	0.3
3135	Quality Controllers	28	0.3
8151	Rubber Mixing	24	0.3
7242	Electronic fitter	24	0.3
8122	Rolling & Wire Rods machine operators	24	0.3
7412	Electronics Mechanics and Servicers	23	0.3
8121	Metal Processing Plant Operators	23	0.3
8212	Electrical and Electronic Equipment Assemblers	22	0.2
7241	Electrical instrument fitters	21	0.2
7223	Lathe Machine Operators	21	0.2
3131	Power Production Plant Operators	20	0.2
7126	Plumbers	19	0.2
8141	Rubber milling machine operator	18	0.2
3115	Mechanical engineering technicians	17	0.2
8219	Rubber products assembler	16	0.2
7223	Boring machine operator	16	0.2
7131	Painters	16	0.2
7245	Electronic instrument fitters	14	0.2
7223	Latheman	13	0.1
8122	Metal Finishing Plant Operators	12	0.1
8122	Metal finishing and Coating machine operators	11	0.1
	Moulders	11	0.1
	Wheels/ Rims machine operators	10	0.1
3135	Process Controllers	10	0.1
7224	Knife sharpener	10	0.1
	Tinker / Fitter	9	0.1
8142	Plastic molders	8	0.1
8142	Casting /polishing / button related machines operator	6	0.1
8142	Machine operator - PVC	6	0.1
8141	Rubber Extrusion	6	0.1
	Quality checker	6	0.1
8141	Rubber molder	5	0.1
8142	Plastic cable making machine operator	5	0.1
3114	Electrical & Telecommunication Riggers	5	0.1
	Others	15	0.2

Note: This is the requirement for the next two years by the surveyed sample. In order to arrive at one year requirement, research would divide this by two

10.3 Current and next year skill demand for the industry – overall

In estimating the total required skilled worker occupation category employees for the universe of the three industries, it was estimated that there are 507, 2420 and 1589 total number of companies in Rubber and plastic industry, Metal related industry and Engineering service sector respectively. Extrapolating[9] the above estimated number of employees required for skilled worker occupation categories to the universe, approximately 42,362 skill requirement was identified at an overall level. Further, there is a gap identified for the current year, which is estimated to be 47,896 (refer Table 7).

Table 7: Skilled worker occupation category current and future requirement analysis – for the requirement within the country

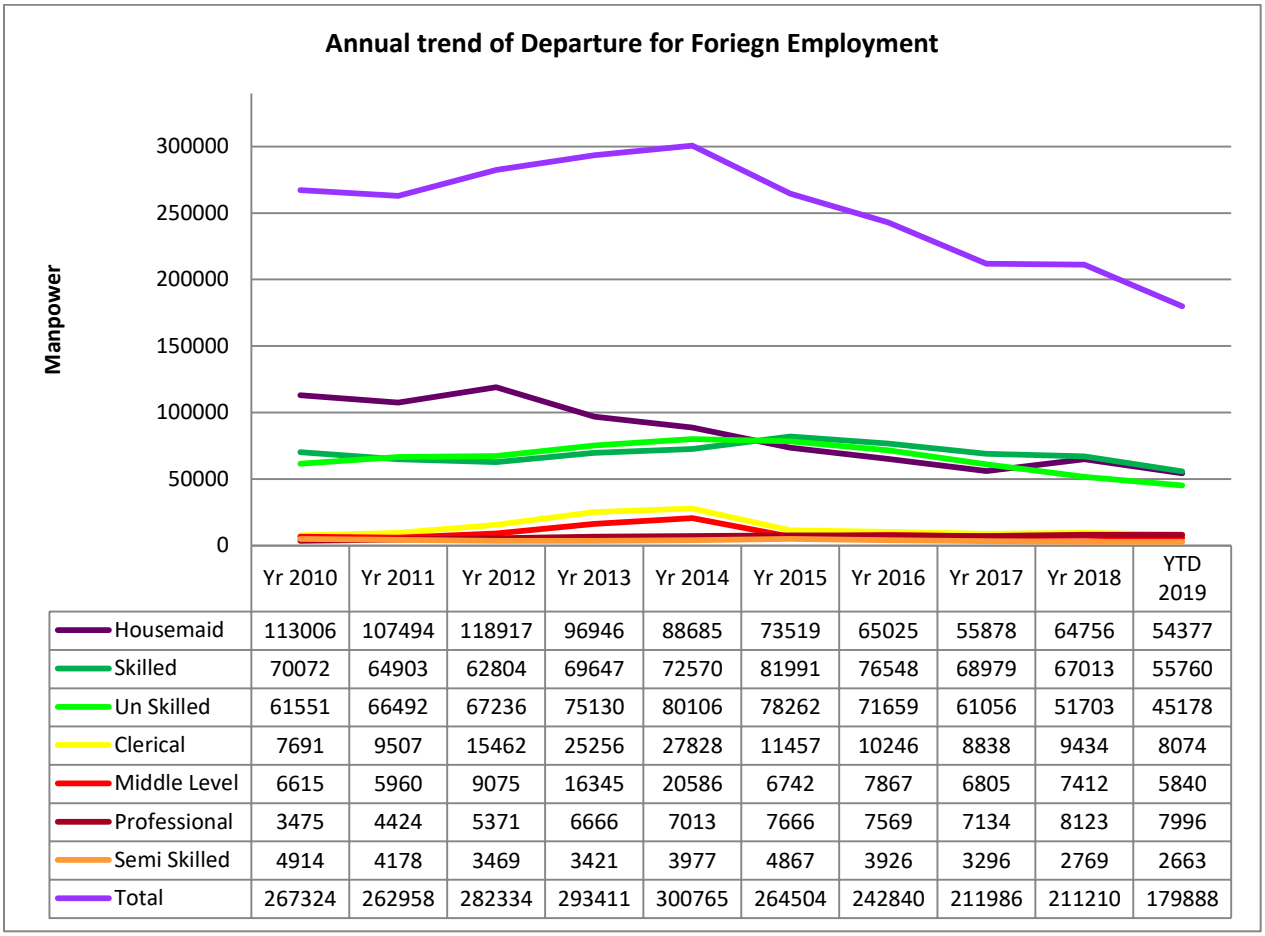
Raw	Formulas applied for calculation		Related base	Rubber & Plastic industry		Metal related industry			Engineering Service sector			Total skill demand for the industry (Estimated for the universe)
				Large & Medium	Small	**Large scale**	**Medium scale**	**Micro & Small scale**	**Large scale**	**Medium scale**	**Small scale**	
R1		Number of companies	sample	39	23	10	30	89	15	18	28	252
R2		Total staff	sample	15575	331	4634	1874	521	55951	1235	241	80362
R3		Current skilled worker occupation category staff	sample	8561	191	2818	749	326	27597	312	96	40650
R4		Required skilled worker occupation category staff to optimize the operation	sample	9371	359	2989	835	483	32381	426	116	46960
R5	R3-R4	**Current shortage of skilled worker occupation category staff**	sample	810	168	171	86	157	4784	114	20	6310
R6		Skilled worker occupation category staff requirement for next 2 years	sample	794	84	379	355	337	7524	280	111	9864
R7	R6/2	**Skilled worker occupation category staff requirement for next 1 year**	sample	397	42	190	178	169	3762	140	55.5	4932
R8		Estimated number of companies in the universe[8]	Universe	243	264	169	823	1428	95	318	1176	4516
R9	R7/R1*R8	**Skilled worker occupation category staff requirement for next 1 year**	Universe	2474	482	3203	4869	2704	23826	2473	2331	42362
R10	R5/R1*R8	**Currently faced shortage of skilled worker occupation category staff**	Universe	5047	1928	2890	2359	2519	30299	2014	840	47896

[8] Source: Desk research and expert interviews

[9] Estimation were carried out at different scale level of companies and accumulated to arrive at the overall number considering the different staff size need for small, medium and large scale companies.

As per the available data of the Sri Lanka Bureau of Foreign Employment, annual departure for foreign employment for different jobs and occupation categories is approximately 55,760 in YTD 2019. However, starting from 2015, it is showing a sharp decline and has reached lowest in the year 2019. The same trend can be found with regard to the departure statistics of un-skilled workers as well. As the biggest three departure categories for foreign employment are housemaids, skilled and unskilled segments and they are showing a declining trend, that has created a reduction in departure trend at an overall level (refer Figure 4).

Figure 4: Total departure for foreign employment



	Yr 2010	Yr 2011	Yr 2012	Yr 2013	Yr 2014	Yr 2015	Yr 2016	Yr 2017	Yr 2018	YTD 2019
Housemaid	113006	107494	118917	96946	88685	73519	65025	55878	64756	54377
Skilled	70072	64903	62804	69647	72570	81991	76548	68979	67013	55760
Un Skilled	61551	66492	67236	75130	80106	78262	71659	61056	51703	45178
Clerical	7691	9507	15462	25256	27828	11457	10246	8838	9434	8074
Middle Level	6615	5960	9075	16345	20586	6742	7867	6805	7412	5840
Professional	3475	4424	5371	6666	7013	7666	7569	7134	8123	7996
Semi Skilled	4914	4178	3469	3421	3977	4867	3926	3296	2769	2663
Total	267324	262958	282334	293411	300765	264504	242840	211986	211210	179888

Around 33% had departed for occupations that are related to Rubber and Plastic, Metal related and Engineering Services out of the total departed for skilled category in the year 2010. This has reduced continuously till 2014 and has increased slightly in the year 2015 following a slow drop again till 2019.

After a closer look of data updated for the year 2019 (updated till September), current skilled cadre requirement to meet the demand for foreign skilled employment is 55,760. If the current reducing trend of departure of skilled category employees continues for the next couple of years, it will be less than 55,000 skilled category cadre requirements in total would exist. Further, around 9,598 (refer Table 8) of employees would be required for related occupation categories if 2019 trend continues. However, if the new regime implements any policies to encourage local manufacturing sector and SME category, this trend would change. On the other hand, if any new policies facilitate for a growth like it was in 2015

(ever highest), the requirement of skilled employee for departure in total would be more than 80,000 per annum.

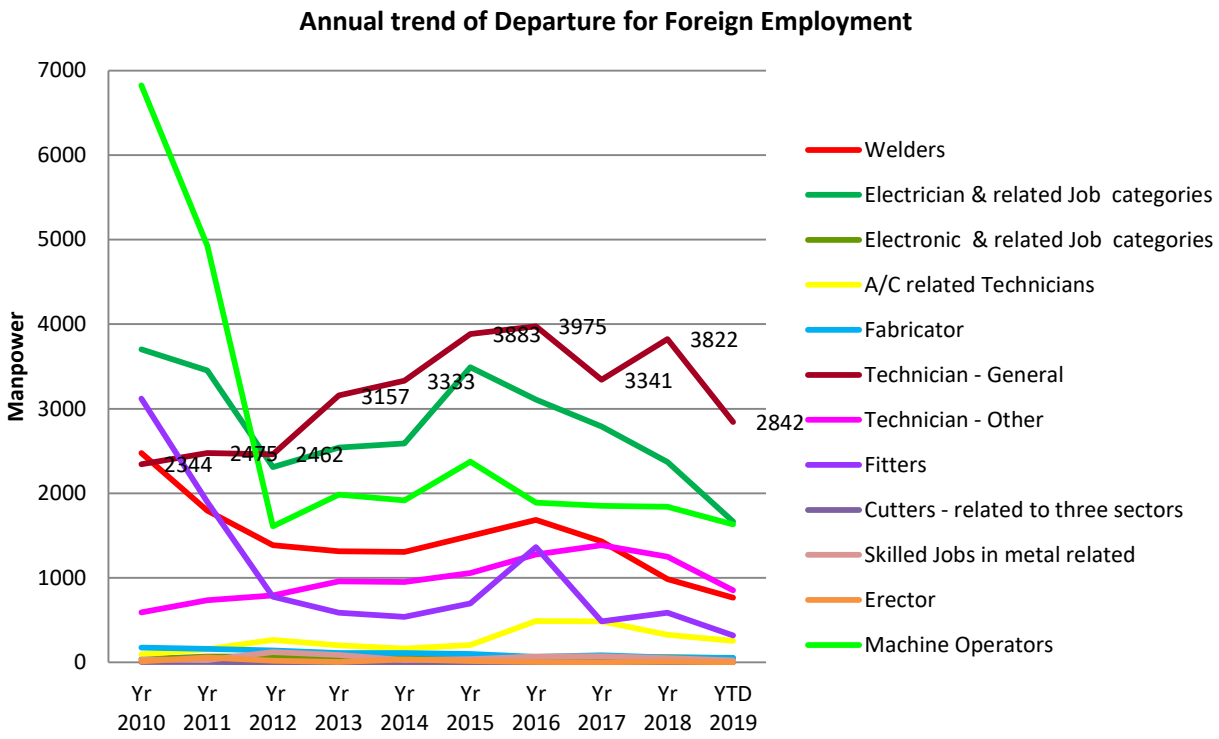
Table 8: Proportion of departure for related categories from total departure for skilled category

	Yr. 2010	Yr. 2011	Yr. 2012	Yr. 2013	Yr. 2014	Yr. 2015	Yr. 2016	Yr. 2017	Yr. 2018	YTD 2019
Skilled category total departure	70072	64903	62804	69647	72570	81991	76548	68979	67013	55760
Related occupation total departure	23179	18378	12048	13269	13406	16322	16454	14209	12978	9598
Percentage of departure for related occupations from total departure for skilled category	**33%**	**28%**	**19%**	**19%**	**18%**	**20%**	**21%**	**21%**	**19%**	**17%**

According to the Figure 2, most demanded occupation category is Technician – General followed by Electrician, Electronic related job categories. There is a diminishing trend of departure for these categories starting from 2015 whereas the departure for A/C related technician in engineering services is showing as an attractive job category for foreign employment.

Below Figure 2 further presents that average 3,200 Technician- General are departed for foreign employment. This indicates that the total requirement for the highest demanded skilled job occupation which is technician would be around 5,700 (Technician – General, Technician – Other and AC related Technicians). Although, it is not very clear that the total supply of technician job category currently from the supply side data analysis, it implies that there is considerable gap from supply side in order to meet the demand for companies in Sri Lanka as well to meet the foreign employment opportunities for this job category. The same picture can be seen for the next two highest departed skilled categories; Electrician & related job categories and Electronic & related job categories.

Figure 5: Annual Trend of Departure for Foreign Employment



10.4 Overall Skill gap analysis

According to the above chapter, the total supply and demand of skilled worker category is summarized in the below table. As it presents skilled worker occupation category gap for the next year would be 31,254+ in the industry at an overall level.

Table 9: Skill gap –estimated for the total industry

R9 extracted from in table 7	Total estimated skilled worker category staff required for next year	42,362
	Total departure estimates per year	10,000
	Total demand	52,362
	Total supply	17,066
	Total gap per year (Demand - supply)	**35,296**

10.5 Rubber and plastic industry skills gap analysis

Having done the skill gap analysis within the completed sample of the survey (refer annexure), this section would be discussing an estimate of skilled employee gap for the Rubber & Plastic Industry in the country. The findings explained in this section should be read after considering a Margin of Error of 12.5% or more due to low sample size. Steps followed in arriving at the universe level skill gap size are explained in the annexure.

As a result of secondary data collected about the universe size for Rubber and Plastic industry in Sri Lanka, it was found that the universe size of Rubber and Plastic Industry companies of more than 5 employees (defined as small, medium and large scale companies), are 507 in total[10]. As per the Index of Industrial Production by Department of Census and Statistic bulletin-annual updates, IIP index has shown a year on year de-growth of -16.5% performance of Rubber and Plastic Industry in Sri Lanka in the latest year ended by Q3 2019. Therefore, it will be assumed that there won't be many added to the total skilled cadre in the industry in the coming years and hence 2016 data was used as the most updated available universe size. Further, the total universe is segregated to Large and Medium to 243 and small-scale companies of 264 as the Annual Industry Survey 2016. Taking this universe in to calculation, it was estimated that there will be a requirement of approximately 2,956 for the industry whereas 6975 skilled employee cadre requirements to fulfill the current requirement.

[10] Annual Industrial Survey 2016

Table 10: Current & Future Skilled Employee Requirement – Rubber & Plastic Industry

Raw	Calculation		Related base	Rubber & Plastic industry		Total skill demand for the industry (Estimated for the universe)
				Large & Medium	Small	
R1		Number of companies	in the sample	39	23	62
R2		Total staff in the surveyed sample	in the sample	12106	327	12433
R3		Current skilled worker occupation category staff	in the sample	8561	191	8752
R4		Required skilled worker occupation category staff to optimize the operation	in the sample	9371	359	9730
R5	R3-R4	**Currently faced shortage of skilled worker occupation category staff**	in the sample	810	168	978
R6		**Skilled worker occupation category staff requirement for next 2 years**	in the sample	794	84	878
R7	R6/2	**Skilled worker occupation category staff requirement for next 1 year**	in the sample	397	42	439
R8		Number of companies in the universe	in the universe	243	264	507
R9	R7/R1*R8	**Skilled worker occupation category staff requirement for next 1 year**	in the universe	2474	482	2956
R10	R5/R1*R8	**Currently faced shortage of skilled worker occupation category staff**	in the universe	5047	1928	6975

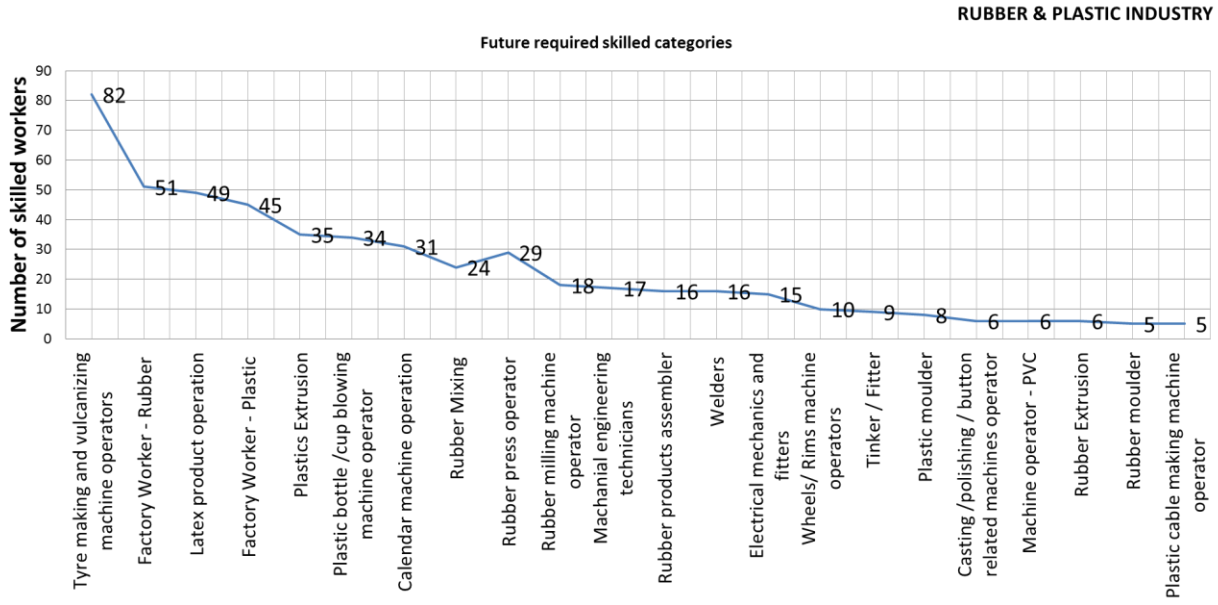
As per the Tertiary & Vocational Education Commission (TVEC) student course completed database from both public and private training institutes in 2018, it was highlighted that only 37 students complete courses with regard to 'Rubber & Plastic Production Assistant', 'Gas and Reinforce Plastic Moulder' and 'Field Officer Rubber'. Given the negligence number of supply to the industry currently, the annual skilled employee requirement should be considered as the total skill gap for Rubber and plastic industry.

Table 11: Skill gap –estimated for Rubber & Plastic industry

R9 extracted from in table 7	Total estimated skilled worker category staff required for next year	2,956
	Total departure estimates per year	-
	Total demand	2,956
	Total supply	37
	Total gap per year (Demand - supply)	**2,919**

Among the skilled job categories required for the future by Rubber and plastic industry related companies interviewed in this study has indicted that the highest demanded job category are "Tyre making and vulcanizing machine operators" followed by "Factory worker – Rubber", "Latex Product Operator", "Factory worker – Plastic", "Plastic Extrusion" and "Plastic Bottle/cup blowing machine operators" and other skill job occupations are listed in the below figure in order of demand.

Figure 6: Future required skilled category worker analysis



Note: The above figure present the data gathered from the survey sample. This chart shows the trend of highest to least demanded job occupation related to the category. This data cannot be estimated for the universe due to lack of number of companies in the universe who would need these specific occupations

10.6 Metal related industry skills gap analysis

Having done the skill gap analysis within the completed sample of the survey (refer annexure), this section would be discussing an estimate of skilled employee gap for the Metal related Industry in the country. The findings explained in this section should be read after considering a Margin of Error of 8-9% due to the low sample size covered in the study. Considering different business sizes and growth plans that large, medium and micro & small-scale companies would have, the total estimation was carried out at each scaled company level and accumulated to arrive at the total industry level gap.

It was found that the universe size of Metal related Industry companies (including micro & small, medium and large-scale companies), there are 2420 companies as per Annual Industrial Survey 2016. It was estimated that there are 1428 micro & small-scale companies, 823 medium scale companies and 169 large scale companies in the industry. Taking these universe sizes in to consideration, it was estimated that there will be a requirement of skilled employees for the next one year would be 10,776 in total where approximately 3,203 skilled employee requirements would be there with large companies, 4,869 skilled worker requirement for medium scale companies whereas 2,704 would be the demand from micro & small scale companies. Further, 7768 skilled employees' requirement exists immediate in order to fill the current requirement.

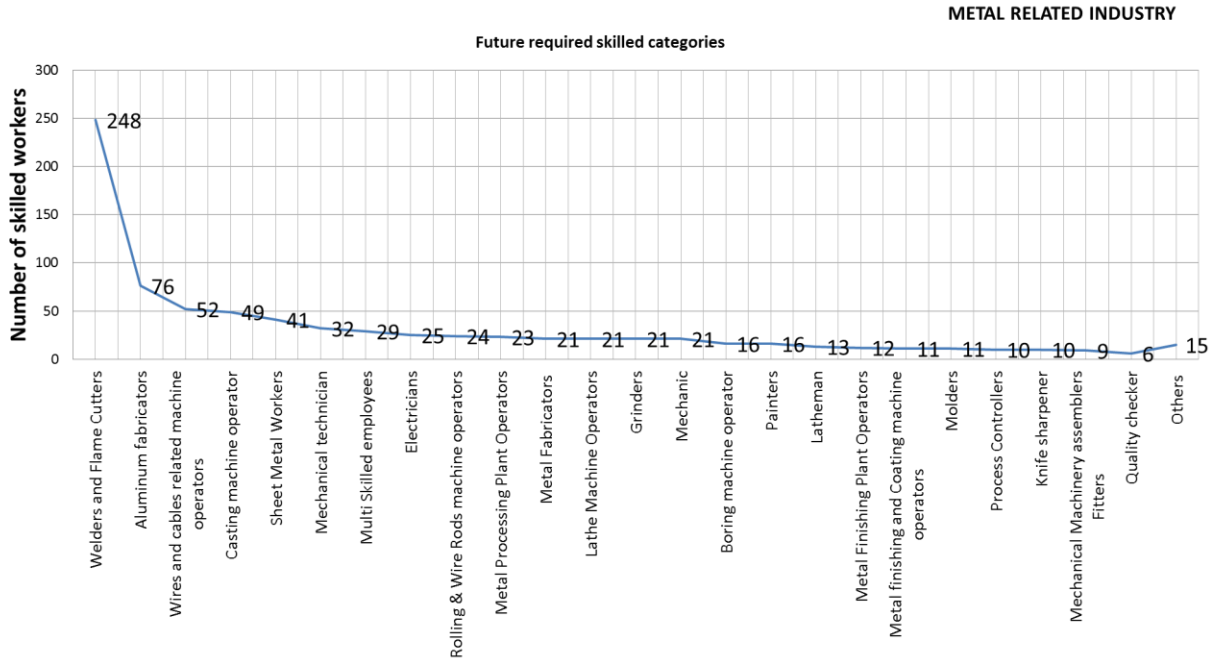
As per the Tertiary & Vocational Education Commission (TVEC) student course completed database, it is challenging to isolate supply side statistics for Metal related industry and Engineering service sector separately due to similar courses offered to cater both of these industries. Therefore, skilled employee gap analysis will be calculated for both Metal related industries and Engineering service sector.

Table 12: Current & Future Skilled Employee Requirement – Metal related Industry

Raw	Calculation		**Related base**	Metal related industry			**Total skill demand for the industry (Estimated for the universe)**
				Large scale	**Medium scale**	**Micro & Small scale**	
R1		Number of companies	in the sample	10	30	89	129
R2		Total staff in the surveyed sample	in the sample	5353	1734	595	7682
R3		Current skilled worker occupation category staff	in the sample	2818	749	326	3893
R4		Required skilled worker occupation category staff to optimize the operation	in the sample	2989	835	483	4307
R5	R3-R4	**Currently faced shortage of skilled worker occupation category staff**	in the sample	171	86	157	414
R6		**Skilled worker occupation category staff requirement for next 2 years**	in the sample	379	355	337	1071
R7	R6/2	**Skilled worker occupation category staff requirement for next 1 year**	in the sample	190	178	169	536
R8		Number of companies in the universe	in the universe	169	823	1428	2420
R9	R7/R1*R8	**Skilled worker occupation category staff requirement for next 1 year**	in the universe	3203	4869	2704	10776
R10	R5/R1*R8	**Currently faced shortage of skilled worker occupation category staff**	in the universe	2890	2359	2519	7768

The highest demanded job category in the industry is 'Welders and Flame Cutters'. Aluminum fabricators are the second in demanded as presented in the below figure.

Figure 7: Future required skilled category worker analysis



Note: The above figure present the data gathered from the survey sample. This chart shows the trend of highest to least demanded job occupation related to the category. This data cannot be estimated for the universe due to lack of number of companies in the universe who would need these specific occupations

10.7 Engineering service sector-skills gap analysis

Having done the skill gap analysis within the completed sample of the survey (refer annexure), this section would be discussing an estimate of skilled employee gap for the Engineering service sector in the country. The findings explained in this section should be read after considering a Margin of Error of 12.4% due to the low sample size covered in the study. Considering the different business sizes and growth plans that large, medium and micro & small scale companies would have, the total estimation was carried out at each scaled company level and accumulated to arrive at the total sector level gap.

As a result of secondary data collected on the universe size for Engineering service sector in Sri Lanka, it was found that the universe size (defined as small, medium and large scale companies), is 1589 companies as per Annual Industrial Survey 2016. The total universe is segregated to small, medium and large scale companies in the ratio of 74%, 20% and 6% respectively. Engineering service sector representation by small, medium and large scale was derived based on the data collected at the desk research from multiple sources and expert interviews in the industry. Accordingly, it was estimated that there are 1176 small scale companies, 318 medium scale companies and 95 large scale companies in the sector. Taking these universe sizes in to calculation, it was estimated that there will be a requirement of

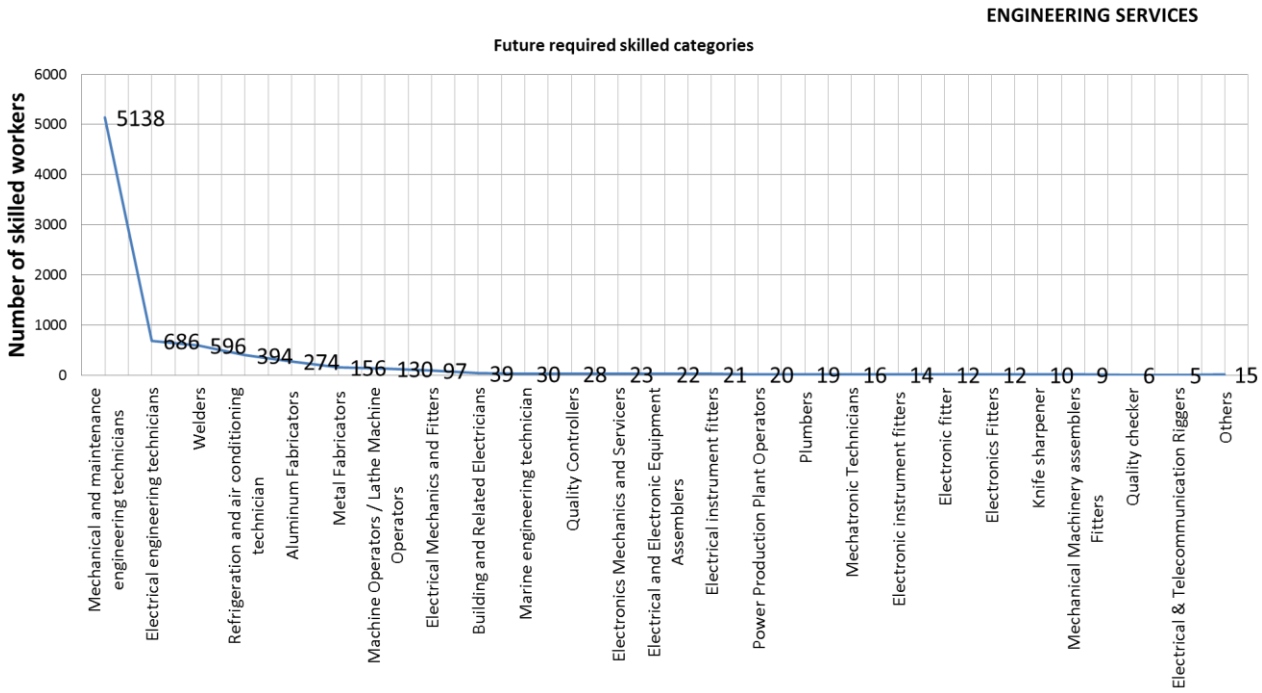
skilled employees for the next one year would be 28,630 in total where approximately 23,826 skilled employee requirements would be there with large companies, 2473 skilled worker requirement for medium scale companies whereas 2331 would be the demand from small scale companies. Further, there is a requirement of 33,153 currently in order to fulfill the current skilled employee requirement.

Table 13: Current & Future Skilled Employee Requirement – Engineering Service sector

Raw	Calculation		**Related base**	Engineering Service sector			**Total skill demand for the industry (Estimated for the universe)**
				Large scale	**Medium scale**	**Small scale**	
R1		Number of companies	in the sample	15	18	28	61
R2		Total staff in the surveyed sample	in the sample	54168	957	233	55358
R3		Current skilled worker occupation category staff	in the sample	27597	312	96	28005
R4		Required skilled worker occupation category staff to optimize the operation	in the sample	32381	426	116	32923
R5	R3-R4	**Currently faced shortage of skilled worker occupation category staff**	in the sample	4784	114	20	4918
R6		**Skilled worker occupation category staff requirement for next 2 years**	in the sample	7524	280	111	7915
R7	R6/2	**Skilled worker occupation category staff requirement for next 1 year**	in the sample	3762	140	55.5	3958
R8		Number of companies in the universe	in the universe	95	318	1176	1589
R9	R7/R1*R8	**Skilled worker occupation category staff requirement for next 1 year**	in the universe	23826	2473	2331	28630
R10	R5/R1*R8	**Currently faced shortage of skilled worker occupation category staff**	in the universe	30299	2014	840	33153

Among the skilled occupation categories required for the future by Engineering service sector related companies interviewed in this study has indicted that the highest demanded job category is 'Mechanical and maintenance engineering technicians. This counts to 5138 mechanical and maintenance engineering technicians are required to fulfill the requirement of next two years.

Figure 8: Future required skilled category worker analysis



Note: The above figure present the data gathered from the survey sample. This chart shows the trend of highest to least demanded job occupation related to the category. This data cannot be estimated for the universe due to lack of number of companies in the universe who would need these specific occupations

As per the Tertiary & Vocational Education Commission (TVEC) student course completed database from both public and private training institutes in 2018, it was highlighted that students complete courses with regard to 'Rubber & Plastic Production Assistant', 'Gas and Reinforce Plastic Moulder' and 'Field Officer Rubber'. Given the negligence number of supply to the industry currently, the annual skilled employee requirement should be considered as the total skill gap for Rubber and plastic industry.

Table 14: Skill gap –estimated for Metal Industry & Engineering Services Sector

R9 extracted from in table 7	Total estimated skilled worker category staff required for next year for Metal industry and Engineering service	39,406
	Total departure estimates per year	10,000
	Total demand	49,406
	Total supply	(17,029)
	Total gap per year (Demand - supply)	**32,377**

10.8 Emerging skills requirement

In a journey of making the country a hub in South Asia for Rubber and Plastic as well as for service sector, it is vital to understand and appreciate the emerging skill needs for these industries in the country. However, emerging skills are an area which is not reflected or thought through by most of the industrial companies as per the study findings. Most of the companies' focus is on managing and eliminating the current issues and challenges and elevating the performance of the firms due to economic and political instability and security concern that they were facing post Easter Sunday attack. Hence, it was found that their level of understanding on emerging skill needs were lacking or deprioritized amid many critical business concerns that they were experienced with.

As a result, this section focuses more on the unmet skills requirements of the three sectors currently, than of the emerging skills requirement. This is also identified as a limitation of the study, plus a vital gap that is witnessed in the industry.

KEY HIGHLIGHT:

The industries lack the futuristic view on the nature of skills required. Hence, "Emerging Skills" is an unknown or irrelevant notion for them. This situation is skewed by small and medium sector companies than the large scaled.

Emerging Occupations /New Occupation categories have not been identified by most companies in the Rubber and Plastic industry. The emerging skilled employee categories they identified are; 'Injection Moulding Machine Operators', 'Packers', 'Plastic Cutting', 'Industrial Engineering', UPVC /Aluminum Welders, 'Research & Development and Innovation'. As mentioned before, these are more onto currently lacking skills in the industry than emerging skills for the future.

Engineering Service sector identifies Skilled Workers with smart technology, Multi-skilled Craftsman, Lathe & Milling Machine Operators, 'CNC Machine Operators', Elevators, Electricians, Technicians, Welders and Macaronic Engineering as the emerging skills requirement in the sector. Like Rubber & Plastic these are not future skills requirement, but more of current lag on skills which are not prioritized now.

Metal related industry identifies Injection Moulding Machine Operators, Multi-skilled Craftsman, Pipe Fitters, Electricians, Steel Modification, Cutters and Welders, Lathe & Milling Machine Operators are the

emerging skilled category employees required which are challenging to source currently regardless of the low efforts and/or importance placed on sourcing the mentioned skilled category.

Out of the occupation categories highlighted as emerging needs by companies, there is no training courses offered targeting most of these occupations except, technician, electrician, welders, multi-skilled craftsman (refer Table 15)

Table 15: Emerging skill occupation categories and availability of courses from TVEC currently

Occupations identified as emerging	**Availability of courses**
Injection Moulding Machine Operators	There aren't supportive training courses currently in the country
Packers	
Plastic Cutting	
UPVC /Aluminium Welders	
CNC Machine Operators	
Elevators	
Macaronic Engineering	
Pipe Fitters	
Steel Modification	
Cutters	
Lathe & Milling Machine Operators	
Industrial Engineering	
Research & Development and Innovation	
Skilled Workers with smart technology	
Multi-skilled Craftsman	There are supportive training courses currently in the country
Welders	
Electricians	
Technicians	

10.9 Talents & Qualifications demanded by employers from skilled employees

To understand the talent and qualification requirement of skilled employees in the three industries and to foresee a career progression for them, it is vital to understand the minimum qualification requirement for unskilled and skilled occupation categories. This will reveal a gap or the seamless paths that are available out there for skilled category employees to progress in their career with the right prospects.

10.9.1 Rubber & Plastic Sector

When considering the minimum qualifications requirement for unskilled workers in the Rubber & Plastic industry, 62% of the companies stated that for managerial position it is mandatory that the candidate is a Graduate or more, whilst 18% mentioned Diploma or Vocational training with experience is important, followed by 10% requested knowledge and experience about Rubber & Plastic industry and A/L pass out. For professionals, being a graduate or more is minimum qualification expected by 94% of companies and the rest of them also mentioned knowhow and experience in the industry is required. Technical and Associate Professionals are expected to have a Diploma / Vocational Training (70%), knowledge and experience in Rubber & Plastic sector (15%), A/L pass outs (15%).

Clerk and clerical support staff are recruited based on A/L pass (65%), O/L with experience (10%), Diploma / Vocational training (14%), knowledge & experience (7%) and account related course (4%). The industry looks for service and sales staff with a minimum qualifications of A/L pass outs, (46%), 19% of them look for graduates of sales & marketing, and a good 9% expects Diploma/Vocational Training, knowledge and experience, experience in sales & marketing as well as O/L pass outs with experience.

Table 16: Minimum Qualification Requirement in Rubber & Plastic Industry for different occupations

	Studied up to Gr8	No need specific education level but need experience	Studied up to O/L	Experience +ability to work hard/operate machine	Passed O/L with experience	Vocational Training / NVQ 3 or 4	Experience in Sales & Marketing	Account related courses	Passed A/L with experience	Knowledge & Experience in related industry	Diploma & Vocational Training	Graduate & over
Managers									10%	10%	18%	62%
Professionals										6%		94%
Technical Associate								15%	15%	70%		
Clerk & Support					10%			4%	65%	7%	14%	
Service & Sales					9%		9%		46%	9%	9%	18%
Skilled workers		16%	20%	12%	24%				20%		8%	
Craft work		38%	12%						50%			
Machine Operators		17%	24%	5%	34%	12%			7%			

Having understood the minimum qualification requirement at different occupation level, when exploring into the skilled staff under Rubber & Plastic industry, they are screened based on the following qualifications;

1. Passing O/L with experience (24%)
2. Studied O/L (20%)
3. Passed A/L with experience (20%)
4. No need of education but experience is vital (16%)
5. Experience plus ability to operate machinery (12%)

KEY HIGHLIGHT:

The minimum educational qualification requirement in Rubber & Plastic at entry level, paves ways for skilled employees to progress towards a white-collar role within the industry.

Another 8% of them also suggested that people with Diploma and Vocational training are also recruited for skilled categories.

Craft and related trades are recruited mainly based on experience (38%), experience with A/L (50%), and another 12% is where they recruit with a minimum qualification of O/L without experience.

For machine operators in the Rubber & Plastic industry is expected to have a minimum of O/L with experience mentioned by 34% of the respondents, whilst a good proportion of 20% mentioned just O/L is suffice. Experience without an educational background and the ability to operate machines are also looked at by 23% of the recruiters in this industry.

Though more than half of the industry expects experience as the main criterion for skilled employees, there's also a good half of the industry recruits skilled workers based on educational qualifications along with experience. This sounds that some of the skilled workers have right qualification to pursue a career progression up to senior levels in industry. The minimum requirements for managerial positions are increasingly expected from the skilled workers as well (though the weightage differs, it is considered), which paves a clear career vision/path for skilled workers to get into managerial positions as part of their career progress. For instance A/L with experience is a minimum requirement for managers, technicians, clerks and sales staff as well as expected from skilled workers, craft related workers and machine operators.

10.9.2 Metal related Industry

Table 17: Minimum Qualification Requirement in Metal related Industry for different occupations

	Studied up to Gr8	No need specific education level but need experience	Studied up to O/L	Experience +ability to work hard/operate machine	Passed O/L with experience	Vocational Training / NVQ 3 or 4	Experience in Sales & Marketing	Account/ HR related courses	Passed A/L with experience	Knowledge & Experience in related industry	Diploma & Vocational Training	Graduate & over
Managers							8%	11%	22%	8%	22%	34%
Professionals									14%	10%	34%	43%
Technical Associate					21%	3%	13%		13%	15%	32%	3%
Clerk & Support					5%		10%		59%	7%	12%	7%
Service & Sales				5%	5%	9%	13%		44%		21%	4%
Skilled workers				2%	52%		22%		10%	2%	12%	
Craft work	5%				53%	21%				11%	11%	
Machine Operators	5%	2%	6%		38%	9%	21%		6%		13%	

When considering the minimum qualifications requirement for managerial positions in the Metal industry, only 42% of the companies stated that for managerial position, it is mandatory that the candidate is a Graduate or more, whilst 22% mentioned Diploma or Vocational training and/or A/L with experience is important, followed by 11% on account or HR related qualifications. For professionals being a graduate or more is minimum qualification expected by only 43% while another 34% expects at least a Diploma or Vocational Training.

KEY HIGHLIGHT:

The qualified people in the industry do not seem to have expected experience and hence, the metal industry does not place importance for educational qualification to enter, sustain or grow within the industry. This gives equal opportunity for all to progress to managerial positions. But this continues to alarm the perception towards the industry among potential candidates.

Technical and associate professionals are expected to have a Diploma / Vocational Training (32%), and a good 21% with O/L and experience. Clerk and clerical support staff are recruited based on A/L pass (59%) and Diploma / Vocational training (12%). The industry looks for service and sales staff with a minimum qualifications of A/L pass outs, (44%) and 21% expects Diploma/Vocational Training.

Having understood the minimum qualification requirement of managerial and support staff, when exploring into the skilled staff of Metal industry including craft and related trades and machine operators, they are screened based on the following qualifications in order of majority;

1. Studied O/L with experience
2. Passed O/Ls
3. Experience

Metal Industry doesn't place any vital importance on educational or paper qualification when screening out and recruiting employees. The industry believes more on experience and professional education such as vocational training which provides practical exposure to the required skills as oppose to academic qualifications such as a Degree, MBA and other. Hence this is reflected even among the minimum qualifications required for managerial staff among the Metal Industry. Though this poses a question on how career progression can be ensured for the skilled staff, since the industry overall doesn't place an importance on paper qualifications, becoming a manager in metal related company is not limited by a Diploma or a Degree, unlike other sectors.

10.9.3 Engineering Service

Table 18: Minimum Qualification Requirement in Engineering Service sector for different occupations

	Physical Fitness & Health Condition	No need specific education level but need experience	Studied up to O/L	Experience, talent and ability to work hard	Passed O/L with experience	Vocational Training / NVQ 3 or 4	KDU	Passed A/L with experience	Knowledge & Experience in related industry	Diploma & Vocational Training	Graduate & over
Managers					3%		5%	10%		22%	60%
Professionals									8%	7%	86%
Technical Associate					21%			12%		55%	9%
Clerk & Support					9%				40%	12%	33%
Service & Sales			12%		12%			35%		35%	6%
Skilled workers		4%	19%	10%	19%			24%		24%	
Craft work		25%			50%					25%	
Machine Operators	5%		25%	7%	25%			10%		21%	

KEY HIGHLIGHT:

Sourcing entry level skilled workers is quite challenging in Engineering Services due to minimum qualification is expected to be a qualified engineer. That means, the industry expectation is to have more theoretical knowledge when the skilled employees are recruited

When considering the minimum qualifications requirement for workers in the Engineering Service sector, 60% of the companies stated that for managerial position it is mandatory that the candidate is a Graduate or more, whilst 22% mentioned Diploma or Vocational training with experience is important, followed by 10% requested knowledge and experience in the sector with A/L pass out. For professionals being a graduate or more is minimum qualification expected by 86% of them and the rest of them mentioned knowhow and experience in the sector and/or Diploma/Vocational training is required. Technical and associate professionals are expected to have a Diploma / Vocational Training (55%) and A/L pass outs or O/L pass out with experience (37%). Clerk and clerical support staff are recruited based on mainly know-how and experience (40%) and based on qualified graduate or more (33%). The nature of the sector demands a minimum qualification of a first degree in Engineering even for a clerical staff. It's quite challenging to employ non-engineering background employee at any managerial, skilled or unskilled levels at an Engineering Service sector. The sector looks for service and sales staff with a minimum qualifications of A/L pass outs or with diploma or vocational training (30% respectively) followed by O/L at 24%.

Having understood the minimum qualification requirement of managerial staff, when exploring into the skilled staff under Engineering Service sector, they are screened based on the following qualifications;

1. Diploma / Vocational training (24%)
2. Passed A/L with experience (24%)
3. Passing O/L with experience (19%)
4. Studied O/L (19%)

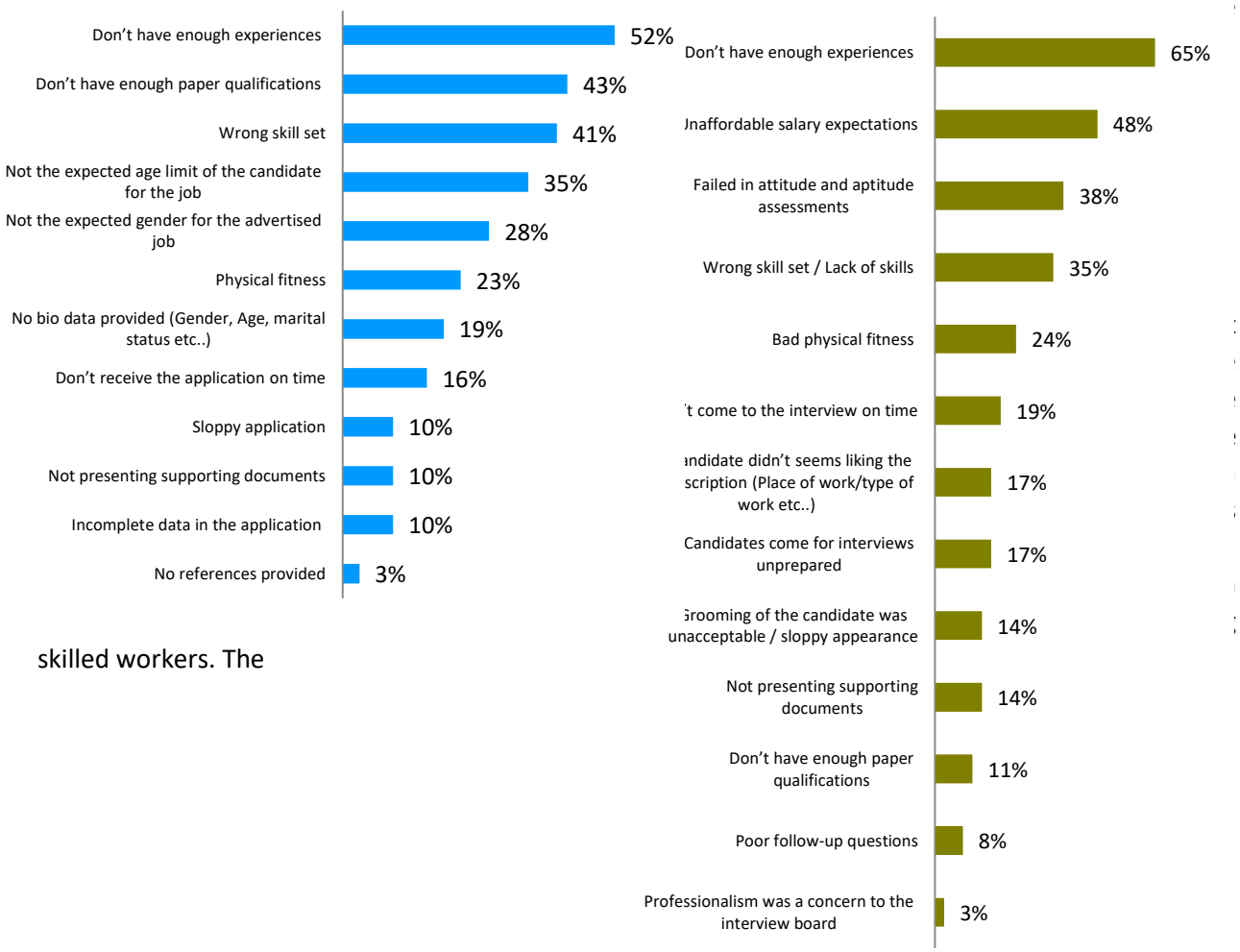
Craft and related trades are recruited mainly based on experience with O/L (50%) and a good 25% requires Diploma/Vocational Training and rest recruit unskilled labour and train them on the job since there's a scarcity on this particular nature of position amidst the Engineering sector. For machine operators also takes the same stance as craft and related trade employees.

Engineering Service as a sector is more often recruited based on basic qualification being a minimum of a Diploma or Vocational Training. As mentioned before, it is quite challenging for a non-engineering background employee, or for anyone who does not possess the ability to have a fair understanding on engineering to work in this sector. Hence unlike Rubber & Plastic, Engineering Sector is more prone to recruit based on first hand paper qualification at all managerial, skilled and unskilled levels of occupations.

10.10 Challenges faced by Employers when sourcing the required skilled employees

In Rubber & Plastic industry, depicted below are the reasons for opting out a candidate based on the application sent for a specific skilled vacancy;

Figure 9: Rejection Factors during Application and Interview Stage of Rubber & Plastic Sector



skilled workers. The

Second most popular reason for rejection is lack of paper qualifications which stays at 43%. Paper qualification is not just academic eligibility through O/L, A/L qualification but it also considers vocational training certifications with NVQ levels. Skill-job fit, age-job fit and gender-fit also plays a considerable role in rejection. Since skilled roles are expected to focus on physically hard-working environment,

KEY HIGHLIGHT:

Even though all three industries share similar rejection factors, Metal Industry overlooks most of the factors when recruiting due to resource scarcity in the industry.

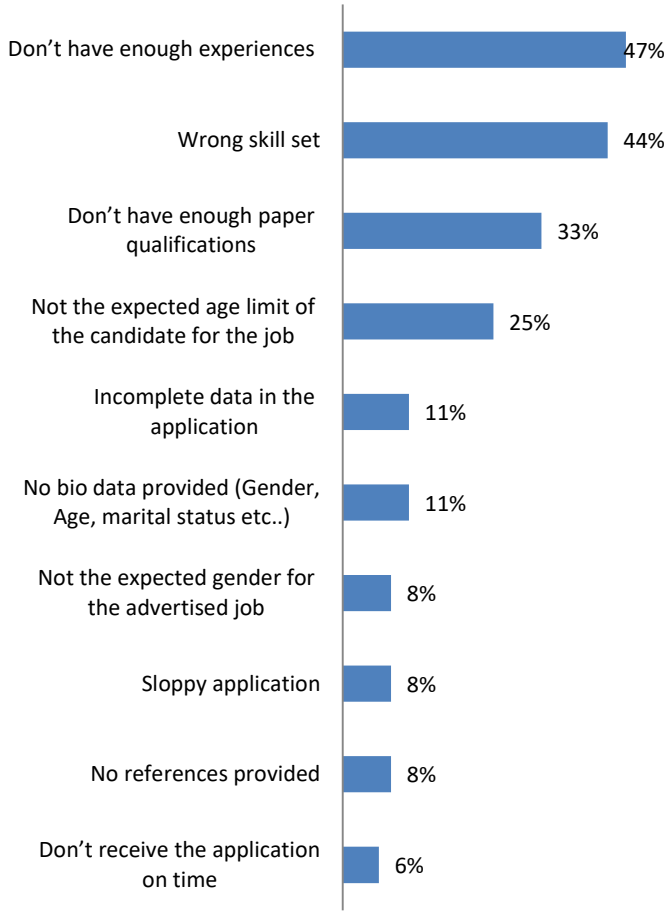
physical fitness is also a consideration factor when screening application – the activities they are involved in apart from work experience is assessed on the application form when evaluating physical fitness at the application stage. Apart from the above, rest of the rejection factors are external factors such as not receiving application on time, incomplete forms, etc. which are of less significance. Whilst all the above-mentioned rejection factors are witnessed among Large and Medium scale companies in the Rubber & Plastic industry, age-job fit isn't a consideration for smaller companies. This justifies the lack of labour supply in market, especially lack of youth labour supply for skilled employment and as a result the most affected nature of companies are the smaller firms. Hence, age is not a hard prone consideration when screening employees for interview stage.

Once screened out through application, at the interview stage, further assessment is done on the authenticity of the information provided in the application. Even during interview stage approx. 65% of the candidates are rejected based on inadequate experience. Despite the screening that takes place during the application stage based on experience, the lack of skilled labour supply in the industry pushes them to put through less experienced candidates from the application stage to interview stage. Hence, the evaluation on the know-how of the skilled job based on the limited number of years of experience is done predominantly during the interview. There are also instances, that the claimed number of years of experience is further validated or ensured through the interviewing process. The second largest factor on rejection during interview phase is the inability to satisfy salary expectations of the candidate. This is a prevailing concern in most of the industrial sectors among skilled employees, where the employees demand higher pay based on how hardcore the role is whilst on the employers' end, skilled workers are often not considered into a higher paid category. Attitude and aptitude gaps are also a challenge amidst recruiting skilled workers. Despite the nature of the job which is expected to be physically challenging, increasingly the youth who enter to skilled jobs often seek convenience and comfort through other non-core areas. Unwillingness to work long hours, not comfortable in working in non-ac area, especially in the rubber & plastic industry skilled workers aren't comfortable with the odd odour in the factories are few of the many convenience seeking factors which often categorizes them in the eyes of the employers as not having the right attitude to do skilled jobs.

Engineering Service sector also follows a similar trend on the important factors of rejections at application and interview stage. Having said that, it's interesting to note that grooming of the candidate also has a significant proportion which reflects the importance placed on staff grooming even at the skilled and unskilled level in Engineering Service sector. This is mainly driven by the fact that a high level of professionalism is expected among this sector in comparison to any other industrial sector.

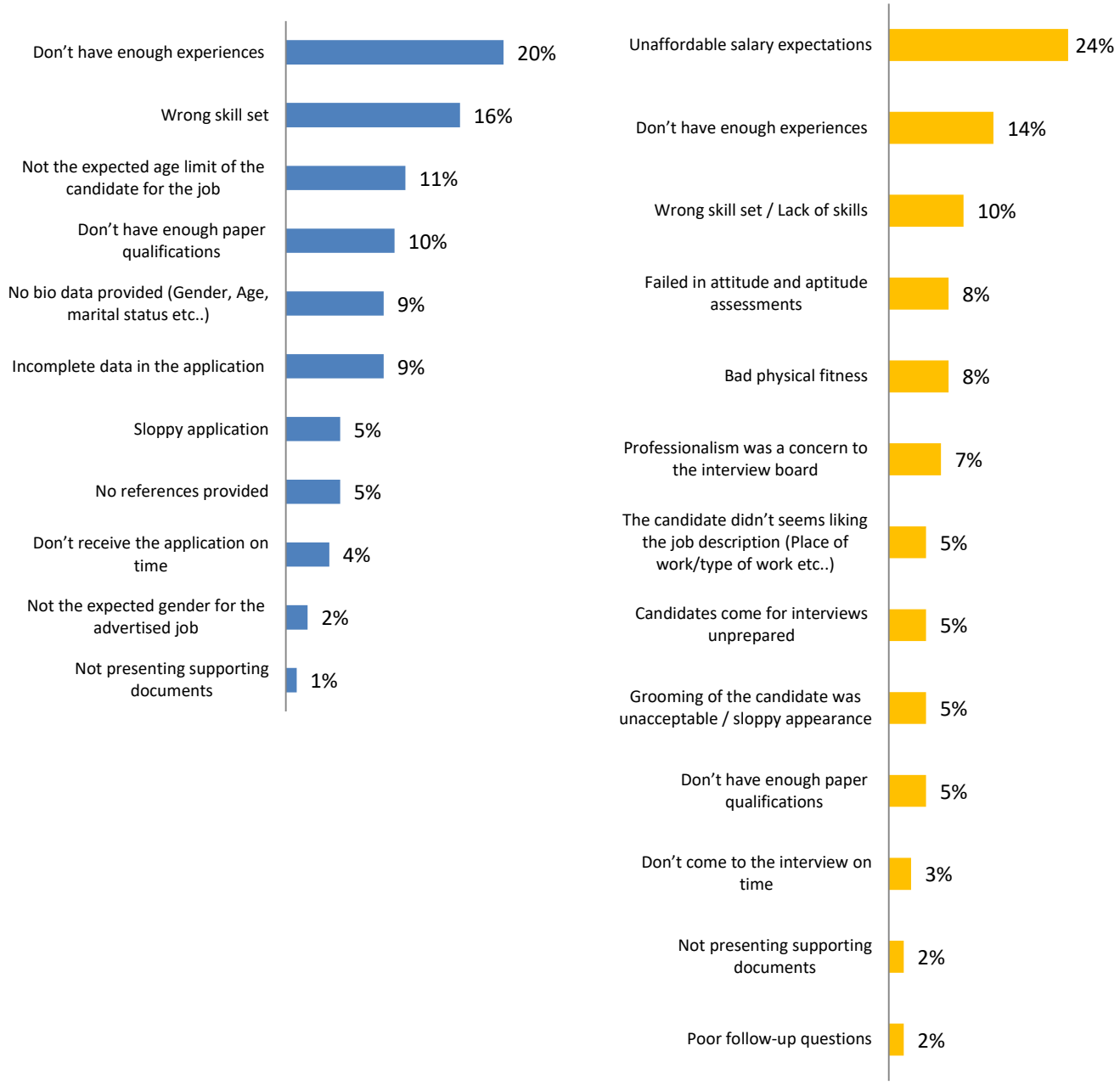
Apart from the application stage and interview stage rejection reasons, some companies focus on recruiting unmarried individuals, since the industry pay is not sufficient to cater towards maintaining a family, hence rejecting a candidate based on the fact that he/she is married. Hence assuming that the risk of an employee leaving the firm is high when he/she is married or has a big family (or a breadwinner of the family), which questions their commitment to job. Having said that, by nature, people who are married and are bound to family responsibilities are often the most committed and responsible individual and tend to stick to their job for a long time due to family commitments they have.

Figure 10: Rejection Factors during Application and Interview Stage of Engineering Sector



Though Metal industry shares the same sentiments as the Rubber & Plastic and Engineering Services sectors on rejection factors, only one fifth of the companies have identified these as mentionable issues, whilst 80% of the Metal industry firms don't have rejection factors which highlights the bigger issue in the industry is finding people and not necessarily skilled people, as they are open to employ unskilled people and train them due to scarcity.

Figure 11: Rejection Factors during Application and Interview Stage of Metal Industry



At an industry level 99% of the companies believe that skilled occupations are important for any industrial company to run the business, but more than half of them also believe that it is not easy to find the right skilled level employee. Whilst more than 60% of the Large and Medium scale companies find it difficult to source the right skilled employee, only 35% of the smaller companies find it difficult. Around 65% of the of the smaller firms relatively finds it easy to source. This can be for two vital reasons;

1. Smaller firms are open for short term or temporary skilled workers whilst medium and large firms seek for skilled employees for long terms. With the investment they put behind training and development they find it very difficult to source as well as sustain the right talent.
2. Medium and large companies are very specific on the skill level requirement and are often not generic like smaller companies. Hence smaller companies find it easier than the medium and large firms because their requirement is generic at most of the instances.

This scenario is quite the opposite in the Metal Industry where the small-scale companies find it challenging to source people in comparison to medium and large scale metal firms. One of the reasons that make it challenging is that among the smaller scale companies safety measures are minimal and are prone to accidents more than medium or large scale firms. Hence its challenging for smaller companies to source staff for the skilled occupations.

Increasingly sourcing the right skilled workers is becoming a challenge or finding the right candidates who can be trained is also an unattainable task driven by the following socio psychographic trends mentioned below in the order of importance;

1. People prefer white collar jobs as oppose to blue collar jobs
2. Higher salary expectation without having the right skill, experience and/or qualifications
3. Not comfortable with the working environment due to the sound, smell and noise
4. They seek for easy money through convenient jobs such as riding three wheelers
5. The inability to stick to one job
6. Trying to be an entrepreneur without any prior experience

KEY HIGHLIGHT:

Although, the generations to come would not be ready to enter industries in current state, as they would be mostly tech-savvy and looking for smarter and faster way of doing things without rolling their sleeve to work, the future industry with high technology would be more attractive and hence adoption of high technology in industry is a need

The above attitudinal blocks among the youngsters these days are often supported or rather not rejected by their parents. Parents who have gone through the hardship in life to support and feed their families often opt out of giving the same option to their children. Hence often encourages them to pursue a white-collar job or be their own boss than follow their footsteps. For instance, a welder never wants his son to become another welder, a machine operator prefers his son to have his own shop than become a machine operator in a firm. This strong bound attitude in the minds of parents are sometimes extended to an extent where the parents are okay with their children being unemployed despite the financial difficulties in the family, until their children find something that makes them happy as well as the parents.

10.11 Current recruitment methods of skilled employees

Direct contact emerged as the most popular source of recruitment and employers believe that high retention can be maintained when recruiting employee through direct contact of existing employees.

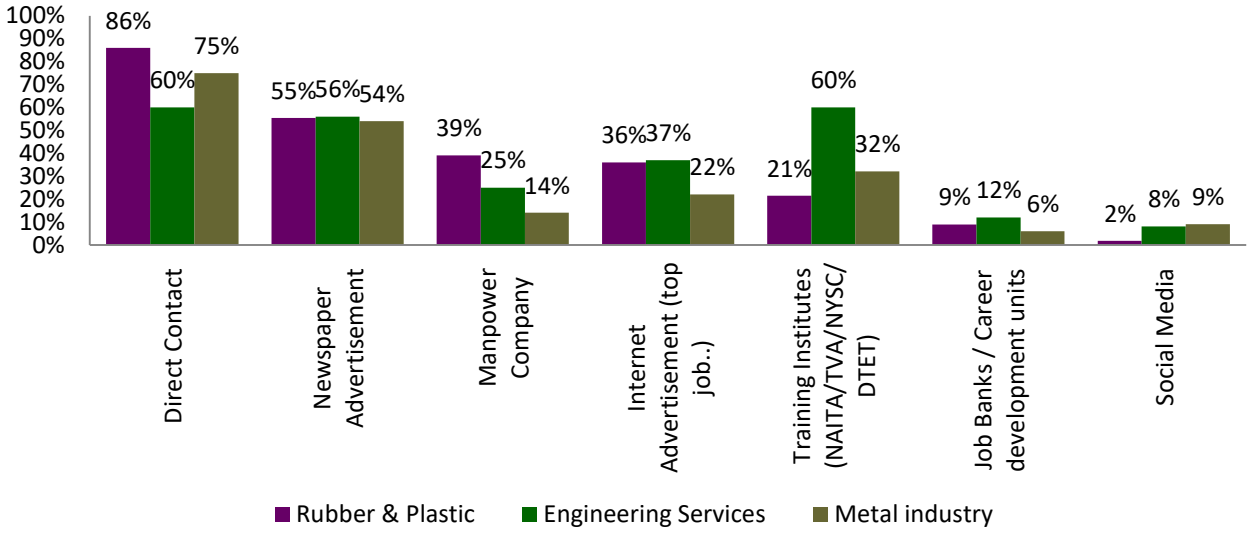
Contribution of training institute is relatively low as training courses related to Rubber & Plastic sector are not offered by them. Internet advertisements are mainly used for recruiting managerial position, not the skilled level.

Contribution of training institute is relatively high as training courses related to light engineering are freely available. This remains true in Metal Industry as well. In further conversations with companies, it was identified that the quality of people that they get from Germen Technology is very well match with their expectation.

KEY HIGHLIGHT:

Despite the increasing number of training centers, direct recruitment is considered as the most used method than sourcing through training centers.

Figure 12: Sources of Recruitment



11 Conclusion

The total estimated annual pass out students from vocational training institutions and private sector training institutions are 11,366 after completing the related courses for the three industries namely Rubber & Plastic, Metal & Engineering Services. This number will go up to 17,066 with the yearly skill generation by 3 Forces & CEB training center. The total estimated skilled cadre requirement (in addition to the existing cadre) for the three industries is 47,896 per annum. Another 42,362 skilled employees are required for the next year for the industry. In addition to this, annual departure for foreign employment for the selected three industries in a year estimated to be 10,000. Accordingly, a total of 35,296 annual skill gaps exist with regard to the three industry sectors in the country.

The highest passed out batch in 2018 consist of 'Mechanic (Other Machinery)', whereas the highest demand is for 'Mechanical and maintenance engineering technicians' (56% of the total required cadre) while the highest annual departure category is also 'technician-general'.

Looking at Rubber & Plastic, currently the total skilled cadre required to fill the existing gap would be approx.6,975. The highest demanded skilled category occupation is 'Tyre making and vulcanizing machine operators' followed by 'Factory worker – Rubber', 'Latex Product Operator', 'Factory worker – Plastic', 'Plastic Extrusion' and 'Plastic Bottle/cup blowing machine operators'.

In Metal & Engineering Services, the estimated required skilled employee for current use is 7,768 and for next year would be 10,776. This is after considering the current skills supply in the market for the above mentioned two sectors. The highest demanded skilled job category for Metal industry is 'Welders and Flame cutters' followed by 'Aluminum fabricators'. For engineering service sector, there is a current skill requirement of 33,153 and the requirement for next year is around 28,630. The sector needs 'Mechanical and maintenance engineering technicians' followed by 'Electrical Engineering technician', 'Welders', 'Refrigeration and air conditioning technician'. The total skill gap of 32,377 is suffered by Metal and Engineering service sector companies in the country.

Increasingly sourcing the right skilled workers is becoming a challenge or finding the right candidates who can be trained is also an unattainable task driven by the following socio psychographic trends mentioned below in the order of importance - People prefer white collar jobs as oppose to blue collar jobs, Higher salary expectation without having the right skill, experience and/or qualifications, Not comfortable with the working environment due to the sound, smell and noise, They seek for easy money through convenient jobs such as riding three wheelers, The inability to stick to one job, Trying to be an entrepreneur without any prior experience, etc. Hence managing attitudinal shift is a huge challenge amidst employers.

Skilled occupation in Rubber & Plastic Industry is believed to be a career which doesn't have a progressing path to convert blue collar jobs to a white-collar job. But the industry assessment revealed that for any level of occupation in Rubber & Plastic based company, be it a managerial position, support staff role or skilled occupation, there are common minimum qualifications that are looked at by the recruiters, hence ensuring a clear career path which is attainable even for skilled worker to move into a managerial or a support staff position. But this awareness or revelation is not rightly communicated to the youths in the market that is currently reluctant to get into skilled occupations for the very same reason. This can be negated or minimized by clear communication during recruitment on career path,

training and development and prospects of the role – Youths are prone to have very ambitious goals but are also very concerned about having a healthy work and life. Showing how this ambitious end goal can be achieved via a skilled occupation and the perks that will come along with the role needs to be communicated with utmost precision.

In contrary to Rubber & Plastic, Engineering Services are often based on qualification when it comes to recruiting skilled workforce. The nature of the industry is such that a basic knowledge in engineering becomes a must to do any role in an Engineering Service company. Having said that, this poses a challenge in sourcing the right resource with an engineering background for a skilled occupation for numerous reasons. Youngsters with an engineering background is not willing to do a skilled occupation (blue collar job), since they believe for the education, they possess they deserve a white-collar job which is more convenient and apt for their status core. Since Engineers are now venturing into different avenues of businesses including marketing, sales, HR and other which provides good pay and perks for the role they do, there's a scarcity of sourcing candidates with the engineering background.

Recruitment in the Metal Sector is not a very streamlined or rationalized process, the employee turnover in this sector is quite high, the industry tends to recruit resources with lack of minimum qualification for skilled occupation. This is mainly experienced by small and medium scaled companies. The industry is caught in a vicious cycle of recruiting baselessly considering the urgency of filling the position which in turns leads to the workforce leaving the jobs quite often. The challenge here is to streamline the recruitment process in the industry – by way of tightening internal processes.

The companies could also diligently adapt the practice of recruiting through vocational training centers which will ensure the right candidates are trained and are accessible. Some of the firms have permanent agreements and tie-ups with the NVQ training centers to get their recruits trained and certified. More than 70% of the recruitment is done through direct contacts than through vocational training centers and other training sources.

Since there is a scarcity of skilled workforce, companies tend to recruit unskilled employees and train them on the job. The advantage in this approach is that they can be molded in the manner in which the company requires and to be in line with the culture of the firm, while the challenging side is, since employee turnover is high in the industry the trained workforce tend to leave the organization as soon as they are trained.

Some companies focus on recruiting unmarried individuals, since the industry pay is not enough to cater towards maintaining a family, hence rejecting a candidate since he/she is married. Hence if the risk of an employee leaving the firm is high when he/she is married or has a big family (or a breadwinner of the family), which questions their commitment to job. Having said that, by nature people who are married and are bound to family responsibilities are often the most committed and responsible individual and tend to stick to their job for a long time due to the family commitment they have.

Since the companies can't afford to provide perks of accommodation and lodging for the recruits, they tend to seek for skilled workforce within the same area. This tends to limit the potential skilled talent that is out in the market.

Some of the training institutes are reluctant to source their students to certain companies and such companies are unaware of the reasons behind it. This is seen as quite an unusual and an unethical

practice given that such National level training institutes are supposed to supply in all fairness to every eligible company based on acceptable norms and rationale and are obliged to provide reasons for rejection of labour supply. When a potential candidate list is sent through the ministry, government and semi government-based companies recruit them without any proper assessment of person-skill fit, person-attitude fit and/or person-age fit.

During the recruitment process after the initial interviews some of the companies test them with the safety equipment to see the practical exposure of them. There are instances where NVQ certified candidates also fail this test. This justifies the curriculum being more theoretical than practical.

Currently we have at least a fragmented segment in the market who are willing to go through the process of exploring such natured skilled occupations. But the challenge is posed when considering the future resource requirement of such industries, since the future generations will have more options, more expectations and more benefits they seek when doing a job – or simply opt out from working for anyone and do something on their own. In some of the benchmarked countries such as Japan and Singapore, the youngsters are given the opportunity to try out the possible skilled occupations during their learning period and pick the options they wish to pursue, which is not available in Sri Lanka. This can be a possible initiation than can be implemented in Sri Lanka, which might help reduce the level of employee turnover and increase the supply of skilled labour.

There are two main reasons for youngsters to join vocational training centers – parents pushing them to learn something new through the vocational center in addition to their main stream of studies and there's another segment which spends time at the vocational center while waiting for their results from their academic studies or until they get a good job opportunity. Hence training through vocational centers becomes an additional skill mentioned in their curriculum vitae rather than a necessary skill in their career. The pass outs from vocational training centers are negligible on an annual basis and industries such as Rubber & Plastic and Metal don't source from training centers.

This also leads to larger companies sourcing skilled labour from countries such as India & China, as the skill levels are much better, and the work attitudes are more apt and beneficial for investment put by the companies.

While the standard occupation job categories are there in the selected three industries, except for some of the large scale companies, the level of clarity of such job categories are very poor amidst the medium and small scale firms and they tend to use their own terminologies to fit such designations or job categories.

Industries are de-growing, on the other hand foreign departure of skilled workers are de-growing, whilst industrial employers in Sri Lanka need skilled workforce, in contrary to certain large companies are sourcing skilled workforce from countries such as China & India. The recent policies also portray that in schools there's a place for vocational skills training on the 13th year, whilst the younger generation don't envision such careers as their dream/ambitious roles for the future. This situation suggests streamlining everything while creating an aspiration among youths to be in such industries. Highest skilled job category departure for foreign employment is technician-general which amounts to 3,000-3,500 annual departure size. Hence it is worthwhile to enhance the supply to cater to the demand in this category which seems to be relatively very low in this category.

One of the biggest unidentified concerns prevailing in the 3 industries is that the companies are battling with the current issues and challenges in day to day operation on sourcing, training and sustaining the skilled workforce and ignorant and unawareness of the future requirement of skills in the sector. Emerging skills are not something of their priority and is not an area they intend to work on in the foreseeable future. This was evident when questioned about emerging skills, the companies from any of the three industries were not even aware of what emerging skills meant and when explained they were not able to articulate the future skill needs. Instead, they mentioned areas of improvements in skills of the workforce in the current context and currently hard to find skills.

12 References

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- education by Department of Census and Statistics from http://www.statistics.gov.lk/Pocket%20Book/chap13.pdf
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13 Annexures

Table 19: Major occupation category definitions

OCCUPATIONS	DESCRIPTION
Managers	This category includes chief executives; general and corporate managers managing director; administrative, finance, production, service and sale manager; and regional and branch manager who plan, direct and coordinate the policies and activities of business and other organization.
Professionals	Who enhance the existing knowledge, apply scientific or artistic concepts and theories, or teach in a systematic manner. Most occupations in this category such as engineers, lawyers, economists, computing professionals, teachers and health professional require skill at graduate and postgraduate education.
Technical & associate professionals	This category performs mostly technical and related tasks connect with research and application of scientific, artistic, or operational methods. These occupations, which typically require skill at upper secondary education, include industrial robot controllers, photographers and medical assistants.
Clerks and Clerical support workers	This category performs clerical duties with associated with non-handling operations, travel arrangements, requests for information and arrangement. Most of these jobs, such as secretaries, cashiers, or transport clerks, require skill at least lower secondary educations.
Services and Sales workers	This category provides personal services related to travel housekeeping, catering, personal care, or protection, or they demonstrate and sell goods. Most occupations require skill at least lower secondary education.
Skilled workers	This group includes occupations that require skill at least secondary education or equivalent critical skill and knowledge in the industry
Craft and Related Trade worker	This group applies their skill in the fields of mining and construction, making or repairing machinery, printing, processed food, textiles, or articles including handicrafts goods which involve the performance of complex physical duties that normally involve initiative, manual dexterity and other practical skill. Most of these occupations, such as builders, bricklayers, plumbers, or electronic mechanics require a substantial period of training
Machine operators and Assemblers (Production Workers)	This group operates and monitors industrial machinery and equipment, drives and operates motor vehicles and mobile machinery, or assembles products. Most occupations have not a standard of education but will usually have formal experience related training
Elementary Occupations	This group consists of simple and routine tasks that mainly require the use of hand tools plus physical effort. Most occupations in this group, such as cleaners, building caretakers, doorkeepers or labourers do not require formal education qualification.

Source: Central Bank of Sri Lanka

13.1 Total Departures for Foreign Employment

Table 20: Statistics on foreign departure for employment

Manpower Level	Yr. 2010	Yr. 2011	Yr. 2012	Yr. 2013	Yr. 2014	Yr. 2015	Yr. 2016	Yr. 2017	Yr. 2018	YTD 2019
Housemaid	113006	107494	118917	96946	88685	73519	65025	55878	64756	54377
Skilled	70072	64903	62804	69647	72570	81991	76548	68979	67013	55760
Un Skilled	61551	66492	67236	75130	80106	78262	71659	61056	51703	45178
Clerical	7691	9507	15462	25256	27828	11457	10246	8838	9434	8074
Middle Level	6615	5960	9075	16345	20586	6742	7867	6805	7412	5840
Professional	3475	4424	5371	6666	7013	7666	7569	7134	8123	7996
Semi-Skilled	4914	4178	3469	3421	3977	4867	3926	3296	2769	2663
Total	**267324**	**262958**	**282334**	**293411**	**300765**	**264504**	**242840**	**211986**	**211210**	**179888**

13.2 Total Departures for Foreign Employment – Related occupation job categories

Table 21: Statistics on foreign departure for skilled employment –relevant to selected three sectors

Manpower Level	Yr. 2010	Yr. 2011	Yr. 2012	Yr. 2013	Yr. 2014	Yr. 2015	Yr. 2016	Yr. 2017	Yr. 2018	YTD 2019
Welders	2476	1796	1388	1314	1307	1498	1685	1433	986	766
Electrician & related Job categories	3704	3451	2310	2540	2591	3489	3108	2792	2371	1667
Electronic & related Job categories	39	68	69	60	59	52	63	52	62	51
A/C related Technicians	95	155	266	203	166	207	489	487	327	254
Fabricator	176	162	143	113	112	101	65	86	58	54
Technician - General	2344	2475	2462	3157	3333	3883	3975	3341	3822	2842
Technician - Other	590	735	793	959	952	1058	1278	1385	1249	854
Fitters	3121	1897	777	589	538	699	1364	485	587	320
Cutters - related to three sectors	6	5	0	2	3	3	2	3	3	3
Skilled Jobs in metal related	36	29	124	88	27	39	69	72	51	23
Erector	13	60	20	6	35	15	7	3	10	1
Machine Operators	6826	4929	1608	1985	1915	2373	1889	1851	1840	1634
Total	**23179**	**18378**	**12048**	**13269**	**13406**	**16322**	**16454**	**14209**	**12978**	**9598**

13.3 Skill Gap calculation stages

Step 1 – Skill supply was estimated using data available at TVEC. Total number of students passed out from industry related courses were counted as the supply for the industry. The skill trained from the three forces and the CEB training center were not available by specific occupation types. Therefore, skill supply from TVEC database was used as supply for each industry. However, when estimating the skill gap at an overall level, supply from three forces and CEB training center was considered.

Step 2 – Gathered data on current required skilled cadre in large, medium and small-scale companies were calculated in each segment separately. This was done considering the significant skill need differences among different scaled companies.

Step 3 – Arrived skill requirement at each scaled company level was finally extrapolated to the universe at each scale level.

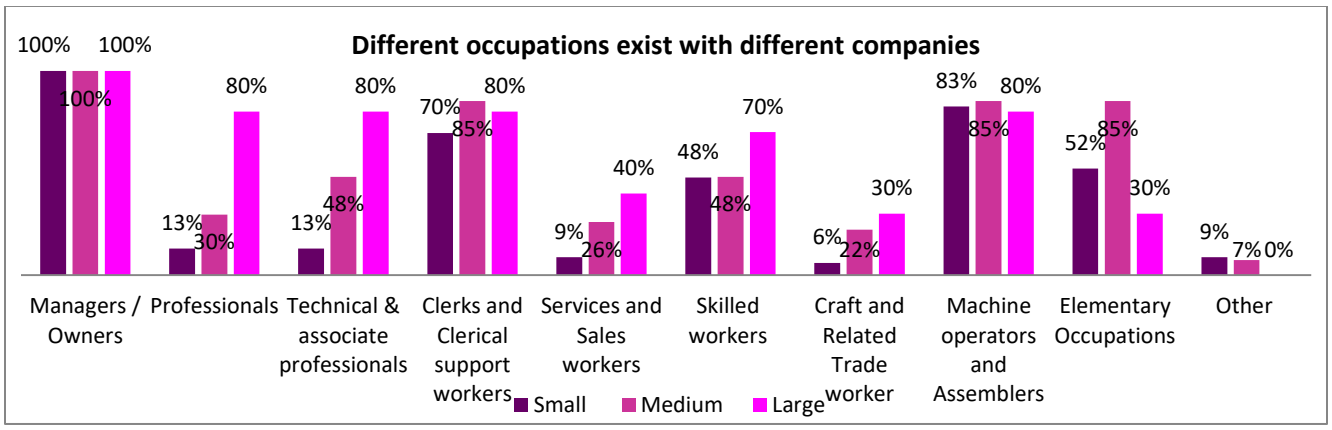
Step 4 – Finally, the total skill requirement at each scale level was cumulated to arrive at the total industry requirement

13.4 Other findings

13.4.1 Rubber & Plastic industry

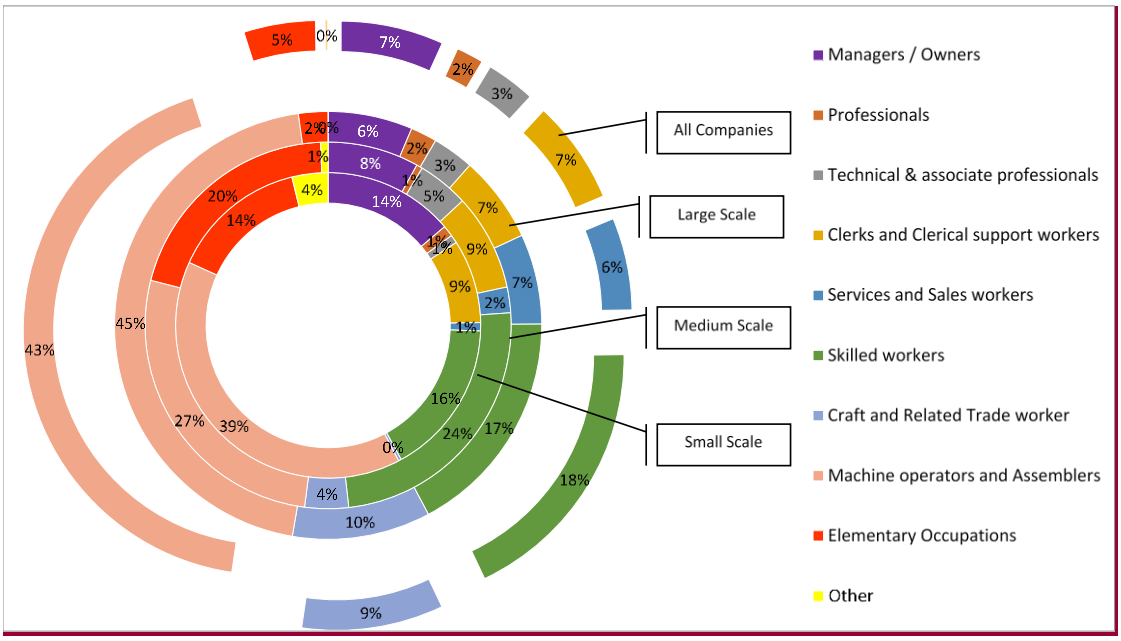
When analyzing skilled worker category employees in Rubber and Plastic industry related companies covered in this study, only around 48% of small and medium companies identify that they have skilled employees currently. However, majority like 83% has mentioned that they have machine operators (refer Figure 13). The same trend exists among medium scale companies too. Does it mean that around half of the small and medium scale companies do not identify machine operators as skilled employees? Or else, does this give directions to believe that there is less clarity of employees' segmentation for occupation categories among small and medium companies? When observing 7 out of 10 companies covered under large scale, they accept that they have skilled employees. Does it prove the point that large companies would have better clarity of employee segmentation under occupation categories compared to small and medium scale companies?

Figure 13: Profile of surveyed companies based on the staff composition- Rubber & Plastic industry



The below figure 18 presents the percentage of employees under each occupation from the total staff of each scale companies. Accordingly, there are 43% of the total employees are machine operators and assemblers which is skewed by large scale companies. This seems to be the most populated occupation category in small and medium scale companies as well. The total number of employees identified under the total skilled worker category i.e., accumulation of Skilled Workers, Craft and related Trade Workers and Machine Operators and Assemblers are the majority in the sector.

Figure 14:Total staff composition of surveyed sample - Rubber & Plastic industry



Instructions to read the chart: From the middle chart to the outer chart, 1st chart present small scale, 2nd chart present medium scale, 3rd chart represent large scale companies. The most outer chart depicts the overall Rubber and Plastic study findings. Below table present the employee breakdown by board occupation categories.

Out of the total number of employees in the sector, skilled workers' contribution amounts to nearly 70% which confirm the criticality of skilled category employees to the Rubber and Plastic Industry.

It is interesting to present that there is a shortage of 978 skilled workers in the sample companies, which is 11% of the current skilled worker cadre. The filling of this shortage is identified as an immediate requirement. In addition to this, there is a skilled employee requirement of 10% of the current skilled cadre for the next two-year consumption, which are 878 in numbers.

When discussing about the emerging skill requirements, most of the companies were not very confident about the future due to political instability that they lived in at the time of interviewing (post Easter Sunday attack and changing political environment). Further, it was observed that most of the companies are not ready to think or discuss about emerging skill requirement for their businesses as the business confidence had dropped drastically as per their opinion.

Figure 15: Overall Rubber and Plastic Skilled category worker analysis

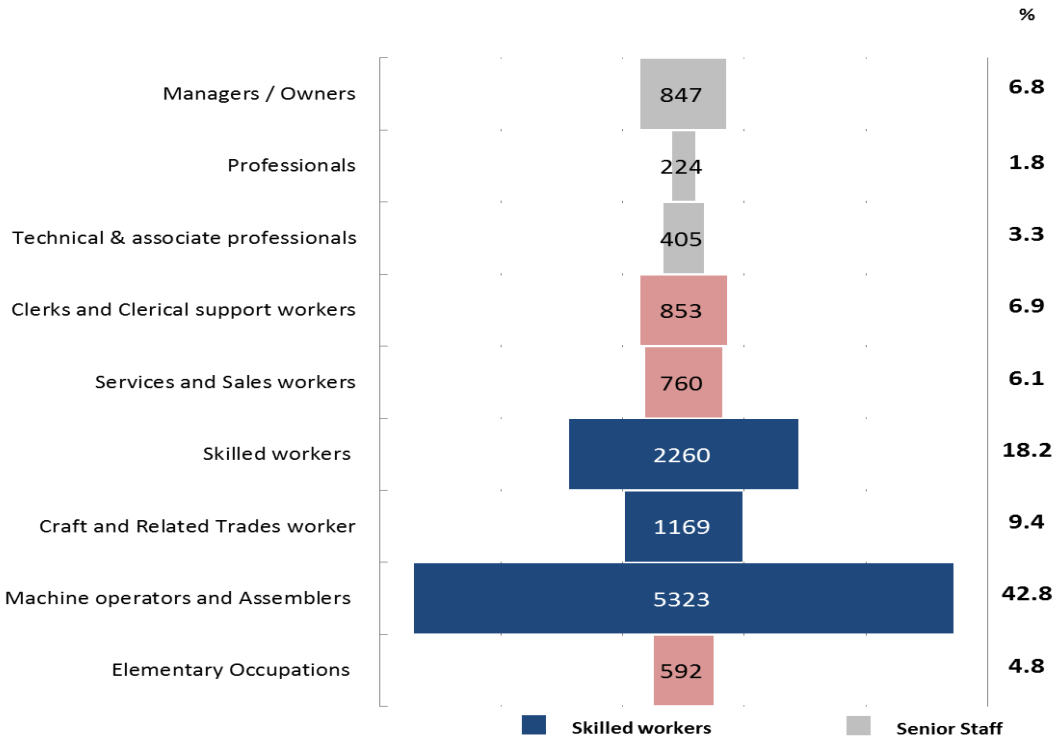


Table 22: Current & next two years skill worker requirement-Rubber & plastic industry – Surveyed sample

Total current skilled workers =	8752
Total required skilled workers=	9730
Total required skilled workers=	-978→ (-11.0%)
Total recruited skilled workers within the last one year =	837→ (9.5%)
Total skilled workers required for future growth – next two years =	878→ (10.0%)

The overall Rubber & Plastic Industry picture that was discussed is similar to the picture of large-scale Rubber and Plastic companies in this study. However, current and future required skilled employee gap percentage is relatively low as it was revealed by the large-scale companies.

Figure 16: Rubber and Plastic Skilled category worker analysis - Large-Scale companies

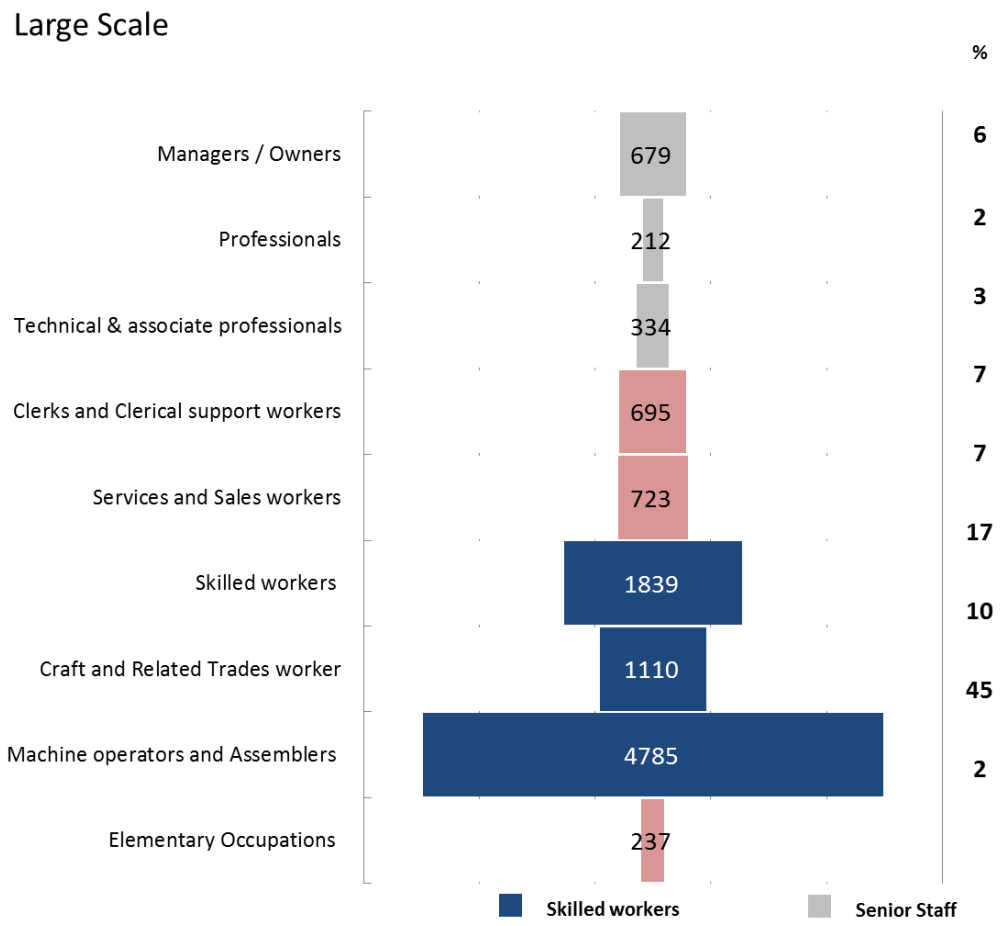


Table 23: Current & next two years skill worker requirement-Rubber & plastic industry- Large scale

Total current skilled workers =	7734	
Total required skilled workers =	8105	
Total required skilled workers =	**-371 → (-4.8%)**	
Total recruited skilled workers within the last one year =	**499→ (6.5%)**	
Total skilled workers required for future growth – next two years =	**514→ (6.6%)**	

As it is presented below, medium level companies expect the current cadre to increase by 50% to meet the immediate skill gap. Further, nearly 34% of the current cadre is requested for the next two-year growth plans.

Figure 17: Rubber and Plastic Skilled category worker analysis - Medium-Scale companies

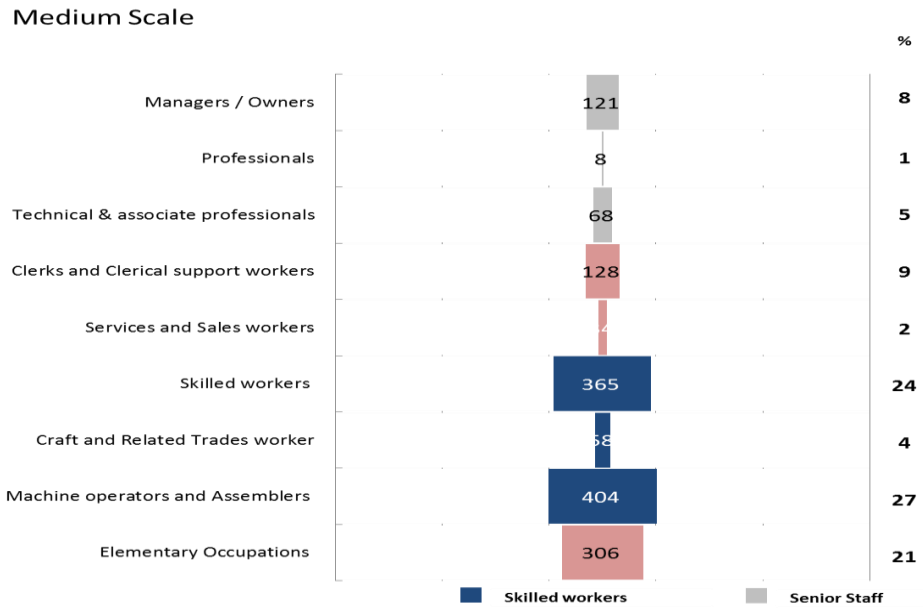


Table 24: Current & next two years skill worker requirement-Rubber & plastic industry- Medium scale

Total current skilled workers =	827	
Total required skilled workers=	1266	
Total required skilled workers=	**-439 → (-53%)**	
Total recruited skilled workers within the last one year =	**279→ (33.7%)**	
Total skilled workers required for future growth – next two years =	**280→ (33.8%)**	

23 Small scale companies interviewed had mentioned that they require additional 168 skilled workers in order to handle the current business requirement which is like more than 85% of the current cadre. Other than the currently required additional skilled employees, they are forecasting a need of approximately 40% of the current cadre for their next two years' consumption.

Figure 18: Rubber and Plastic Skilled category worker analysis - Small-Scale companies

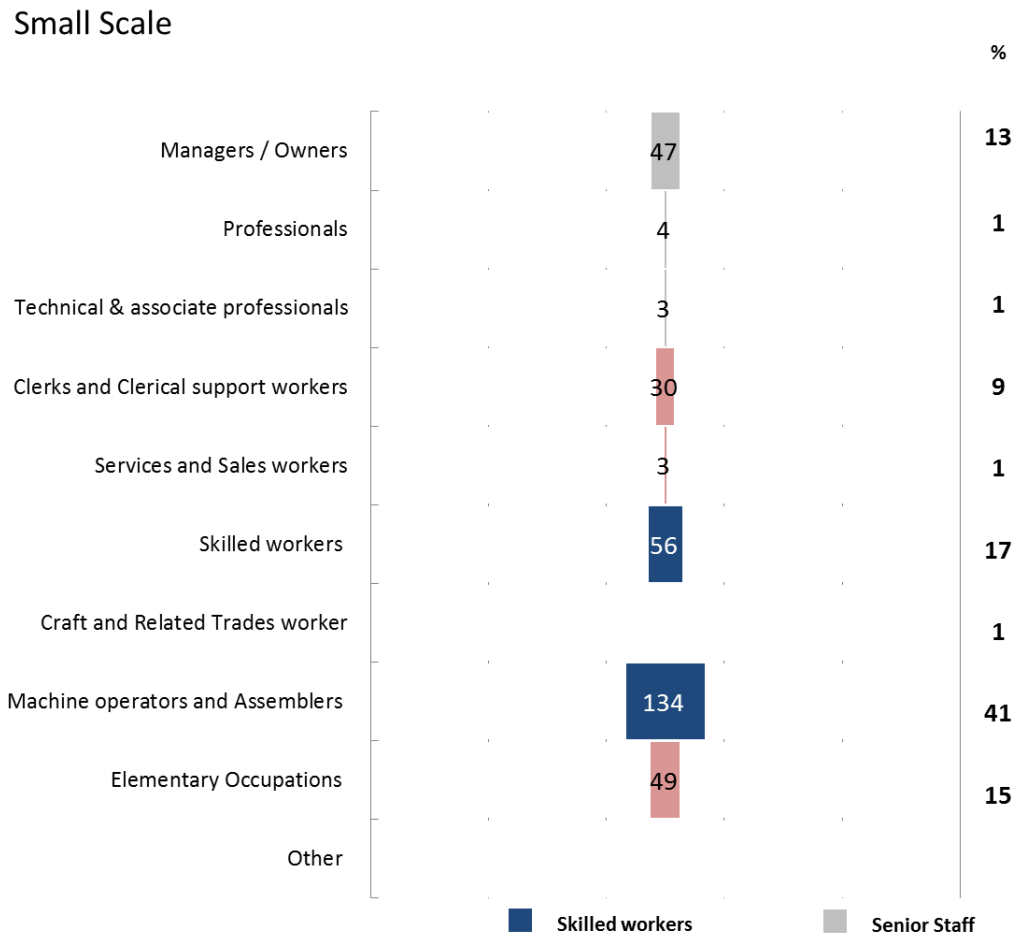


Table 25: Current & next two years skill worker requirement-Rubber & plastic industry- Small scale

Total current skilled workers =	191	
Total required skilled workers=	359	
Total required skilled workers=	**-168→ (-88%)**	
Total recruited skilled workers within the last one year =	**59→ (30.9%)**	
Total skilled workers required for future growth – next two years =	**84→ (43.9%)**	

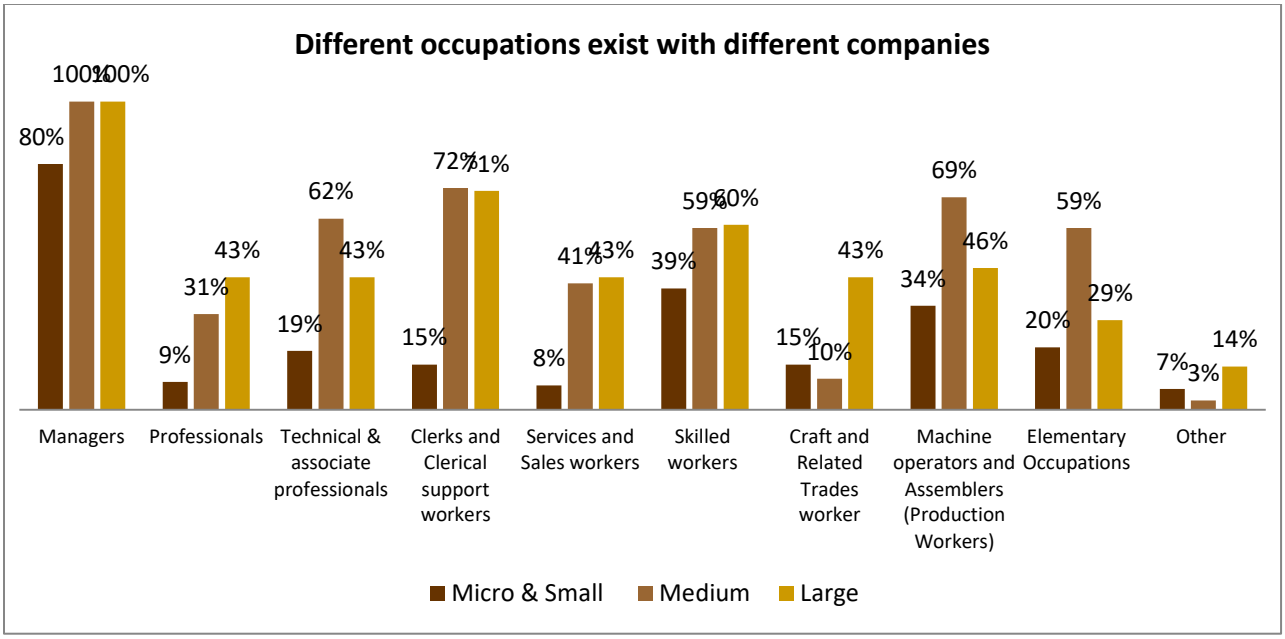
13.4.2 Metal related industry

Data gathered from the 129 companies interviewed under the Metal related Industry has shown the total number of employees employed by these companies currently amounts to 7682. This includes, managers, professional level staff, technical and associate professionals, clerks and clerical support workers, services and sales workers, skilled workers, craft and related trade workers, machine operators and assemblers and elementary occupations.

When considering small, medium and large companies' availability of employees under different occupations identified above, it is clear that all companies had manager designated staff, sometimes; it was the owner of the company plays the role of a manager in small scale companies. However, 20% of micro and small-scale companies had mentioned that they do not have manager level employees. Only 31% of medium scale companies had stated that they have professional level employees. It is important to note that not even half of large-scale companies' interviews seem to have professionals occupied in work. Very least proportion of micro and small-scale companies do have employed Technical and Associate professional level employees, whereas around 62% of medium scale companies had claimed that they have Technical and Associate professional level employees. Surprisingly, not even half of the sample of large-scale companies have mentioned that they have Technical and Associate professional level employees in their companies which need attention and further evaluation. However, around 3/4th of medium and large-scale companies had clerk and clerical support workers whereas; only 15% of micro and small-scale companies maintain support workers. Another important observation is that not even half of the medium and large-scale companies interviewed seem to have a sales staff. Further, a point to note is, only 30% of large-scale companies seem to have workers who are classified under elementary occupation, which is defined as unskilled employees, this trend is similar to the situation in Rubber and Plastic industry's elementary work employment situation.

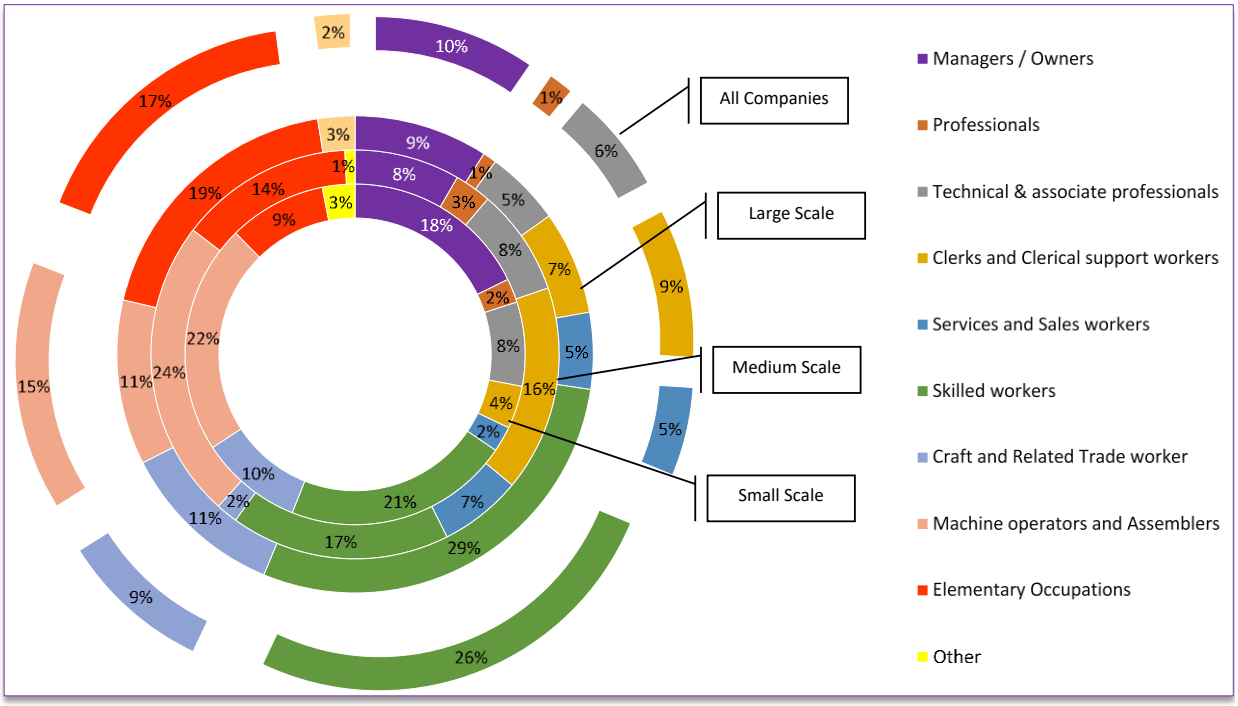
When analyzing skilled employees in Metal related industry companies covered in this study, only around 40% of micro & small companies identify that they have skilled employees currently. Similarly, around 34% of the companies have mentioned that they have machine operators. The trend is very different when observing data of medium and large-scale companies. Around 60% companies in each medium and large scale had claimed that they have employed skilled workers whereas 69% and 46% of medium and large-scale companies stated that they have machine operators respectively. This shows that not many people are employed for specific jobs even by large scale companies. Further, it was stated that employees should be multitasking, and everyone should be equipped to do any work or assist in operation. Even the employees who are allocated for specific job like welding should be able to handle work such as cutting and painting work which are related to his main job in order to work with the scarcity of workers for specific jobs. While this trend is salient among micro and small companies, it exists in medium and large-scale companies to certain extend.

Figure 19: Profile of surveyed companies based on the staff composition- Metal related industry



The below figure presents the percentage of employees under each occupation from the total staff of each level companies. Accordingly, it shows that there is higher percentage of elementary/ unskilled workers which is second to the proportion of skilled worker representation in the total staff strength. Only 15% of the total employees are machine operators and assemblers which are skewed by the large number of machine operator category employees of medium scale companies. Micro and small-scale companies mainly operated with owner/manager, machine operators and some skilled workers and very less number of support service workers is occupied. The total number of employees identified under total skilled workers and Machine Operators and Assemblers are the majority in the sector with 40% representation where 25% are classified under skilled worker category and only 15% are identified as Machine Operators and Assemblers.

Figure 20: Total staff composition of surveyed sample – Metal related industry



From the middle chart to the outer chart, 1st chart present small scale, 2nd chart present medium scale, 3rd chart represent large scale companies. The most outer chart depicts the overall Rubber and Plastic study findings. Below table present the employee breakdown by board occupation categories.

Out of the total number of employees in the sector, skilled workers' contribution amounts to nearly 50% which confirm the criticality of skilled category employees to the Metal related Industry.

It is interesting to present that there is a shortage of 414 skilled workers in the sample companies, which is 11% of the current skilled worker cadre. The filling of this shortage is identified as an immediate requirement. In addition to this, there is a skilled employee requirement of 27.5% of the current skilled cadre for the next two-year consumption, which are 1071 in numbers.

When discussing about the emerging skill requirements, most of the companies were not very confident about the future due to political instability that they lived in at the time of interviewing (post Easter Sunday attack and changing political environment). Further, it was observed that most of the companies are not ready to think or discuss about emerging skill requirement for their businesses as the business confidence had dropped drastically as per their opinion.

Figure 21: Overall Skilled category worker analysis- Metal related industry

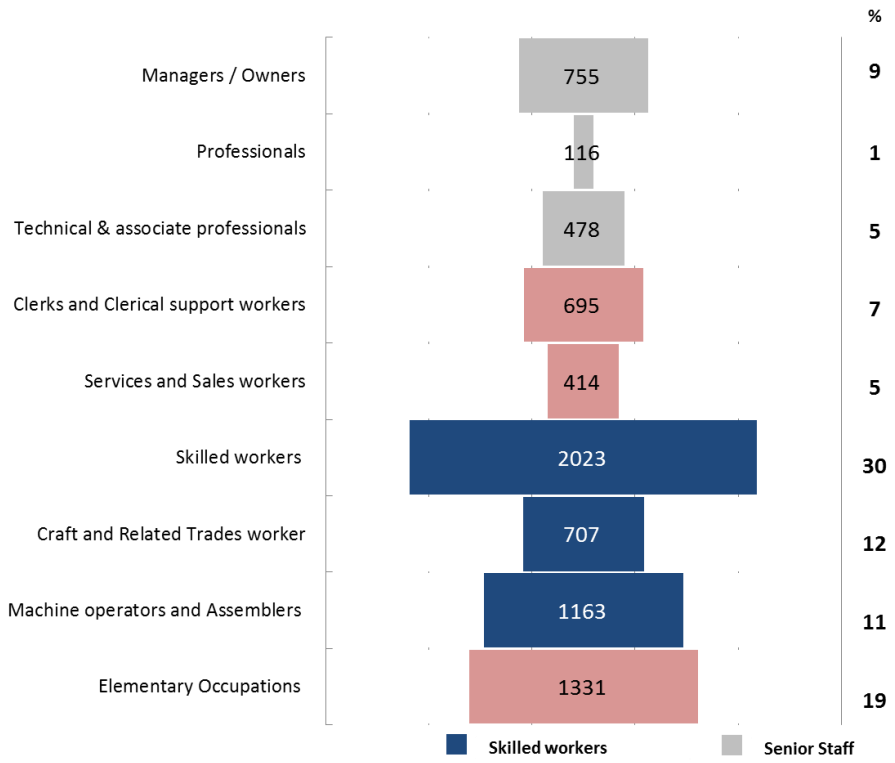


Table 26: Current & next two years skill worker requirement-Metal related industry- Surveyed sample

Total current skilled workers =	3893	
Total required skilled workers=	4307	
Total required skilled workers=	**-414→ (-10.6%)**	
Total recruited skilled workers within the last one year =	**1024→ (26.3%)**	
Total skilled workers required for future growth – next two years =	**1071→ (27.5%)**	

Figure 22: Metal related industry-skilled category worker analysis - Large-Scale companies

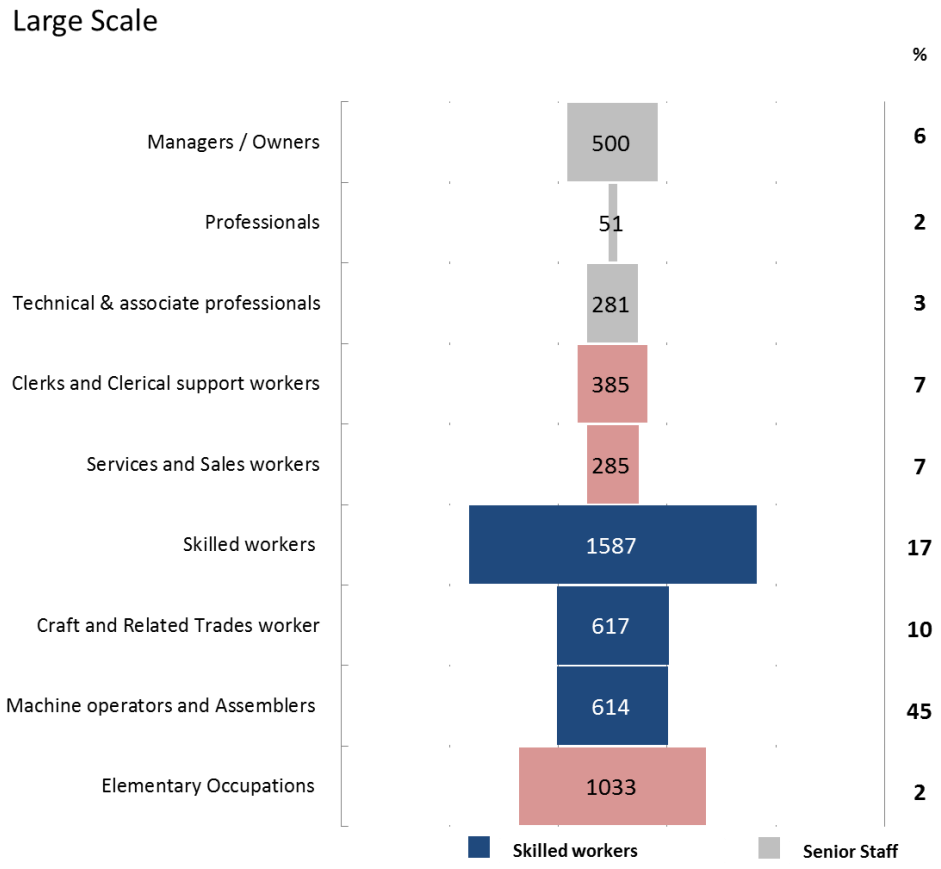


Table 27: Current & next two years skill worker requirement-Metal related industry- Large scale

Total current skilled workers =	2818	
Total required skilled workers=	2989	
Total required skilled workers=	**-171 → (-6.1%)**	
Total recruited skilled workers within the last one year =	**455→ (16.1%)**	
Total skilled workers required for future growth – next two years =	**379→ (13.5%)**	

As it is presented in the below figure, medium level companies expect nearly 11.5% of increase to the current cadre to fill the existing cadre and to meet the business operation requirement as of today. Further, nearly 47% of the current cadre is requested for the next two years business plans. Skill worker contribution to the entire staff is relatively low like 43%.

Figure 23: Metal related industry-skilled category worker analysis - Medium-Scale companies

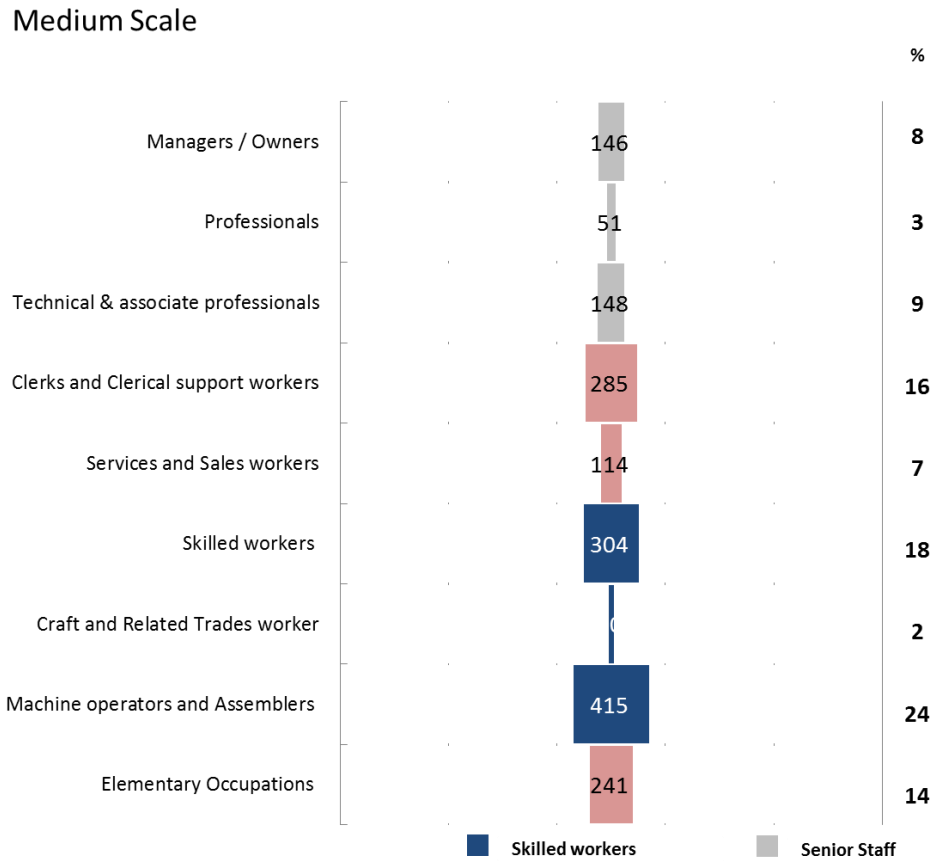


Table 28: Current & next two years skill worker requirement-Metal related industry- Medium scale

Total current skilled workers =	749	
Total required skilled workers=	835	
Total required skilled workers=	**-86 → (-11.5%)**	
Total recruited skilled workers within the last one year =	**247→ (32.9%)**	
Total skilled workers required for future growth – next two years =	**355→ (47.4%)**	

Respectively, 43 and 46 micro & Small-scale companies (total 89 companies) interviewed had mentioned that they want additional 157 skilled workers in order to handle the current business requirements which are like more than 48% of the current cadre size they have today. Other than the current required additional amount, they are seen a need of around 337 skilled staff which is 103% increase from the current cadre for their next two years business requirements. This shows the criticality of the staff scarcity to the micro and small-scale companies and urgency required to pay policy makers attention to

sustain and motivate micro and small-scale companies in the industry. The micro & small-scale companies also experience a 13.5% employee turnover annually.

Figure 24: Metal related industry-skilled category worker analysis – Micro & Small-Scale companies

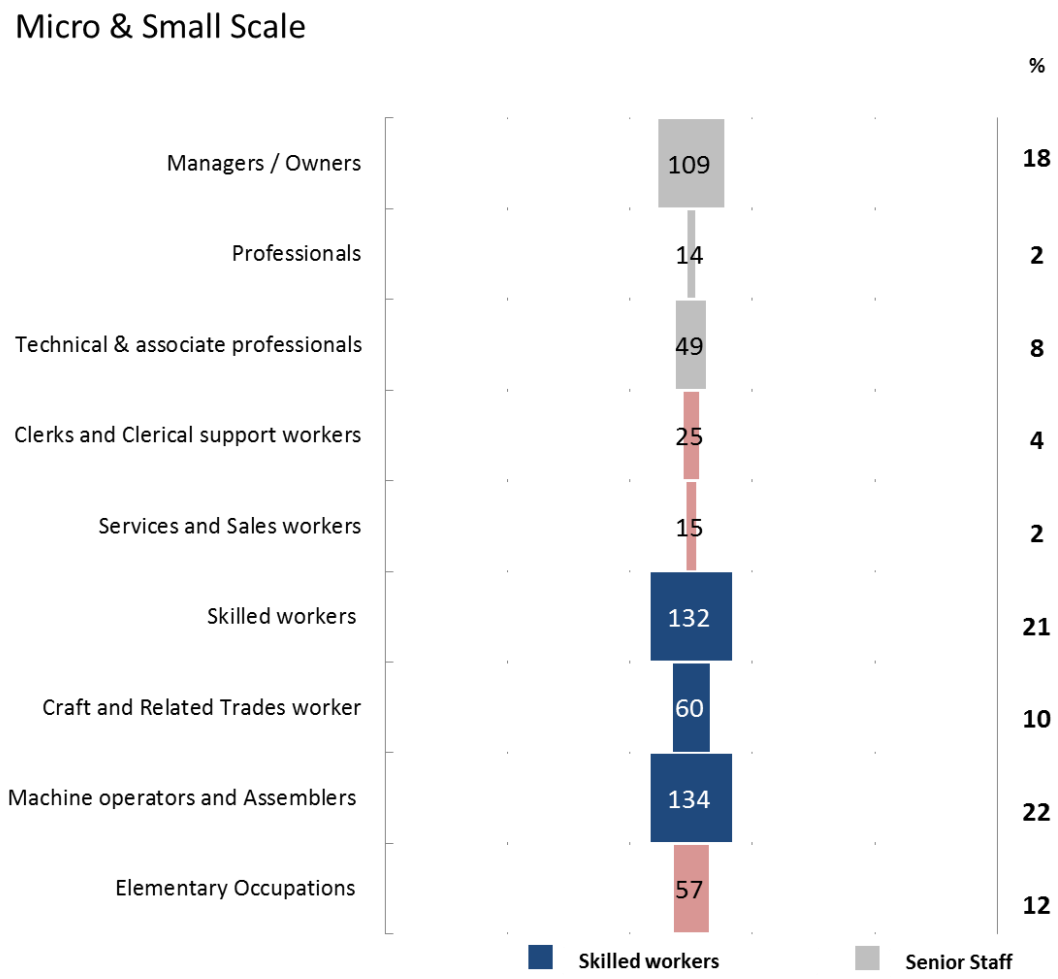


Table 29: Current & next two years skill worker requirement-Metal related industry- Small scale

Total current skilled workers =	326	
Total required skilled workers=	483	
Total required skilled workers=	**-157→ (-48.2%)**	
Total recruited skilled workers within the last one year =	**295→ (90%)**	
Total skilled workers required for future growth – next two years =	**337→ (103%)**	

13.4.3 Engineering service sector

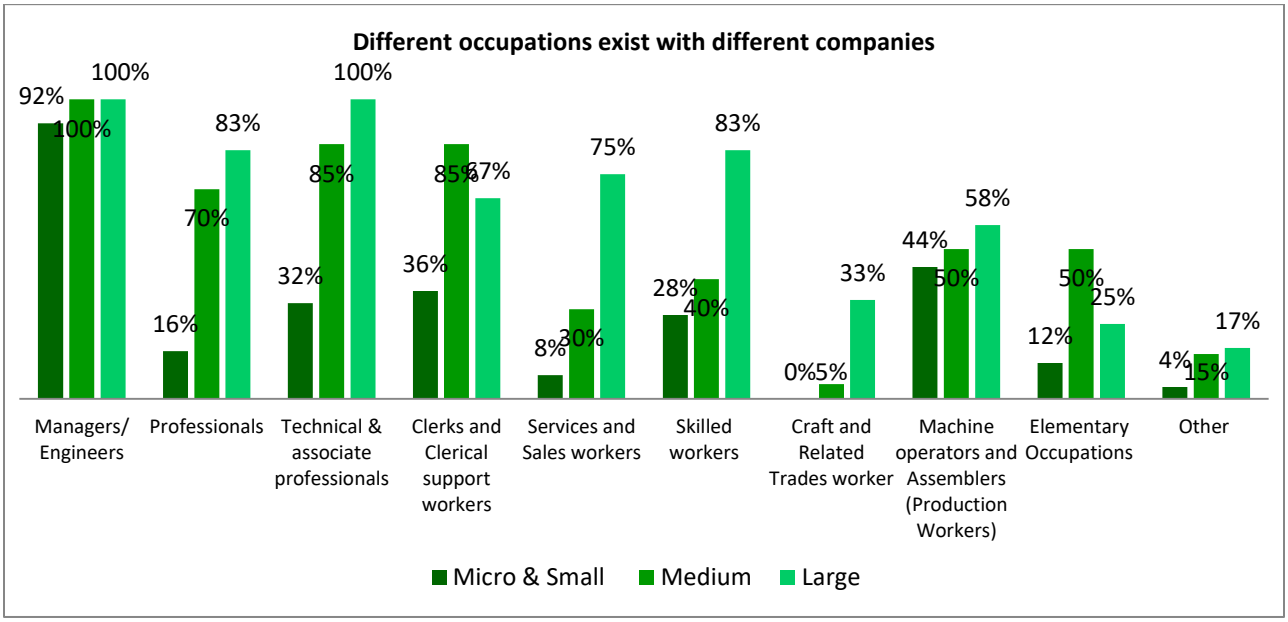
When considering small, medium and large companies availability of employees under different occupations identified above, it is clear that almost all companies had manager designated staff, sometimes; it was the owner of the company plays the role of a manager in small scale companies. However, 8% of small-scale companies had mentioned that they do not have manager level employees. Majority like 70% of medium scale companies had stated that they have professional level employees but just 16% of small-scale companies had professional level employees. Needless to explain, all large-scale employees have professional level staff employed. Only 1/3rd of small-scale do have employed Technical and Associate professional level employees, whereas around 85% of medium scale companies had claimed that they have Technical and Associate professional level employees. All large scale surprisingly, not all companies interviewed have a sales team, more interesting factor is that 25% of the large scale companies have mentioned that they do not designated sales staff, leaving rooms to believe that seniors including Managers/ Engineers involve in sales as well. Compared to the Metal related industry, more companies in to Engineering services maintain senior level staff probably due to the high expertise knowledge is more required throughout the business process. Another important observation is that just a half of the medium and large scale companies and less than 1/3rd of large scale companies interviewed seem to have elementary staff which is defined as unskilled employees, this trend is similar to the situation of other two considered industries in this study. However, compared to Rubber and Plastic industry related companies, very a smaller number of companies in Engineering services seems to have a staff categorized under elementary worker.

When analyzing skilled employees in Engineering service sector companies covered in this study, only around 28% of small companies identify that they have skilled employees currently. Similarly, around 40% of the companies have mentioned that they have machine operators. The trend is very different when observe data of medium and large-scale companies. Around 40% companies in medium had claimed that they have employed skilled workers whereas only 50% of medium scale companies seem to have a staff designated as machine operators. This situation with large scale companies is that nearly 80% of large-scale companies stated that they have skilled workers whereas only 58% seem to have machine operators.

The discussion with Engineering service sector companies revealed that as much as the specialized knowledge is vital for their industries, more important is having a multitasking staff to smoothly run the

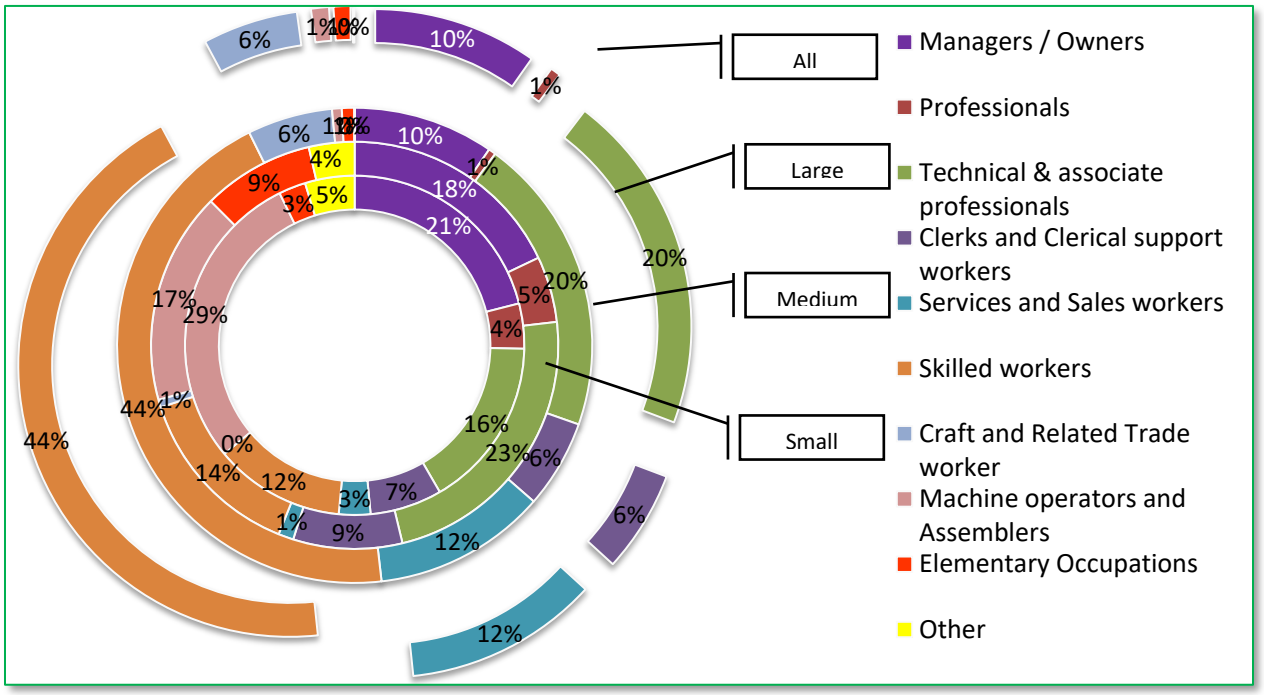
business even during scares staff members to run the business. Like discussed under the Metal related industry, even the employees who are allocated for specific jobs should be able to handle other work that are related to his/her main job.

Figure 25: Profile of surveyed companies based on the staff composition- Engineering service sector



While, it was above discussed the profile of companies regarding the type of occupations that are there in each company, the below figure presents the percentage of employees under each occupation from the total staff of Engineering service sector companies. Accordingly, it shows that there is higher percentage of skilled workers in the industry which is skewed by the large-scale companies in the sector. When counting the contribution of the machine operators and Craft and related Trade workers in the total staff it is at a lower level among the large-scale companies. Although 58% of large companies had mentioned that they have machine operators in their cadre as presented in the above figure, but the number of machine operators is very less in large scale companies. However, machine operator contribution in the total staff strength in small and medium companies is 29% and 17% respectively. Remarkably, contribution of senior level staff, i.e., Managers/Engineers, Technical and Associate professionals is amounts to 30% at an overall level, which is 30% in large scale companies and 41% in medium scale and 37% in small scale companies in the Engineering service sector.

Figure 26: Total staff composition of surveyed sample – Engineering service sector



From the middle chart to the outer chart, 1st chart present small scale, 2nd chart present medium scale, 3rd chart represent large scale companies. The most outer chart depicts the overall Rubber and Plastic study findings. Below table present the employee breakdown by board occupation categories.

Out of the total number of employees in the sector, skilled worker contribution amounts to nearly 51% which confirm the scarcity of skilled category employees in the even in the Engineering service sector similar to the Metal related Industry. These companies claimed that there is a shortage of 4,918 skilled workers, which is 17.6% of the current skilled worker cadre.

Figure 27: Overall Skilled category worker analysis- Engineering service sector

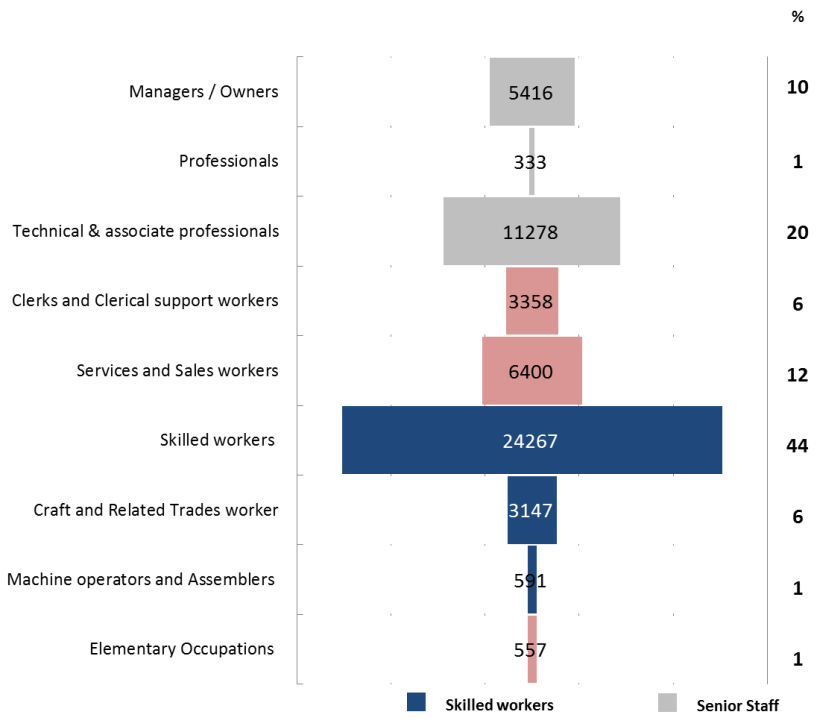


Table 30: Current & next two years skill worker requirement-Engineering service sector- Surveyed sample

Total current skilled workers =	28005	
Total required skilled workers=	32923	
Total required skilled workers=	**-4918→ (-17.6%)**	
Total recruited skilled workers within the last one year =	**5843→ (20.9%)**	
Total skilled workers required for future growth – next two years =	**7915→ (28.3%)**	

Skilled employee contribution in the total staff in large scale metal related companies interviewed is similar to the overall industry picture. However, current and future required skilled employee gap percentage is relatively high as it was revealed by the large-scale companies but the skilled employee turnover ratio is similar to the overall Engineering service sector story discussed above. Accordingly, large scale companies' skilled employee annual turnover ratio is 9.8 which were 10.1% at the overall sector level.

Figure 28: Engineering service sector -skilled category worker analysis - Large-Scale companies

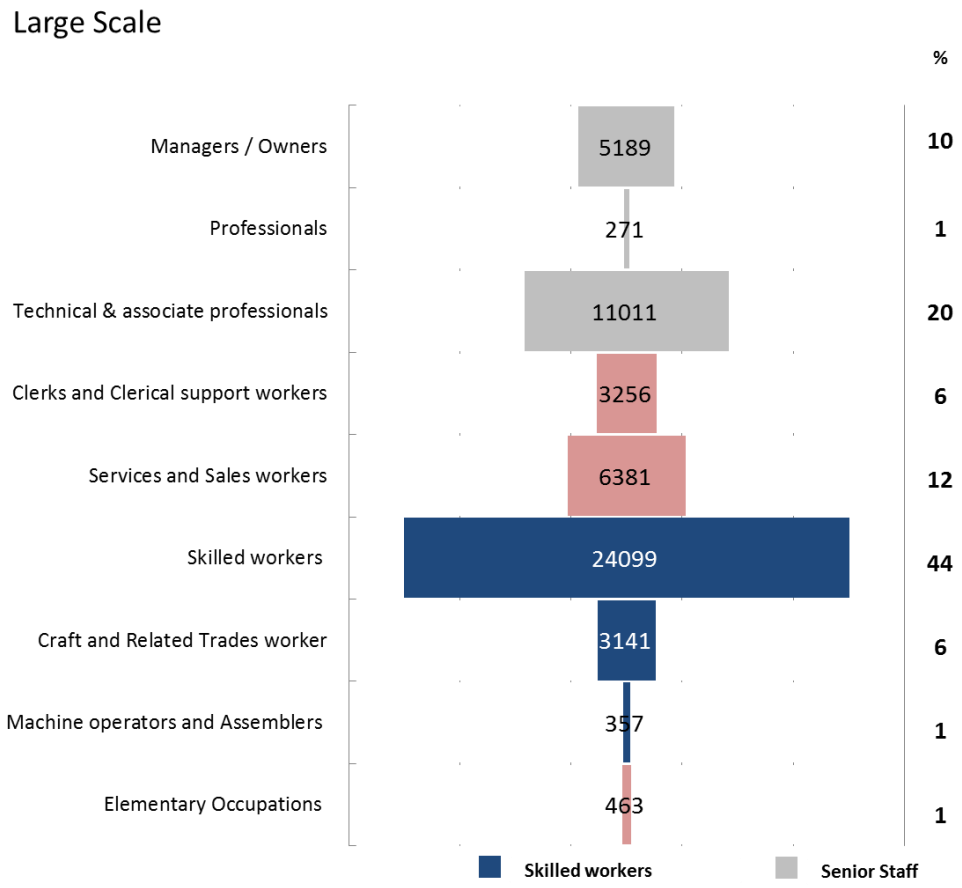


Table 31: Current & next two years skill worker requirement-Engineering service sector- Large scale

Total current skilled workers =	27,597
Total required skilled workers=	32,381
Total required skilled workers=	**-4,774 → (-17.3%)**
Total recruited skilled workers within the last one year =	**5649→ (20.5%)**
Total skilled workers required for future growth – next two years =	**7524→ (27.3%)**

As it is presented in the below figure, medium level companies expect nearly 36.5% of increase to the current cadre to fill the existing cadre and to meet the business operation requirement as of today. Further, nearly 89.7% of the current cadre is requested for the next two years business plans. Skill worker contribution to the entire staff is relatively low like 31%. In the year before, the medium scale

companies have recruited more than 50% of the current cadre. Like large scale company situation, around 10% skilled employee turnover is experienced by medium scale companies interviewed under Engineering service sector.

Figure 29: Engineering service sector -skilled category worker analysis - Medium-Scale companies

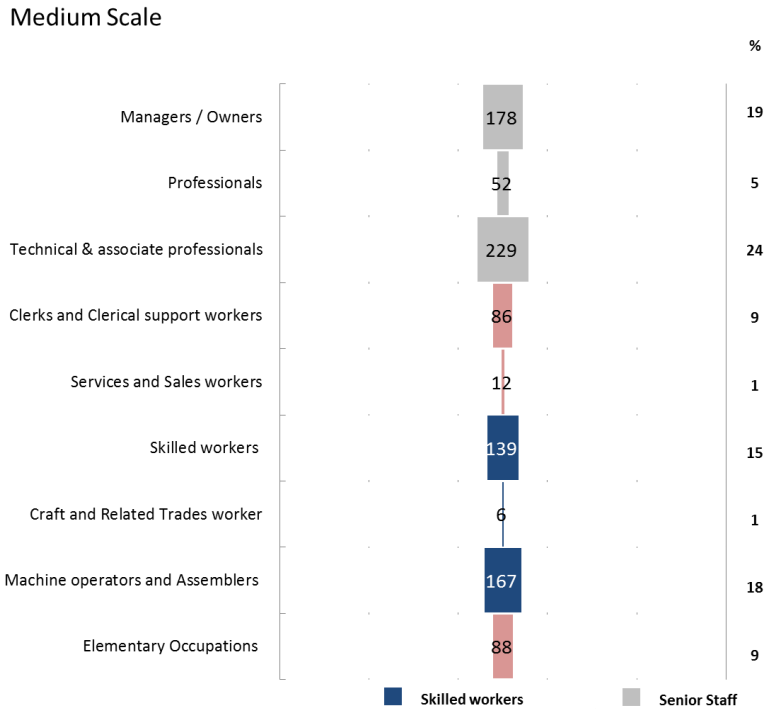


Table 32: Current & next two years skill worker requirement-Engineering service sector- Medium scale

Total current skilled workers =	312	
Total required skilled workers=	426	
Total required skilled workers=	**-114→ (-36.5%)**	
Total recruited skilled workers within the last one year =	**171→ (54.8%)**	
Total skilled workers required for future growth – next two years =	**280→ (89.7%)**	

28 Small scale companies interviewed had mentioned that they want additional 20% skilled workers in order to handle the current business requirements. Other than the current required additional amount, they is a need of around 111 skilled staff which is more than 300% increase from the current small cadre that they have in order to meet their next two years business requirements. It is interesting to see some growth plans are in the minds of small-scale companies in interviewed although they did not or was not sure to specify the growth plans. The small-scale companies also experience nearly 10% employee turnover annually.

Figure 30: Engineering service sector -skilled category worker analysis - Small-Scale companies

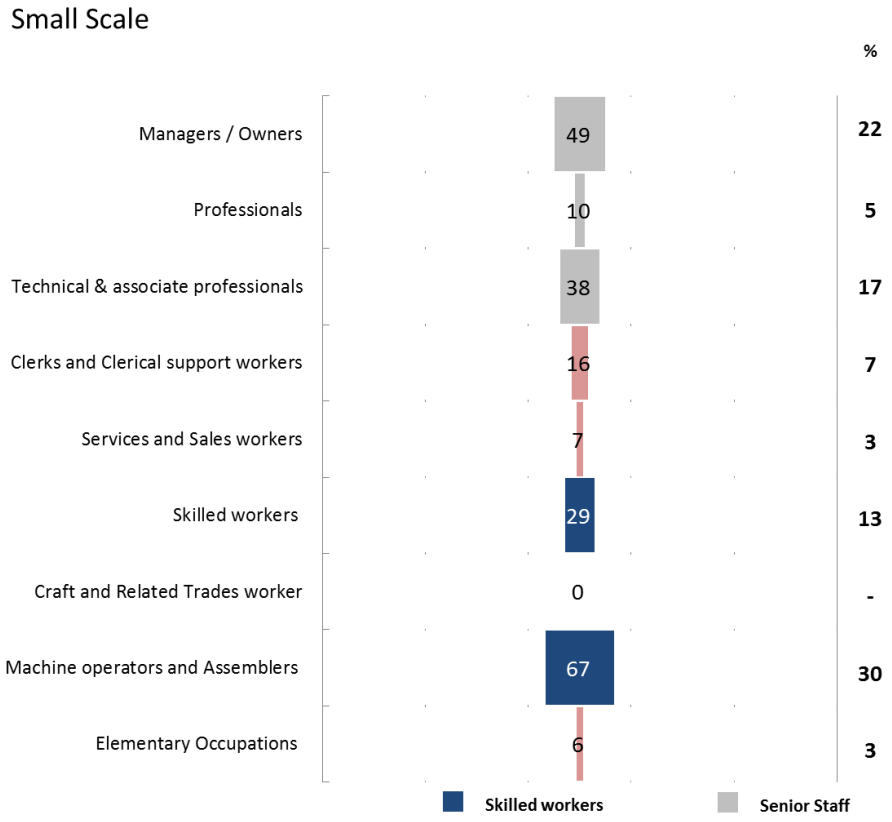


Table 33: Current & next two years skill worker requirement-Engineering service sector- Small scale

Total current skilled workers =	96	
Total required skilled workers=	116	
Total required skilled workers=	**-20→ (-20.8%)**	
Total recruited skilled workers within the last one year =	**33→ (344%)**	
Total skilled workers required for future growth – next two years =	**111→ (115%)**	