Industrial Skills Framework for the Malaysian Plastics Industry

Focus: **Injection Moulding Sector**

In collaboration with

MINISTRY OF HUMAN RESOURCES

HRDF

MPMA
MALAYSIAN PLASTICS MANUFACTURERS ASSOCIATION

MONASH University
MALAYSIA

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MONASH University MALAYSIA

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Disclaimer
The purpose of this document is to provide information that is publicly available so that readers can make informed independent decisions on any actions they may choose to undertake. The conclusions and views expressed in this report do not necessarily reflect the views of every member of the MPMA.

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Foreword

DATUK SHAHUL HAMEED DAWOOD
CHIEF EXECUTIVE, HRDF

The Human Resources Development Fund (HRDF) has continuously worked towards increasing efficiency at the workplace by equipping the Malaysian workforce with proper skills, competencies and trainings. This therefore requires us to work hand in hand with players from the industry to align training needs with suitable certification programs. A well planned investment in human capital development will boost the growth of the industry and economy of Malaysia in the long term.

The recent COVID-19 pandemic has impacted most industries and has rendered conventional job positions obsolete. There are calls for flexible working methods and new jobs that will allow employees to work remotely while maintaining current productivity. HRDF has quickly realized that there is a need to revamp our approach in reaching out to the industry for the purpose of up-skilling and reskilling employees. Our biggest challenge at this point is to aggressively assist retrenched and unemployed Malaysian workers to get back into the workforce.

As such, this Industrial Skills Framework (IndSF) is a well-timed effort geared towards addressing the current challenges of assisting Malaysians to be successfully hired based on new skills and competencies that are required by the industry. I would like to take this opportunity to congratulate all members of the Sectoral Training Committee (STC) on Plastics, subject matter experts from the industry and especially Malaysia Productivity Nexus for their tireless effort in developing this IndSF document. It is indeed an honour to be able to deliver this initiative to the Malaysian workforce. HRDF looks forward to being the driving force in shaping and empowering our Malaysian workforce so that they are globally competitive and skilful.

MALAYSIAN PLASTICS MANUFACTURERS ASSOCIATION

Foreword

EDDIE FONG
PLASTICS STC CHAIRMAN

The Human Resources Development Fund (HRDF) has continuously played a vital role in nurturing Malaysian talent through skills development and capacity building programmes. The development of this Industrial Skills Framework is another such programme.

Despite 2020 being a challenging year, the Plastics Sectorial Training Committee (STC) and experts from the industry have developed the Industrial Skills Framework for the Malaysian Plastics Industry focussing on the Injection Moulding sector. The Malaysian plastics injection moulding sector is a very important supporting sector to many different manufacturing areas such as E&E, Automotive, Industrial and Household products; supplying high quality, innovative parts, components and finished products. In meeting the needs of the sector, the central role of talent development cannot be understated, as it forms the foundation of the capabilities of the industry. Without the right talent, investments into machinery and technology would not realise their full potential.

In today's new norm, it is imperative for the industry to sustain its competitiveness through improvement of both technology and skills of our workforce. Thus, the IndSF will be a vital source of information for individuals, employers and training providers to comprehend the knowledge, experiences and skills needed for career advancement within the industry.

Here, I would like to take this opportunity to thank all members of the Plastics STC, subject matter experts from the industry, representatives from the academia, and government agencies, for bringing your expertise and experience around the table and engaging in such fruitful, constructive and open exchanges during the workshops. A special mention to Monash University Malaysia for putting the framework into perspective and developing the recommendations surrounding the '7i's. The development of this document would not have been possible without HRDF for their support in terms of funding and valued guidance.

The IndSF (Industrial Skills Framework) for the Malaysian Plastics Industry can be used as a guideline by various stakeholders to develop a competent local workforce for the Injection Moulding Sub-sector in line with Malaysia's aspiration in pursuing i4.0 and becoming a high-income nation. Work on the IndSF for the Malaysian Plastics Industry has depended on, and will continue to depend on active involvement of stakeholders. The more we share, the more we all get to understand what can be done to support talent development for the Malaysian plastics industry.

Foreword

ASSOCIATE PROF. SANTHA VAITHILINGAM
DEPUTY HEAD OF SCHOOL
(ENGAGEMENT AND IMPACT)
SCHOOL OF BUSINESS
MONASH UNIVERSITY MALAYSIA

Paramount to a resilient economy are knowledge intensive industry sectors with a workforce that is continuously refreshing skills and competencies for the needs of industry. However, industries globally are struggling to fill job vacancies due to a skills mismatch within the workplace. For industry to attract the needed pipeline of talent and improve potential employment outcomes requires business, government and other key players to come together and align workforce objectives with educational initiatives to ensure the development of talent such that the workforce enables industry to be future ready. This includes the necessary skills and leadership to future proof the firm and industry from major structural changes in the global economy.

Global Asia in the 21st Century (GA21) of Monash University Malaysia established a strong partnership with Malaysian Plastics Manufacturers Association (MPMA) in 2016 when we first embarked on the study Skills Needs in the Malaysian Plastic Sector. MPMA proactively saw the need to reposition itself as a driving force for change, especially in reskilling and upskilling as a means to enhancing and creating high-value career pathways for the workforce within the plastic industry. The current study brings us to the next phase of this change initiative through the development of an Industrial Skills Framework for the Malaysian Plastics Industry together with Human Resources Development Fund (HRDF).

This study sets out a guiding skills framework for HRDF and the plastics sector to improve and strengthen skills development, participation and worker retention as a way to ensure that the workforce is appropriately equipped to meet the needs of the plastics industry in a fast changing global economy. The framework identifies the diverse skills needed for current and future needs of the plastics industry. It provides guidance not only for those in the Plastics sector but also to individuals in other sectors wishing to advance their careers.

It is our pleasure to work with HRDF and MPMA to formulate an Industrial Skills Framework for the Malaysian Plastics Industry, focusing on the injection Moulding sub-sector. This framework provides a bold vision and an opportunity for individuals to learn, upskill and reskill in response to critical challenges faced by industry and help prepare them for the fourth industrial revolution.

Acknowledgement

Sectorial Training Committee on Plastics

1. Mr Eddie Fong, Plasform Sdn Bhd (Chairman)
2. Mr Poobalan, HRDF (Vice-Chairman)
3. Ms Sujata Albert, MPMA (Vice-Chairman)
4. Mr PK Leong, May Plastics Sdn Bhd (representing Federation of Malaysian Manufacturers (FMM))
5. En Ahmad Hanapi, Jabatan Tenaga Manusia (JTM)
6. Mr YK Yeon, Triplus Industry Sdn Bhd
7. Mr YA Liew, MPMA Committee

Monash University Malaysia

1. Associate Professor Santha Vaithilingam
2. Professor Mahendhiran Nair
3. Professor Pervaiz Ahmed
4. Dr Au Wee Chan
5. Mr Daniel Lee Lih Wei
6. Mr Yeng Hong Qing
7. Ms Choong Chai Lim
8. Ms Lee Wan Juin
9. Ms Shirlyn Tang

Industry Representatives

1. Guppy Plastic Industries Sdn Bhd
2. MPMA - En Ahmad Khairuddin
3. MPMA - Secretariat
4. Piping Technology Sdn Bhd
5. Reachpac Asia Sdn Bhd
6. Sipro Plastic Industries Sdn Bhd
7. Sonyu Plastic Industries Sdn Bhd
8. Takahata Precision Moulding Sdn Bhd
9. Zeito Plastic Components Sdn Bhd

Government Agencies/Representatives

1. Advanced Technology Training Center (ADTEC) Taiping
2. Kolej Kemahiran Tinggi MARA (KKTM) Masjid Tanah
3. Jabatan Pembangunan Kemahiran (JPK)
4. Ministry of Education
5. Industrial Training Institute (ILP) Jitra Kedah
6. Industrial Training Institute (ILP) Bukit Katil Melaka

Special thanks to the Industrial Skills Framework Unit under HRDF for making the report possible.

1 Purpose of the Industry Skills Framework

The objective of the Industrial Skills Framework (IndSF) is to outline the competencies in the Malaysian Plastics Injection Moulding Sector (PIMS). It provides an insight of the skills required, career pathways, as well as the required trainings and certifications for talent development in the industry.

It complements existing references such as the National Occupational Skills Standard (NOSS) and Malaysian Qualifications Framework (MQF).

2 Industry Profile

Plastics and related products are imperative in all aspects of human existence. Due to their high adaptability, versatility, and durability, plastics are oftentimes the preferred advanced material products for almost all sectors of the economy. Thus, not only are they integral in the production process, but also vital in the optimum functioning of a wide range of industrial sectors, such as aerospace, transportation, construction, manufacturing, medical devices and many others.

Due to the vast range of applications, plastics and related products have continued to receive buoyant demand over the past few decades. According to Statista (2018), the global plastics production in 2018 has seen a 46.5% increase from a decade ago, reaching 359 million metric tonnes worldwide. Amongst the plastics produced, 18% were produced in Europe, which employs over 1.6 million people in the plastics-manufacturing sector, with a multiplier effect of 2.4 in GDP and approximately 3.0 in jobs. Regarding the industrial value-added contribution, the European plastics industry currently ranks seventh in Europe, paralleling their pharmaceutical industry. Plastics industry firms in advanced countries create significant economic impact on their economies by establishing a high value position and supporting continuous innovation. Nonetheless, Asia currently holds an estimated 51% share of the global plastics production, whereas Europe and NAFTA (i.e., USA, Mexico and Canada) account for only a combined 35% share of the plastics production. This shows how the plastics industry in Asia has the potential to drive economic growth in the region and is a critical enabler of innovation.

The Malaysian plastics industry is well-established with a strong performance record and serves as an important contributor to the high-skilled and income employment in the country. As of the first quarter of 2019, Malaysian Investment Development Authority (MIDA) estimates that over

RM18 billion worth of investments

have flowed into Malaysia, resulting in more than

1,500 manufacturing projects

and creating more than

100,000 employment

opportunities in the Malaysian plastics industries[1]. Even amid the global economic slowdown, as well as the implementation of restrictions on single-use plastics in the EU, the plastics industry in Malaysia still exhibits promising growth potential, mainly due to the increasing demand for electronic products, pharmaceuticals, and the food and beverages industry[2]. As such, the Malaysian plastics market's revenue is predicted to grow at an estimated compounded annual

[1] https://www.mida.gov.my/home/9077/news/-malaysia-promotes-specialisedhigh-end-plastic-products/
[2] https://www.thestar.com.my/business/business-news/2018/10/15/analysts-cautious-on-the-future-of-domestic-plastics-industry

growth rate of 5.27% over the period of 2018 - 2023[3].

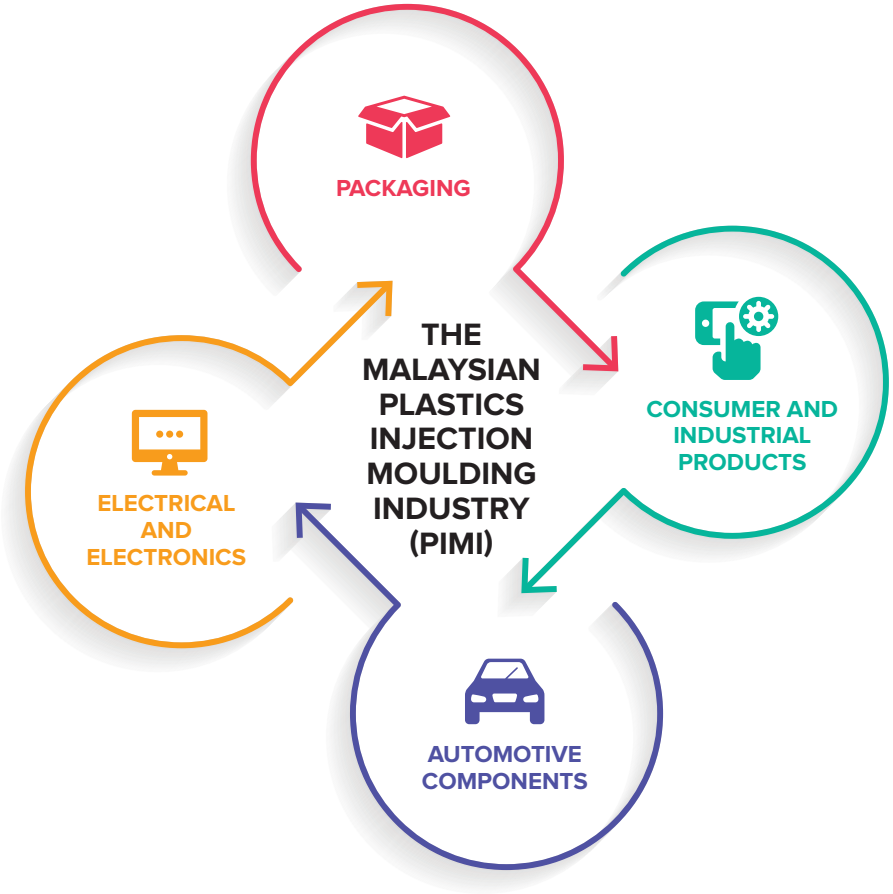
Although not being a part of the 12 national key economic areas (NKEAs), the plastics industry is intrinsically linked to all other sectors and is an important contributor to the local manufacturing industry, providing a feedstock into a diverse range of end-use industries. As mentioned by the then Deputy International Trade and Industry Minister Dr Ong Kian Ming, "the plastics products industry is one of the most vibrant industries in Malaysia's manufacturing sector"[4].

Nonetheless, with the presence of strong competitions from leading plastics-manufacturing countries such as China and Germany, as well as the Southeast Asian counterparts such as Thailand, Vietnam, and Indonesia, it is imperative for Malaysian manufacturers to put emphasis on technology improvement and innovation, skills development amongst employees, as well as exploration of new markets in order to sustain competitiveness. The nurturance of strong quadruple helix linkages between research and education institutions, industry associations, government agencies, and public sentiments, will be a great prospect for the Malaysian plastics industry to continue the process of moving up the innovation value chain, drive for excellence in product and process innovations.

Malaysian Plastics Manufacturers Association (MPMA), actively engages with key stakeholders to promote sustainability practices, proper usage of plastics with due care to the environment and to promote the plastics industry more widely across Malaysia and globally. A series of economic plans were launched to enable Malaysian firms to move up the innovation value chain, attract talent, and gain competitive advantage. However, Malaysian plastics firms face challenges in navigating the transition from low value to high value workforce to be able to compete globally. Central to these transitions is the development of a highly skilled workforce and the adoption of Industry 4.0 (i4.0)

[3] https://www.thestar.com.my/business/business-news/2018/10/15/analysts-cautious-on-the-future-of-domestic-plastics-industry
[4] https://www.mida.gov.my/home/9579/news/plastic-products-industry-one-of-malaysia-s-most-vibrant-industries-/

The Malaysian Plastics Injection Moulding Sector



The production of plastics products in Malaysia comprises of three main processes which include injection moulding, film extrusion and blow moulding. The focus of this study is limited to the injection moulding sector.

The plastics injection moulding sector – an important supporting sector to many different manufacturing areas

PLASTICS INDUSTRY SUPPLY CHAIN

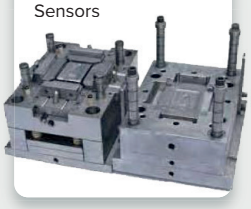
INJECTION MOULDING PROCESS

1 RAW MATERIALS

Resins
Additives
Colorants
Modifiers
Plasticisers
Recycled raw materials

2 MOULD

Tool steel material
Lubricants
Gaskets
O-rings
Seals
Nipples & connectors
PVC hose & PU tubing
Welding rods
Drill bits & cutter bits
Heaters
Hot runner systems
Sensors



3 CONVERTOR/ INJECTION MOULDING

Machines & servicing
Robotics & servicing
Auxilliary & servicing
Mould release & protection spray
Lubricants
Machines spare parts (e.g. heaterbands, electrical contacters, thermo couples, limit switches, etc)
Chillers
Cooling towers
Water treatment system

4 PRINTING/SPRAY PAINTING

Ink
Solvents
Hardeners
Silk screen
Pad printing
Spary guns
Spray painting cans
Air compressors

5 PACKAGING

Bubble packs
Layer packs
PE bags
Carton boxes
Nesting tray
OPP tapes
Adhesive
Vacuum (Thermoformed) trays
Labels
Date code stickers
Stretch films
Stretch hoods

6 TRANSPORTATION /SERVICES

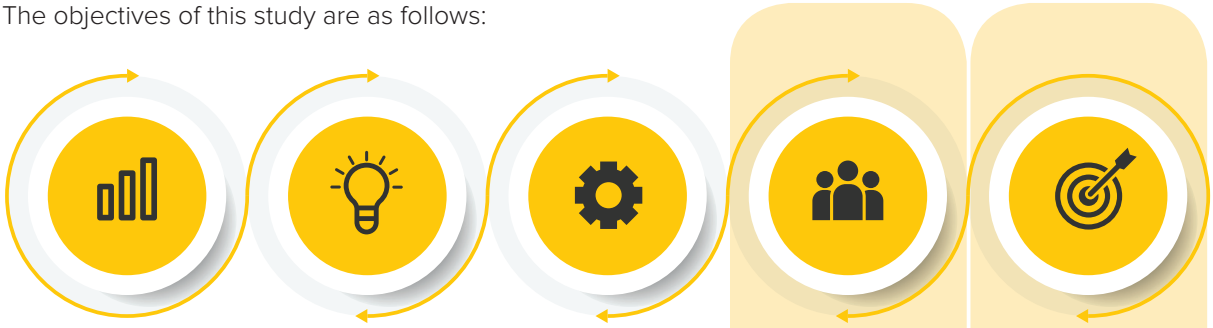
Wooden & Plastics Pallets
Stretch films
Stretch hoods
Shrink hoods
Strapping bands
Forklifts
Lift trucks
Overhead cranes

7 EG. FINISHED PRODUCTS

Band for face shield
E&E parts - blender, fan, aircon, TV
Caps/closures
Medical trays
Syringe
Intravenous components
Speculum
Syringe needle holders
Automotive parts - car, motocycle, trucks
Industrial & Domestic Water Filtration
Sanitizers Sprayheads
Part and components for medical machines/monitors
Parts for office automation equipment - photocopier
Sharp bins
Household products
Telecommunication parts - handphones
Furniture - tables, chairs
Water cistern, water tanks
Industrial Machines Parts

3 Objectives of the Study

The objectives of this study are as follows:



Provide an economic assessment and labour profile of the sector, particularly with regard to current employment and human capital situation.

Assess the drivers of change impacting the plastics industry and the requirement for skills in light of the changes.

Assess the demand and supply of skills in the plastics injection moulding industry.

Map the career pathway of the key occupations within the plastics injection moulding industry.

List recommendations to ensure that the skills requirements of the plastics injection moulding industry are addressed.

Focus of the Skills Gap Study

This study also looks to address the following questions and issues:

Skills Gap

What are the skills gap of firms in this industry?

Skills Development

What are the factors contributing to the development of the skills of the workforce of firms in this industry?

Players

Who are the players contributing to the development of skills for firms in the PIMS?

Institutions

What are the roles of key institutions, such as government, research institutes, universities, industry associations, financial institutions, in providing support and training for this industry? And,

Knowledge

How to create sustainable skills knowledge clusters that have the capability to provide relevant training and mentorship that will lead the development of the industry to higher platform of competitiveness?

4 Research Methodology

This study used a mixed-methods approach that combines quantitative with qualitative analyses to obtain a comprehensive understanding of the industry and the various perspectives of its key stakeholders. The quantitative methods involved a structured questionnaire survey and descriptive analysis were used to provide information on the current and future needs of human capital in the Malaysian plastics industry. The qualitative methods comprised of three separate focus group discussions with (i) MPMA; (ii) selected employers and business owners from the injection moulding industry; (iii) and representatives from the Technical and Vocational Education and Training (TVET) Institutions and the Ministry of Education.

This study focuses on seven key functional roles within the Injection Moulding sub-sector of the plastics industry, based on the types of skills required. The roles are listed below:

Senior General Management
Chief Executive Officer, Chief Operating Officer, etc.

Finance
Costing Personnel

Technologist
Product Engineer, Manufacturing/Industrial Engineer, CAD-CAM Engineer/ Tooling Engineer, Project Engineer, Q.C./Q.A. Engineer, Electronics/Electrical Engineer, Technical Services Engineer, Moulding Engineer, Production Operations Manager

Technician
Supervisor/Foreman, Mechanical Engineering Technician, Electronics/ Electrical Engineering Technician, Q.C./Q.A. Technician, Product/ Packaging Development Technician, Laboratory/ Materials Technician, Manufacturing/Industrial Engineering Technicians, Tooling Technicians, CAD-CAM Technician (Tooling), Production Planner

Craftsman
Team Leader, Electrician, Mould and Die Maker, Model/ Prototype Maker, Plastics Machine Setter, Quality Control Inspector

Operative worker
Injection Moulding Machine Operator, Other Plastics Processing Machine Operator, Printing Operator, Assembler, Plastics Fabricator/Welder

General worker (unskilled)
Factory Worker; involved in manual work such as loading and unloading of goods, sprue removal, packing, etc.

A structured questionnaire survey was used to collect information from both the senior executive (i.e. employers) roles and non-executive (i.e. employees) roles of firms in the industry. The survey questions were designed to capture the different perspectives of the two main roles above to ascertain if there were any gaps in their perception on the nature of the jobs and trainings. The questionnaire was sent to MPMA for feedback and comments on the clarity and conciseness of questionnaire items. Recommendations from MPMA were taken into account and incorporated into the final questionnaire.

The survey was administered to 47 firms within the plastics injection moulding industry, with 47 employers and 74 employees responding in total.

The questionnaire was structured into the following three key parts[5].

Part 1. Gauge the industry and business sentiments and their current and future skills needs:

- Optimism and confidence in the future of the plastics injection moulding industry
- Key internal and external issues of the company
- Technology use and plans
- Talent development strategy
- Level of importance of skills enhancement
- Importance of skills for manufacturing and technical positions
- Percentage of learning taking place on the job
- Actions taken to overcome problems hiring skilled employees
- Profile of new hires in terms of level of difficulty to fill positions
- Staff turnover rate and reasons
- Salary of the workforce by job function
- Salary flexibility for ideal job candidates
- Involvement of key stakeholders
- Staff training expenses
- Importance of training needs for the business
- Key requirements for training providers
- Top three technical skills
- Top three 'soft' skills
- Top three work styles

Part 2. Gauge the effectiveness and feedback of the training environment:

- Training attendance
- Reasons for not undergoing training
- Types of training undergone
- Satisfaction with training
- Reasons for dissatisfaction with training
- Impact on job after training
- Incentives to use skills obtained from training
- Expectations of training programmes
- Outcomes of training programmes
- Willingness for additional training programmes
- Willingness to pay for non-HRDF approved courses

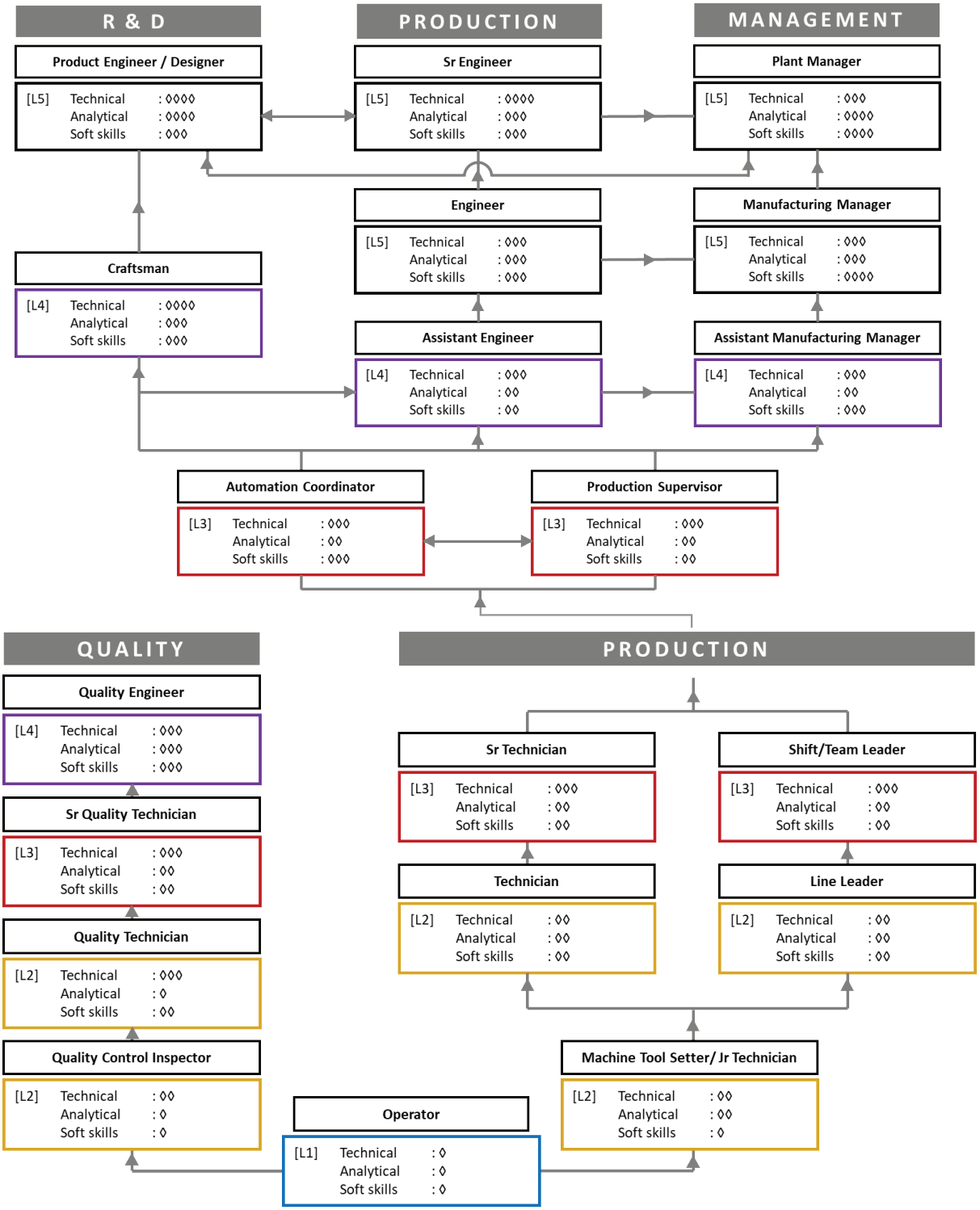
Part 3: Nature of Business and Structure of Existing Workforce:

- Structure of workforce
- Age profile of workforce
- Educational profile
- Main product types

[5] For full questionnaire details, refer to appendix 15.1 and 15.2.

The focus group discussions were conducted with an average of 8 – 10 representatives for each of the target groups. The discussions were guided with a semi-structured set of discussion points by an expert moderator from the study team. The key themes of the discussion points were:

5 Career Pathway[6]



[6] The proposed career pathway serves as a guide for companies. The exact roles and progression should be modified to suit the individual company's purpose and scale for optimal relevance and effectiveness.

Note: Refer to page 18 for the key '◊'.

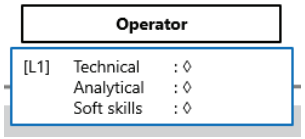
6 Skills Framework for Roles

This skills framework provides a guide for the different tiers of skills required between the roles and gives a quick overview of the level of competencies needed to succeed at the given role level.

Level	Technical	Analytical	Soft Skills
Tier 1 ◊	Ability to apply technical knowledge to complete well-defined tasks and address straight-forward problems.	Ability to carry out logical deductions or inferences based on knowledge at hand to successfully carry out tasks assigned to the individual.	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully carry out tasks assigned to the individual.
Tier 2 ◊◊	Good understanding of technical knowledge accompanied with the ability to identify and use relevant understanding to complete complex and non-routine problems.	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.
Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.	Ability to carry out logical deductions or inferences in a creative and systematic manner to plan and develop courses of action underpinning substantial developments in the company.	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.
Tier 4 ◊◊◊◊	Ability to develop original understanding and extend a sub-area of knowledge or professional expertise. It reflects the ability to address novel situations involving systems of interacting factors.	Ability to carry out logical deductions or inferences systematically to plan and develop courses of action underpinning substantial developments in the company while considering industry best-practices.	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead the department or company to perform tasks while considering industry best-practices.

General Pathway

Operator



	Description
Technical Tier 1 ◊	Ability to apply technical knowledge to complete well-defined tasks and address straight-forward problems.
Analytical Tier 1 ◊	Ability to carry out logical deductions or inferences based on knowledge at hand to successfully carry out tasks assigned to the individual.
Soft Skills Tier 1 ◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully carry out tasks assigned to the individual.

	Technical	Analytical	Soft skills
CORE	• Safe operation and maintenance of production machinery and tools Understanding and adherence to departmental Standard Operation Procedures (SOPs) and Key Performance Indicators (KPIs). • Perform quality checks on finished product as per SOPs. • Maintain a clean, safe, and organised workspace. • Prepare materials for feeder. • Prepare sprues, runners, rejects for crushing. • Prepare supplementary processing materials (packaging materials, ink, solvent, paint, jigs and fixtures, etc.).	• Ability to make decisions within limits of authority and react quickly to problems. • Basic problem solving/trouble shooting abilities	• Work in teams. • Communication with superior or supervisor. • Positive work ethic and self-discipline to complete tasks assigned.
IDEAL	• Able to install moulds and set down moulds in preparation for parameter set up.	• Independently reset minor machine parameters that result from deviations in settings • Ability to contribute ideas for process improvement.	• Reading and writing skills to understand machinery manuals and prepare simple reports.

Technical Training	Soft Skills Training
- SPM - Introduction to Injection Moulding	- Occupational Safety and Health - Analytical & Problem Solving - Team Building - Communication - 5S

Production Pathway

Machine Tool Setter

Machine Tool Setter		
[L2]	Technical	: ◊◊
	Analytical	: ◊◊
	Soft skills	: ◊

	Description
Technical Tier 2 ◊◊	Good understanding of technical knowledge accompanied with the ability to identify and use relevant understanding to complete complex and non-routine problems.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 1 ◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully carry out tasks assigned to the individual.

	Technical	Analytical	Soft skills
CORE	• Repair and maintain machines and auxiliary equipment, using hand tools and power tools. • Trim excess material from part using knife, and grind scrap plastics into powder for reuse. • Remove finished or cured product from dies or mould, using hand tools and air hose. • Measure and visually inspect product for surface and dimension defects, using precision measuring instruments, to ensure conformance to specifications. • Position, align and secure assembled mould, mould components, and machine accessories onto a machine press bed, and attach connecting lines. • Install mould onto machine according to work order specifications. • Observe and adjust machine set up and operations to eliminate production of defective parts and products. • Read specifications to determine setup and prescribed temperature and time settings to mould, form or cast plastic materials.	• Ability to make decisions within limits of authority and react quickly to problems • Contribute ideas to process improvements. • Troubleshoot machine and product quality issues and performing corrective technical or mechanical solutions.	• Communication with manager or supervisor • Work alongside a small team of associates in execution of daily production tasks, work scheduling, training, maintenance, continuous improvement and support the implementation of ISO quality system. • Maintain positive employee relations and adhere to company policies, safety standards and good housekeeping practices.
IDEAL	• Interpret engineering drawings for equipment configuration set up. • Conduct pre-operational checks. • Set up die and components and perform hot processing operations. • Monitor product quality and perform rework.	• Analyse and implement improvement solutions. • Perform evaluations and/or experiments.	• Possess basic numerical and IT skills for calculations and process control • Supervise and monitor manufacturing activities

Technical Training	Soft Skills Training

- SKM 2 – Plastics Injection Moulding Operation Start-Up
- Scientific Injection Moulding, Routsis Training
- Scientific Die Setter, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
	- Occupational Safety and Health
	- Analytical & Problem Solving
	- Decision Making
	- Team Building
	- Communication
	- ISO Standards Knowledge
	- Positive Employee Relations/Interpersonal
	- Lean Manufacturing
	- Automation
	- Computer literacy

Junior Technician

Jr Technician		
[L2]	Technical	: ◊◊
	Analytical	: ◊◊
	Soft skills	: ◊

	Description
Technical Tier 2 ◊◊	Good understanding of technical knowledge accompanied with the ability to identify and use relevant understanding to complete complex and non-routine problems.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 1 ◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully carry out tasks assigned to the individual.

	Technical	Analytical	Soft skills
CORE	• Install, setup, start-up, operation and adjustment of injection moulding machine. • Adhere to safety rules and regulations and maintain workplace cleanliness. • Assist in preventative, corrective, and emergency maintenance of equipment. • Inspect, assemble, pack, and label products. • Setup die and components and perform hot processing operations. • Communicate any defects and products placed on hold for evaluation.	• Troubleshoot and adjust injection moulding machine parameters. • Perform problem-solving of moulding quality defects and correct them. • Perform corrective technical or mechanical solutions.	• Able to work alongside a small team of associates. • Maintain positive employee relations. • Communication with supervisor/manager on production related issues. • Ability to coordinate with other production floor staff (e.g., forklift drivers, quality control, supervisors, receiving group).
IDEAL	• Interpret engineering drawings for equipment configuration setup. • Conduct pre-operational checks. • Monitor product quality and perform rework.	• Contribute to manufacturing process improvements	• Possess basic numerical and IT skills for calculations and process control

Technical Training	Soft Skills Training

- SKM 2 – Plastics Injection Moulding Operation Start-Up
- Scientific Injection Moulding, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Blue Print Reading & Geometric Dimensioning & Tolerancing, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
	- Occupational Safety and Health
	- Team Building
	- Positive Employee Relations/Interpersonal
	- Communication
	- Documentation and Report Writing
	- Computer literacy

Line Leader

Line Leader

[L2] Technical : ◊◊
Analytical : ◊◊
Soft skills : ◊◊

Description	
Technical Tier 2 ◊◊	Good understanding of technical knowledge accompanied with the ability to identify and use relevant understanding to complete complex and non-routine problems.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Monitor product quality and production lines of trim/sort operations to improve yield and to address quality defects. • Monitor lines to ensure proper yield calculations, waste and spill points. • Review of production schedules for accurate run times. • Communicate defects and products placed on hold for evaluation. • Adhere to compliance of safety regulations, company policies, and maintenance workplace cleanliness. • Identify and report safety hazards, malfunctions and accidents within the production area to supervisor/manager. • Complete work orders and accident reports. • Monitor equipment condition and conduct preventative, corrective, and emergency maintenance of equipment. • Setup die and components and perform hot processing operations.	• Troubleshoot and adjust injection moulding machine parameters. • Perform problem-solving of moulding quality defects and correct them. • Perform corrective technical or mechanical solutions.	• Communicate with supervisor/manager on production related issues. • Ability to coordinate with other production floor staff (e.g., forklift drivers, quality control, supervisors, receiving group). • Able to work alongside a small team of associates and maintain positive employee relations. • Ability to work with minimal supervision. • Lead, monitor, and instruct Junior Technicians/ Mould Setters.
IDEAL	• Interpret engineering drawings for equipment configuration setup. • Conduct pre-operational checks. • Monitor product quality and perform rework.	• Ability to analyse areas of improvements and contribute to its implementation. • Work with development team to introduce new materials, products and process technologies.	• Possess basic numerical and IT skills for calculations and process control.

Technical Training	Soft Skills Training

- SKM 2 – Plastics Injection Moulding Operation Start-Up
- Scientific Injection Moulding, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Blue Print Reading & Geometric Dimensioning & Tolerancing, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Overall Equipment Efficiency
	- Occupational Safety and Health
	- Team Building
	- Leadership Development
	- Positive Employee Relations/Interpersonal
	- Communication
	- Documentation and Report Writing
	- Computer literacy

Technician

Technician

[L2] Technical : ◊◊
Analytical : ◊◊
Soft skills : ◊◊

Description	
Technical Tier 2 ◊◊	Good understanding of technical knowledge accompanied with the ability to identify and use relevant understanding to complete complex and non-routine problems.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Monitor product quality and production lines of injection moulding operations to improve yield and to address quality defects. • Monitor and inspect lines for assembly, packing, and labelling. • Comply with safety regulations, company policies, and maintenance of workplace cleanliness. • Execute daily production tasks and implementation of ISO quality systems with team members. • Identify and report safety hazards, malfunctions and accidents within the production area to supervisor/manager. • Complete work orders and accident reports. • Monitor equipment condition and conduct preventative, corrective, and emergency maintenance of equipment. • Setup die and components and perform hot processing operations.	• Troubleshoot and adjust injection moulding machine parameters. • Perform problem-solving of moulding quality defects and correct them. • Perform corrective technical or mechanical solutions.	• Communication with supervisor/manager on production related issues. • Ability to coordinate with other production floor staff (e.g., forklift drivers, quality control, supervisors, receiving group). • Able to work alongside a small team of associates and maintain positive employee relations. • Ability to work with minimal supervision. • Lead, monitor, and instruct Junior Technicians/ Mould Setters.
IDEAL	• Interpret engineering drawings for equipment configuration setup. • Conduct pre-operational checks. • Monitor product quality and perform rework.	• Ability to analyse areas of improvements and contribute to its implementation. • Work with development team to introduce new materials, products and process technologies.	• Possess basic numerical and IT skills for calculations and process control.

Technical Training

- SKM 2 – Plastics Injection Moulding Operation Start-Up
- Scientific Injection Moulding, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Blue Print Reading & Geometric Dimensioning & Tolerancing, Routsis Training
- Scientific Die Setter, Routsis Training
- Understanding Plastics Materials and Processing Techniques

Soft Skills Training

- Occupational Safety and Health Co-ordinator
- Team Building
- Leadership Development
- Positive Employee Relations/Interpersonal
- Communication
- Documentation and Report Writing
- Computer literacy

Senior Technician

Sr Technician

[L3] Technical : ◊◊◊
Analytical : ◊◊
Soft skills : ◊◊

	Description
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Lead a small team for monitoring product quality, production lines and maintenance of equipment. • Ensure correct setup of die, components and machinery for hot processing operations. • Assist with the coordination of tooling and equipment availability and maintenance by liaising with external vendors. • Conduct preventative, corrective, and emergency maintenance of equipment. • Ensure adherence of company policies, safety rules, and quality compliance of personnel. • Ability to interpret engineering drawings for equipment configurations. • Conduct pre-operational checks and monitor product quality and perform rework.	• Troubleshoot and adjust injection moulding parameters to maintain quality and maximum product output. • Perform problem solving to develop corrective actions for customer issues or to initiate continuous improvement • Respond to problems by performing corrective technical or mechanical solutions. • Ensure personnel capabilities of troubleshooting, machine adjustments, and performing corrective or mechanical solutions. • Resolving personnel problems by analysing data; investigating issues; identifying solutions; recommending action.	• Communication with supervisor/manager on production related issues. • Possess teamwork capabilities and maintain positive employee relations. • Lead, monitor, and instruct personnel under charge. • Ability to coordinate with other production floor staff (e.g., forklift drivers, quality control, supervisors, receiving group). • Possess basic numerical and IT skills for calculations and process control. • Ability to work with minimal supervision.
IDEAL	• Plan preventative maintenance and product changeover. • Assist in projects and equipment installation.	• Ability to analyse areas of improvements; and contribute to the creation and revision of systems and procedures for process improvements. • Work alongside development team to introduce new materials, products and process technologies.	• Ability to work independently and unsupervised. • Possess knowledge in production, machinery, engineering and polymers. • Ability to use analytical and diagnostic tools (e.g., SPC, FMEA, SMED). • Possess intermediate numerical and IT skills for calculations and process control.

Technical Training

- SKM 2 – Plastics Injection Moulding Operation Start-Up
- SKM 3 – Plastics Injection Moulding Operation Start-up Supervision
- Scientific Injection Moulding, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Blue Print Reading & Geometric Dimensioning & Tolerancing, Routsis Training
- Scientific Die Setter, Routsis Training
- Understanding Plastics Materials and Processing Techniques
- Statistical Process Control
- Failure Mode and Effects Analysis
- Single Minute Exchange of Die

Soft Skills Training

- Occupational Safety and Health Co-ordinator
- Team Building
- Leadership Development
- Customer Relations
- Positive Employee Relations/Interpersonal
- Data Analysis
- Communication
- Documentation and Report Writing
- Computer literacy

Shift/Team Leader

Shift/Team Leader

[L3] Technical : ◊◊◊
Analytical : ◊◊
Soft skills : ◊◊

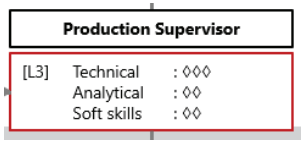
Description	
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Lead a small team of personnel with monitoring of product quality and production lines of trim/sort operations for quality defects. • Ensure production lines are monitored for proper yield calculations, waste and spill points. • Ensure monitoring of equipment condition by personnel and the completion of preventative, corrective, and emergency maintenance of equipment. • Compile production related data for performance analysis. • Ensure team adherence to company policies, and safety regulations by educating and directing personnel on workplace cleanliness; reporting of safety hazards; accidents and malfunctions; control points; equipment; and resources. • Complete work orders and assist in the completion accident reports.	• Assist in the creation and revision of systems and procedures. • Ensure team personnel capabilities of troubleshooting, machine adjustments, and performing corrective or mechanical solutions. • Resolving personnel problems by analysing data; investigating issues; identifying solutions; recommending action.	• Communication with supervisor/manager on production related issues. • Ensure personnel teamwork and maintain positive employee relations. • Lead and monitor team personnel and their coordination with other production floor staff (e.g., forklift drivers, quality control, supervisors, receiving group). • Possess basic numerical and IT skills for calculations and process control. • Ability to work with minimal supervision.
IDEAL	• Complete production plan by ensuring team personnel meet production schedules. • Assist in the evaluation of new equipment and techniques.	• Ability to analyse areas of improvements and implement changes. • Work with development team to introduce new materials, products and process technologies.	• Ability to work independently and unsupervised. • Possess knowledge in production, machinery, engineering and polymers.

Technical Training	Soft Skills Training

- SKM 2 – Plastics Injection Moulding Operation Start-Up
- SKM 3 – Plastics Injection Moulding Operation Start-up Supervision
- Scientific Injection Moulding Process Optimisation, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Understanding Plastics Materials and Processing Techniques
- Overall Equipment Efficiency
- Automation & Robotics for Scientific Moulding
	- Occupational Safety and Health Co-ordinator
	- Team Building
	- Leadership Development
	- Positive Employee Relations/Interpersonal
	- Data Analysis
	- Root Cause Analysis
	- Communication
	- Documentation and Report Writing
	- Computer literacy

Production Supervisor



	Description
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Complete production plan by scheduling and assigning personnel flow on shift production summaries. • Maintain workflow by monitoring steps of process. • Ensure operation of equipment by calling for repairs; evaluating new equipment and techniques • Provide manufacturing information by compiling, initiating sorting, and analysing production performance records and data; answering questions and responding to requests. • Maintain quality service by establishing and enforcing organisation standards • Maintain safe and clean work environment by educating and directing personnel on the use of all control points; equipment, and resources; maintaining compliance with established policies and procedures.	• Create and revise systems and procedures by analysing operating practices, recordkeeping systems, forms of control and budgetary and personnel requirements; implementing change. • Resolve personnel problems by analysing data; investigating issues; identifying solutions; recommending action.	• Accomplish manufacturing staff results by communicating job expectations; planning, monitoring and appraising job results; coaching, counselling and disciplining employees; initiating, coordinating and enforcing systems, policies and procedures. • Maintain staff by recruiting, selecting, orienting, and training employees; develop personal growth opportunities. • Possess basic numerical and IT skills for calculations and process control. • Ability to work with minimal supervision.
IDEAL	• Plan preventive maintenance and product changeover. • Develop, enforce and coordinate health, safety and policy compliance. • Coordinate equipment and machinery availability, repair and maintenance by liaising with external vendors regarding maintenance and repair.	• Identify and implement improvement measures to meet production targets and maximise efficiency.	• Possess knowledge in production, machinery, engineering and polymers. • Ability to work independently and unsupervised. • Ability to use analytical and diagnostic tools and production methods (i.e., SPC, FMEA, SMED).

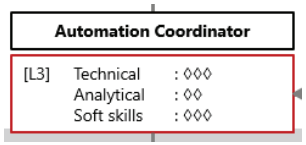
Technical Training

- SKM 3 – Plastics Injection Moulding Operation Start-up Supervision
- Scientific Injection Moulding, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Preventive Maintenance
- Understanding Plastics Materials and Processing Techniques
- Overall Equipment Efficiency
- Automation & Robotics for Scientific Moulding

Soft Skills Training

- Occupational Safety and Health Co-ordinator
- Human Resource
  - Recruitment
  - Appraisal
  - Counselling
  - Training
- Team Building
- Company Procedures and Policies Knowledge
- Leadership Development
- ISO Standards Knowledge
- Positive Employee Relations/Interpersonal
- Problem Solving
- Communication
- Documentation and Report Writing
- Computer literacy

Automation Coordinator



Description	
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 3 ◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.

	Technical	Analytical	Soft skills
CORE	• Lead monitoring of product quality and production lines (i.e., assembly, packing, labelling) execution of other daily production tasks. • Conduct pre-operational checks to ensure production lines and equipment are properly setup. • Facilitate projects and installation of new equipment. • Ensure monitoring of equipment condition by personnel and the completion of preventative, corrective, and emergency maintenance of equipment. • Collect and compile manufacturing engineering and process specifications data for analysis. • Enforce and adhere to compliance with company policies, and safety regulations by educating and directing personnel on workplace cleanliness; reporting of safety hazards; accidents and malfunctions; control points; equipment; and resources.	• Troubleshoot and adjust injection moulding parameters to maintain quality and maximum product output. • Develop corrective actions for customer issues or to initiate continuous improvement. • Contribute to the development, improvement and revision of manufacturing processes by analysing areas of improvement. • Work alongside development team to introduce new materials, products and process technologies. • Assist in research projects by applying knowledge in injection moulding production line and processes. • Resolving personnel problems by analysing data; investigating issues; identifying solutions; recommending action.	• Lead, coach, and monitor team personnel in production activities, troubleshooting and equipment maintenance. • Maintain positive employee relations and adhere to company policies, safety standards, and good housekeeping practices. • Possess basic numerical and IT skills for calculations and process control. • Ability to work with minimal supervision.
IDEAL	• Install and align mould components. • Plan preventive maintenance and product changeover. • Develop, enforce and coordinate health, safety and policy compliance. • Coordinate equipment and machinery availability, repair and maintenance by liaising with external vendors regarding maintenance and repair.	• Ability to analyse areas of improvements; and contribute to the creation and revision of systems and procedures for process improvements. • Work alongside development team to introduce new avenues for automation.	• Possess knowledge in production, machinery, engineering and polymers. • Ability to work independently and unsupervised. • Ability to use analytical and diagnostic tools and production methods (i.e., SPC, FMEA, SMED).

Technical Training

- Degree in Electrical Engineering/Computer Science Scientific Injection Moulding, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Process Documentation for Scientific Moulders, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Preventive Maintenance
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Automation & Robotics for Scientific Moulding
- Automation Design
- Overall Equipment Efficiency

Soft Skills Training

- Occupational Safety and Health Co-ordinator
- Customer Relations
- Team Building
- Company Procedures and Policies Knowledge
- Leadership Development
- ISO Standards Knowledge
- Positive Employee Relations/Interpersonal
- Problem Solving
- Data Collection and Analysis
- Communication
- Documentation and Report Writing
- Computer literacy

Assistant Engineer

Assistant Engineer

[L4] Technical : ◊◊◊
Analytical : ◊◊
Soft skills : ◊◊

	Description
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Develop and install all new injection moulding equipment and document all implementation processes for all moulded products. • Maintain optimal quality and assist to design all control plans. • Administer all projects and recommend improvement to facilitate all first-time quality. • Perform regular investigations for all projects. • Provide support to all operational objectives. • Provide manufacturing engineering information by answering questions and requests. • Prepare all specifications of all plastics processes.	• Perform root-cause analysis for all injection moulding. • Develop manufacturing processes by studying product requirements; researching, designing, modifying, and testing manufacturing methods and equipment; conferring with equipment vendors. • Assure product and process quality by designing testing methods; testing finished product and process capability; establishing standards; confirming manufacturing processes.	• Communicate and engage with external vendors. • Analytical and research capabilities. • Work independently without supervision. • Ability to lead small teams and coordinate personnel. • Possess knowledge in production, machinery, engineering and polymers. • Possess intermediate numerical and IT knowledge.
IDEAL	• Evaluate and lead improvement projects.	• Evaluate manufacturing processes by designing and conducting research programs; applying knowledge of product design, fabrication, assembly, tooling, and materials; conferring with equipment vendors; soliciting observations from operators.	• Ability to use analytical and diagnostic tools and production methods (i.e., SPC, FMEA, SMED).

Technical Training

- Diploma/Degree in Engineering discipline
- Scientific Injection Moulding, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Process Documentation for Scientific Moulders, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Processing for Profit, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Blue Print Reading & Geometric Dimensioning & Tolerancing, Routsis Training
- Understanding Plastics Materials and Processing Techniques
- Statistical Process Control
- Failure Mode and Effects Analysis
- Single Minute Exchange of Die
- Root Cause Analysis

Soft Skills Training

- Company Procedures and Policies Knowledge
- Leadership Development
- Positive Employee Relations/Interpersonal
- Problem Solving
- Data Collection and Analysis
- Communication
- Documentation and Report Writing
- Computer literacy

Engineer

Engineer		
[L5]	Technical	: ◊◊◊
	Analytical	: ◊◊◊
	Soft skills	: ◊◊◊

	Description
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 3 ◊◊◊	Ability to carry out logical deductions or inferences in a creative and systematic manner to plan and develop courses of action underpinning substantial development in the company.
Soft Skills Tier 3 ◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.

	Technical	Analytical	Soft skills
CORE	• Assist in overseeing production of injection moulding parts and support new product and mould validations. • Coordinate machinery and schedules to meet production plan. • Support installation and start-up of new injection moulding lines. • Define mechanization requirements and concepts. • Coordinate mould sourcing and implementation and the validation of mould, equipment and product changes. • Ensure staff compliance to company quality management procedures. • Assist in the execution of Lean and 5S projects for existing production lines.	• Conduct root-cause analysis and create continuous improvement proposals. • Advise in the development of new products. • Design and outsource tools and fixtures to support the production process. • Set-up and assist with executing corrective and preventive maintenance procedures and work instructions for moulds and machines.	• Coordinate the work activities of production staff, process engineers and technicians. • Communicate with staff on work activities and expectations. • Strong background in injection moulding materials, machinery and processes.
IDEAL	• Conduct first-off and development trials and monitoring checks. • Conduct control plan design and assist in product cost requests. • Contribute to the design and implementation of automation related projects.*	• Review current and new injection moulding technologies and methods (e.g., automation and advanced polymers) to improve current production processes.* *Future-ready skills	• Possess capabilities in strategic management; budgeting, planning, scheduling, costing and estimating techniques.

Technical Training

- Degree in Engineering discipline
- Scientific Injection Moulding Process, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Process Documentation for Scientific Moulders, Routsis Training
- Injection Mould Set-up, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Mould Design and Mould Making
- Processing for Profit, Routsis Training
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Product Development for Injection Moulding
- Understanding Plastics Materials and Processing Techniques
- Material Drying Technology, Routsis Training
- Automation & Robotics for Scientific Moulding
- Purging for Scientific Moulders, Routsis Training
- Statistical Process Control
- Failure Mode and Effects Analysis
- Single Minute Exchange of Die
- Root Cause Analysis

Soft Skills Training

- Team Building
- Company Procedures and Policies Knowledge
- Leadership Development
- Positive Employee Relations/Interpersonal
- Problem Solving
- Data Collection and Analysis
- Communication
- Documentation and Report Writing
- Costing & Budgeting
- Planning & Scheduling
- Computer literacy

Senior Engineer

Sr Engineer		
[L5]	Technical	: ◊◊◊◊
	Analytical	: ◊◊◊
	Soft skills	: ◊◊◊

	Description
Technical Tier 4 ◊◊◊◊	Ability to develop original understanding and extend a sub-area of knowledge or professional expertise. It reflects the ability to address novel situations involving systems of interacting factors.
Analytical Tier 3 ◊◊◊	Ability to carry out logical deductions or inferences in a creative and systematic manner to plan and develop courses of action underpinning substantial development in the company.
Soft Skills Tier 3 ◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.

	Technical	Analytical	Soft skills
CORE	• Oversee production of injection moulding parts and support new product and mould validations. • Coordinate machinery and schedules to meet production plan. • Support installation and start-up of new injection moulding lines. • Define mechanization requirements and concepts. • Coordinate mould sourcing and implementation and the validation of mould, equipment and product changes. • Oversee quality assurance according to company quality management procedures. • Lead and execute Lean and 5S projects for existing production lines.	• Drive root-cause analysis and create continuous improvement proposals. • Advise in the development of new products. • Coordinate design and outsourcing of tools and fixtures to support the production process. • Set-up and execute corrective and preventive maintenance procedures and work instructions for moulds and machines.	• Lead the work activities of the production staff, process engineers and technicians. • Supervise and lead staff on work coordination and expectations. • Strong background in injection moulding materials, machinery and processes.
IDEAL	• Execute machine and process optimisation and implement improvement programmes. • Conduct first-off and development trials and monitoring checks. • Conduct control plan design and assist in product cost requests. • Design and implement automation related projects.*	• Review current and new injection moulding technologies and methods (e.g., automation and advanced polymers) to improve current production processes.* *Future-ready skills	• Robust capabilities in strategic management; commercial aptitude; resource allocation; budgeting, planning, scheduling, costing and estimating techniques.

Technical Training

- Degree in Engineering discipline
- Scientific Injection Moulding Process, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Process Documentation for Scientific Moulders, Routsis Training
- Injection Mould Set-up, Routsis Training
- Injection Moulding Machine and Mould Maintenance, Routsis Training
- Mould Design and Mould Making
- Processing for Profit, Routsis Training
- Preventive Maintenance
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Product Development for Injection Moulding
- Understanding Plastics Materials and Processing Techniques
- Material Drying Technology, Routsis Training
- Automation & Robotics for Scientific Moulding
- Purging for Scientific Moulders, Routsis Training
- Statistical Process Control
- Failure Mode and Effects Analysis
- Single Minute Exchange of Die
- Root Cause Analysis

Soft Skills Training

- Team Building
- Company Procedures and Policies Knowledge
- Leadership Development
- Positive Employee Relations/Interpersonal
- Problem Solving
- Data Collection and Analysis
- ISO Knowledge
- Communication
- Documentation and Report Writing
- Costing & Budgeting
- Strategic Planning
- Computer literacy

Research & Development Pathway

Craftsman

Craftsman		
[L4]	Technical	: ◊◊◊◊
	Analytical	: ◊◊◊
	Soft skills	: ◊◊◊

	Description
Technical Tier 4 ◊◊◊◊	Ability to develop original understanding and extend a sub-area of knowledge or professional expertise. It reflects the ability to address novel situations involving systems of interacting factors.
Analytical Tier 3 ◊◊◊	Ability to carry out logical deductions or inferences in a creative and systematic manner to plan and develop courses of action underpinning substantial development in the company.
Soft Skills Tier 3 ◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.

	Technical	Analytical	Soft skills
CORE	• Fundamentals and application of injection moulding processes. • Process control and automation in injection moulding. • Cleanroom moulding fundamentals • Carry out procedures for mould inspection, preparation and mould set-up, and perform mould set-up. • Prepare drawings, schematics and diagrams • Verify the quality of moulded parts against requirements. • Develop standards and guidelines for safety, operations and testing procedures, and ensure regulations compliance	• Optimise processes and formulate machining strategies. • Troubleshoot moulding defects • Resolve engineering and design integration problems and recommend solutions. • Conduct cost-benefit analysis and track expenditure. • Determine product requirements through inspection and analysis.	• Advanced knowledge in product design, processes and materials. • Intermediate leadership and teamwork skills
IDEAL	• Develop detailed dimensional and surface model drawings. • Design parts and assemblies with CAD.	• Research on engineering and design processes for improvement or adoption. • Contribute to business analytics and data-driven decisions.	• Liaise with customers, suppliers, and toolmakers. • Project management skills.

Technical Training	Soft Skills Training
- Diploma/Degree in Engineering - Scientific Injection Moulding Process, Routsis Training - Scientific Injection Moulding Process Optimisation, Routsis Training - Scientific Troubleshooting for Injection Moulding, Routsis Training - Fundamentals to Cleanroom Moulding - 3D Modelling and Simulation for Injection Moulding - Quality Monitoring for Injection Moulding Parts - Process Control, Routsis Training - Mould Design and Mould Making - Automation & Robotics for Scientific Moulding	- Team Building - Leadership Development - Positive Employee Relations/Interpersonal - Problem Solving - ISO Knowledge - Communication - Documentation and Report Writing - Costing & Budgeting - Strategic Planning - Computer literacy

Product Engineer / Designer

Product Engineer / Designer		
[L5]	Technical	: ◊◊◊◊
	Analytical	: ◊◊◊◊
	Soft skills	: ◊◊◊

	Description
Technical Tier 4 ◊◊◊◊	Ability to develop original understanding and extend a sub-area of knowledge or professional expertise. It reflects the ability to address novel situations involving systems of interacting factors.
Analytical Tier 4 ◊◊◊◊	Ability to carry out logical deductions or inferences systematically to plan and develop courses of action underpinning substantial development in the company while considering industry best-practices.
Soft Skills Tier 3 ◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.

	Technical	Analytical	Soft skills
CORE	• Fundamentals and application of injection moulding processes. • Process control and automation in injection moulding. • Cleanroom moulding fundamentals. • Understanding and managing of critical design parameters and product requirements such as costs, timelines, and specifications. • Documentation of R&D activities. • Enforce regulations compliance. • Select appropriate types of plastic injection moulding processes to meet requirements for specific jobs.	• Review manufacturing processes to identify areas to implement injection moulding. • Evaluate rapid prototyping, as a direct manufacturing process, for influences of system selection on final part quality. • Design assembly plans and identify bottlenecks in assembly processes. • Review designs for assembly techniques to determine average assembly time and costs. • Perform cost analyses for implementing injection mould designs.	• Extensive knowledge in product design, processes and materials. • Communicate with operators and vendors. • Train and guide technicians to streamline work process. • Independent knowledge improvement. • Produce accurate report writings on products and processes that communicates and highlights important aspects of overall quality, improvements and aspects which are lacking in a certain product or other relevant factors.
IDEAL	• Lead key product/process design initiatives. • Develop end-to-end experiments for the evaluation of new or improved products.	• Contribute to business analytics and data-driven R&D decisions. • Investigate sustainable design and product/process environmental impact.	• Liaise with customers, material suppliers, and external research programmes and institutions. • Project management skills.

Technical Training	Soft Skills Training
- Degree in Engineering/Product Design - Scientific Injection Moulding Process, Routsis Training - Scientific Troubleshooting for Injection Moulding, Routsis Training - Understanding Plastics Materials - Plastics Part Design, Routsis Training - Mould Design and Mould Making - Fundamentals to Cleanroom Moulding - 3D Modelling and Simulation for Injection Moulding - Automation & Robotics for Scientific Moulding - Blue Print Reading & Geometric Dimensioning & Tolerancing, Routsis Training - Math for Moulders, Routsis Training - Prototyping and Design for Injection Moulding - Injection Moulding Production & Quality Control Inspection Processes	- Team Building - Leadership Development - Company Procedures and Policies Knowledge - Positive Employee Relations/Interpersonal - Problem Solving - ISO Knowledge - Communication - Customer Relations - Documentation and Report Writing - Costing & Budgeting - Strategic Planning - Computer literacy

Quality Pathway

Quality Control Inspector

Quality Control Inspector

[L2] Technical : ◊◊
Analytical : ◊
Soft skills : ◊

	Description
Technical Tier 2 ◊◊	Good understanding of technical knowledge accompanied with the ability to identify and use relevant understanding to complete complex and non-routine problems.
Analytical Tier 1 ◊	Ability to carry out logical deductions or inferences based on knowledge at hand to successfully carry out tasks assigned to the individual.
Soft Skills Tier 1 ◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully carry out tasks assigned to the individual.

	Technical	Analytical	Soft skills
CORE	• Monitor the manufacturing process at different stages • Verify testing results of products. • Collect research data from projects and studies.	• Investigate and resolve product-related customer complaints.	• Produce accurate report writing that communicates and highlights important aspects of overall quality, improvements and aspects which are lacking in a certain product or other relevant factors. • Communication skills and techniques with internal team
IDEAL	• Assist with standards compliance and development.	• Identify inconsistencies and report/discover their causes	• Assist and communicate with regulator, client and third-party auditors. • Basic knowledge in process control concepts, systems and performance metrics; workplace tools and machinery; data collection. • Understand control charts and process capability indices

Technical Training	Soft Skills Training
- SKM 2 – Quality Assurance Assistant - SKM 3 - Quality Assurance Supervisor - Scientific Injection Moulding Process, Routsis Training - Scientific Troubleshooting for Injection Moulding, Routsis Training - Injection Moulding Production & Quality Control Inspection Processes - Statistical Process Control - Basic Measuring Tools - Blue Print Reading	- Team Building - Positive Employee Relations/Interpersonal - Problem Solving - ISO Knowledge - Communication - Customer Relations - Documentation and Report Writing - Computer literacy

Quality Technician

Quality Technician

[L2] Technical : ◊◊◊
Analytical : ◊
Soft skills : ◊◊

Description	
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 1 ◊	Ability to carry out logical deductions or inferences based on knowledge at hand to successfully carry out tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Able to perform audits. • Oversee and verify testing results of products. • Implement quality management strategies to ensure quality output. • Compile research data from projects and studies. • Assist with standards compliance and development.	• Investigate and resolve product-related customer complaints. • Review and identify areas for improvement of QC procedures and test methods.	• Able to produce reports that communicate message clearly with accurate data. • Lead, guide, and mentor employees on quality parameters according to suitable work styles, effectively. • Assist and communicate with regulator, client and third-party auditors. • Sufficient interpersonal skills to achieve objective during mentoring or negotiations.
IDEAL	• Plan daily quality control performance	• Determine follow-up actions	• Advanced knowledge in process control concepts, systems and performance metrics; workplace tools and machinery; data collection. • Use of control charts and process capability indices

Technical Training	Soft Skills Training
- SKM 2 – Quality Assurance Assistant - SKM 3 - Quality Assurance Supervisor - Scientific Injection Moulding Process, Routsis Training - Scientific Troubleshooting for Injection Moulding, Routsis Training - Injection Moulding Production & Quality Control Inspection Processes - Statistical Process Control - QMS Auditor - Basic Measuring Tools - Blue Print Reading	- Team Building - Positive Employee Relations/Interpersonal - Problem Solving - ISO Knowledge - Communication - Customer Relations - Negotiation Skills - Documentation and Report Writing - Computer literacy

Senior Quality Technician

Sr Quality Technician

[L3] Technical : ◊◊◊
Analytical : ◊◊
Soft skills : ◊◊

Description	
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 2 ◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others in their immediate team.

	Technical	Analytical	Soft skills
CORE	• Able to perform audits with high precision. • Defines accurately, enforce and monitor quality procedures. • Plan quality management strategies to ensure quality output. • Evaluate. document and ensure standards and regulatory compliance.	• Identify and initiate corrective action promptly without supervision. • Assist in quality and performance improvement based on past performance of relevant parties.	• Manage quality-related training. • Use of control charts and process capability indices • Liaise with client, suppliers, and auditors. • Data gathering and report writing. • Communication and interpersonal skills.
IDEAL	• Set up process control systems and manage QMS processes. • Verify process control performance. • Set metrics and standards for QMS.	• Determine follow-up actions. • Review and identify areas for improvement of QC procedures and test methods.	• Extensive knowledge in process control concepts, systems and performance metrics; QMSs; quality tools; non-conformance reporting procedures. • Supervise and lead quality technicians and inspectors for daily QC activities.

Technical Training	Soft Skills Training
- SKM 3 - Quality Assurance Supervisor - Scientific Injection Moulding Process, Routsis Training - Scientific Troubleshooting for Injection Moulding, Routsis Training - Injection Moulding Production & Quality Control Inspection Processes - Statistical Process Control - Basic Measuring Tools - Blue Print Reading - QMS Auditor - Lead Auditing	- Team Building - Positive Employee Relations/Interpersonal - Problem Solving - ISO Knowledge - Communication - Customer Relations - Negotiation Skills - Documentation and Report Writing - Computer literacy

Quality Engineer

Quality Engineer

[L4] Technical : ◊◊◊
Analytical : ◊◊◊
Soft skills : ◊◊◊

	Description
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 3 ◊◊◊	Ability to carry out logical deductions or inferences in a creative and systematic manner to plan and develop courses of action underpinning substantial development in the company.
Soft Skills Tier 3 ◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.

	Technical	Analytical	Soft skills
CORE	• Develop, implement and supervise quality production programmes. • Develop and maintain supplier quality index. • Monitor manufacturing process and coordinate systems • Revision of quality control manuals.	• Investigate and correct product quality issues and complaints. • Identify and resolve process issues.	• Extensive knowledge in process control concepts, systems and performance metrics; QMSs; quality tools; non-conformance reporting procedures. • Report writing for client and staff. • Design and implement quality training programs for personnel. • Use of statistical control programs.
IDEAL	• Manage and introduce quality management systems. • Develop and manage systems for health, safety and environmental performance.	• Define and formulate strategies for QC performance improvement projects. • Recommend follow-up actions. • Involved in new product and materials development.	• Prepare for and represent the company during all audits. • Supervise quality control team leads and workers to ensure high productivity and product integrity throughout the production cycle.

Technical Training

- Degree in Engineering discipline
- Scientific Injection Moulding Process, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Scientific Injection Moulding Process Optimisation, Routsis Training
- Injection Moulding Production & Quality Control Inspection Processes
- Basic Measuring Tools
- Blue Print Reading
- Statistical Process Control
- QMS Auditor
- Lead Auditing

Soft Skills Training

- Occupational Safety and Health
- Team Building
- Positive Employee Relations/ Interpersonal
- Leadership Development
- Auditing Skills
- Investigation Skills
- Problem Solving
- ISO Knowledge
- Managerial Skills
- Communication
- Customer Relations
- Negotiation Skills
- Documentation and Report Writing
- Computer literacy

Management Pathway

Assistant Manufacturing Manager

Assistant Manufacturing Manager		
[L4]	Technical	: ◊◊◊
	Analytical	: ◊◊
	Soft skills	: ◊◊◊

	Description
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 2 ◊◊	Ability to carry out logical deductions or inferences based on knowledge at hand to troubleshoot existing and anticipate future problems related to the tasks assigned to the individual.
Soft Skills Tier 3 ◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead others on a departmental or company-wide level.

	Technical	Analytical	Soft skills
CORE	• Assist with setting critical production parameters and product requirements such as costs, timelines, safety, and specifications. • Assist with complying with regulations and industry standards. • Keep equipment operational by coordinating maintenance and repair services. • Ensure all products are produced to high quality standards.	• Monitor all manufacturing processes and maintain the optimization of all equipment. • Analyse and review all production improvement requirements to maintain product quality and minimize problems. • Prepare product and process reports by collecting, analysing, and summarising information and trends.	• Manage and coordinate production KPIs • Coordinate multiple production teams to reach production goals. • Assist with conducting monthly safety meeting, with safety team and production personnel. • Prepare daily and production efficiency reports.
IDEAL	• Assist with quality control and tracking programs to meet quality objectives. • Collect and compile data on equipment use, modification and procurement and provide input on capital expenditure.	• Improve manufacturing efficiency by analysing and planning workflow, space requirements and equipment layout. • Assist with business analytics and data-driven decisions for key production processes.	• Monitor and review the performance of production staff and organise necessary interventions for improvement. • Establish and maintain communication channels across departments

Technical Training

- Degree in Engineering discipline
- Scientific Injection Moulding Process, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Scientific Injection Moulding Process Optimisation, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Process Documentation for Scientific Moulders, Routsis Training
- Processing for Profit, Routsis Training
- Preventive Maintenance
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Automation & Robotics for Scientific Moulding
- Injection Moulding Production & Quality Control Inspection Processes
- Statistical Process Control

Soft Skills Training

- Occupational Safety and Health
- Team Building
- Positive Employee Relations/Interpersonal
- Leadership Development
- Analytical Skills
- Problem Solving
- Developing and Implementing Key Performance Indicators (KPI)
- ISO Knowledge
- Managerial Skills
- Business Analytics
- Communication
- Documentation and Report Writing
- Computer literacy

Manufacturing Manager

Manufacturing Manager		
[L5]	Technical	: ◊◊◊
	Analytical	: ◊◊◊
	Soft skills	: ◊◊◊◊

	Description
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 3 ◊◊◊	Ability to carry out logical deductions or inferences in a creative and systematic manner to plan and develop courses of action underpinning substantial development in the company.
Soft Skills Tier 4 ◊◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead the department or company to perform tasks while considering industry best-practices.

	Technical	Analytical	Soft skills
CORE	• Understand and manage critical production parameters and product requirements such as costs, timelines, safety, and specifications. • Maintain product and company reputation by complying with regulations and industry standards. • Keep equipment operational by coordinating maintenance and repair services. • Ensure all products are produced to high quality standards.	• Monitor all manufacturing processes and maintain the optimization of all equipment. • Analyse and review all production improvement requirements to maintain product quality and minimize problems. • Prepare product and process reports by collecting, analysing, and summarising information and trends. • Improve manufacturing efficiency by analysing and planning workflow, space requirements and equipment layout.	• Manage and coordinate production KPIs • Manage human and material resources to meet production goals. • Conduct monthly safety meeting, with safety team and production personnel. • Maintain daily and production efficiency reports.
IDEAL	• Implement and enforce quality control and tracking programs to meet quality objectives. • Determine equipment use, modification and procurement and provide input on capital expenditure.	• Implement cost control programs (scrap reduction, higher output, etc.). • Contribute to business analytics and data-driven decisions for key production processes. • Contribute to transition of production processes into higher-levels of automated analytics and diagnostics.* *Future-ready skills	• Monitor and review the performance of production staff and organise necessary interventions for improvement. • Knowledge and understanding of local industry trends and disruptions, and its impact on company output.* • Establish network of partnerships with key stakeholders.*

Technical Training

- Degree in Engineering discipline
- Scientific Injection Moulding Process, Routsis Training
- Scientific Troubleshooting for Injection Moulding, Routsis Training
- Scientific Injection Moulding Process Optimisation, Routsis Training
- Process Control, Routsis Training
- Processing Parameters for Injection Moulding, Routsis Training
- Process Documentation for Scientific Moulders, Routsis Training
- Processing for Profit, Routsis Training
- Preventive Maintenance
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S
- Automation & Robotics for Scientific Moulding
- Injection Moulding Production & Quality Control Inspection Processes
- Statistical Process Control

Soft Skills Training

- Occupational Safety and Health
- Team Building
- Developing and Implementing KPIs
- Positive Employee Relations/ Interpersonal
- Leadership Development
- Analytical Skills
- Problem Solving
- ISO Knowledge
- Managerial Skills
- Communication
- Documentation and Report Writing
- Business Analytics
- Costing & Budgeting
- Customer Relations
- Computer literacy

Plant Manager

Plant Manager

[L5] Technical : ◊◊◊
Analytical : ◊◊◊◊
Soft skills : ◊◊◊◊

Description	
Technical Tier 3 ◊◊◊	Mastery of technical knowledge and the ability to refine and use relevant understanding, methods, and skills to address complex problems with limited definition.
Analytical Tier 4 ◊◊◊◊	Ability to carry out logical deductions or inferences systematically to plan and develop courses of action underpinning substantial development in the company while considering industry best-practices.
Soft Skills Tier 4 ◊◊◊◊	Ability to use skills such as communication, technological literacy, reading, writing, and team work to successfully guide and lead the department or company to perform tasks while considering industry best-practices.

	Technical	Analytical	Soft skills
CORE	• Manage operation, production, and R&D cost requests and reports. • Provide decision making information on critical production parameters and product requirements such as costs, timelines, safety, and specifications across departments (production, quality, and R&D). • Maintain product and company reputation by complying with regulations and industry standards. • Keep equipment operational by coordinating maintenance and repair services. • Ensure all products are produced to high quality standards and timely delivery of customer orders.	• Monitor all manufacturing processes and maintain the optimization of all equipment. • Analyse and review all production improvement requirements to maintain product quality and minimize problems. • Review and adjust the schedule in conjunction with customer demands. • Prepare product and process reports by collecting, analysing, and summarising information and trends. • Improve manufacturing efficiency by analysing and planning workflow, space requirements and equipment layout. • Implement cost control programs (scrap reduction, higher output, etc.).	• Manage human and material resources to meet production goals. • Oversee monthly safety meeting, with safety team and production personnel. • Maintain and review daily and production efficiency reports. • Monitor and review the performance of staff and organise necessary interventions for improvement. • Ensure efficient collaboration and coordination between all departments.
IDEAL	• Implement and enforce quality control best practices and tracking programs to meet quality objectives. • Determine equipment use, modification and procurement, R&D intensity, and provide input on capital expenditure.	• Lead business analytics and data-driven decisions for key plant processes.* • Lead transition of production processes into higher-levels of automated analytics and diagnostics.* *Future-ready skills	• Knowledge and understanding of regional and global industry trends and disruptions, and its impact on company output.* • Broaden and strengthen collaborative efforts with key external stakeholders.*

Technical Training

- Degree in Engineering discipline
- Process Documentation for Scientific Moulders
- Injection Mould Setup
- Material Drying Technology
- Automation & Robotics for Scientific Molding
- Purging for Scientific Moulders
- Scientific Troubleshooting for Injection Molders
- Processing For Profit
- Injection Moulding Machine Maintenance
- Injection Moulding Hydraulics
- Mould Design & Mouldmaking
- Statistical Process Control
- QMS Auditor
- Lean Manufacturing and Quality, Routsis Training
  - Math for Moulders
  - Basic Measuring Tools
  - 5S

Soft Skills Training

- Occupational Safety and Health
- Team Building
- Human Resource
- Procurement
- Developing and Implementing KPIs
- Positive Employee Relations/ Interpersonal
- Leadership Development
- Analytical Skills
- Problem Solving
- ISO Knowledge
- Managerial Skills
- Communication
- Documentation and Report Writing
- Business Analytics
- Costing & Budgeting
- Customer Relations
- Computer literacy

SURVEY, DISCUSSIONS & RECOMMENDATIONS

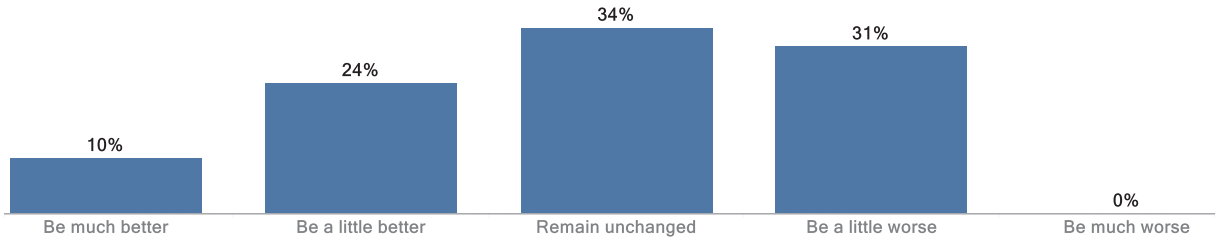
7 Survey Results

In this chapter, the survey results are presented. The chapter commences with the industry and business sentiments. This is followed by current and future skills needs of the industry; present effectiveness of the training environment; and concludes with the nature of business and structure of the workforce in this industry.

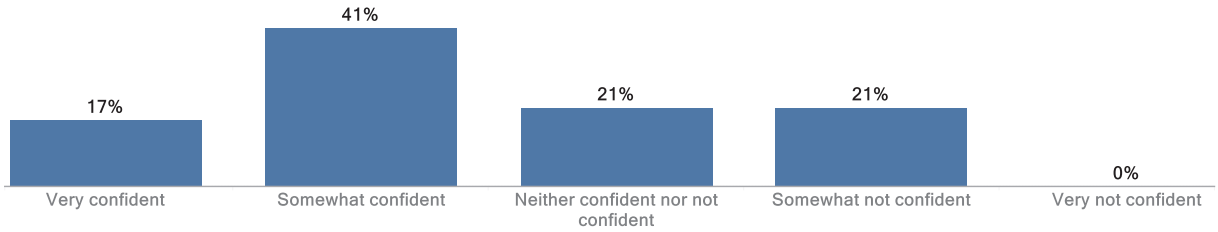
7.1 Industry and Business Sentiments

Across the plastics injection moulding industry, optimism has slightly dampened due to increasing global headwinds, political and economic uncertainties in the fourth quarter of 2019[7]. Senior managers within the injection moulding industry remain cautious, with 65% of respondents indicating that market conditions will remain unchanged or become a little worse. Despite pervasive turmoil from internal and external factors at the national and regional level, 58% of senior managers remain somewhat or very confident of their prospects in the coming year as the industry moves towards technological and sustainability-centric production models to remain competitive. As the manufacturing industry receives the much-needed emphasis from Malaysia's Industry 4.0 policies and initiatives, the increased investments would enable the industry to ramp up production and quality to keep par with, or even exceed, regional competitors.

Do you think the plastics injection moulding market conditions over the next 12 months will:

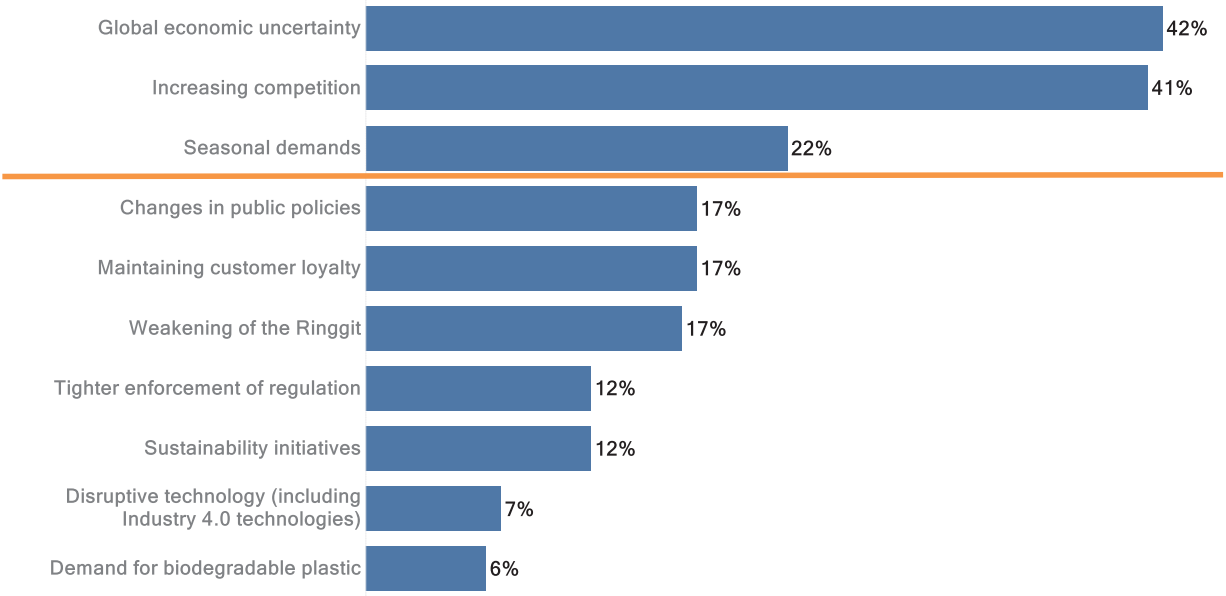


How confident are you about your company's prospects for the next 12 months?



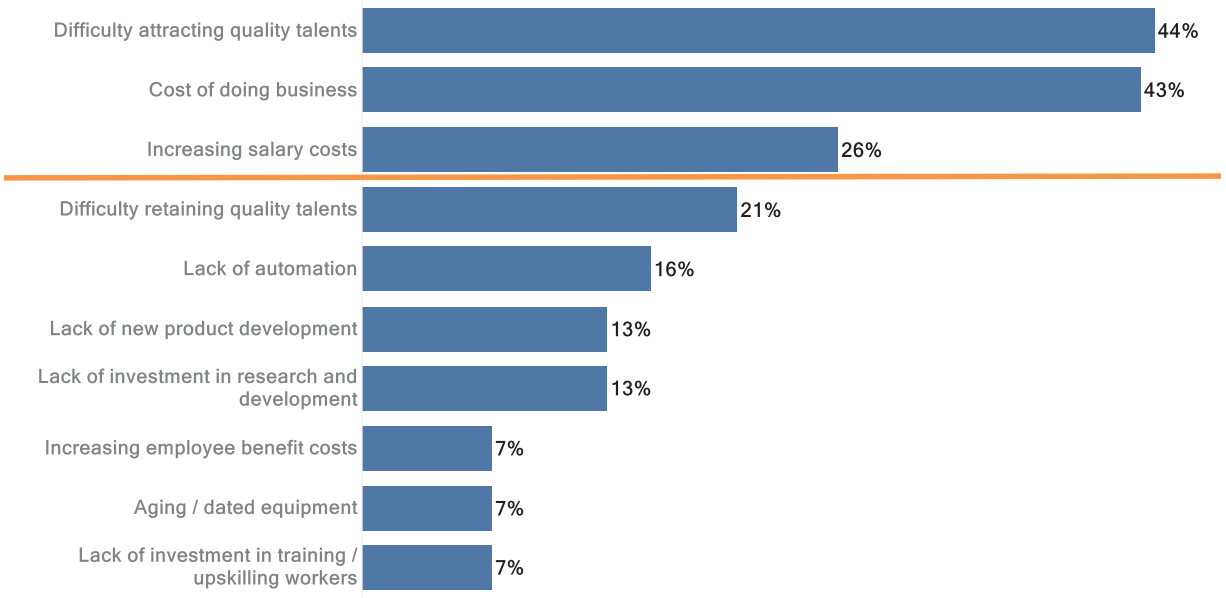
[7] Note: This study was conducted in December 2019, therefore the effects of the Malaysian political change and COVID-19 in 2020 were not captured at the time of the survey.

Thinking about the next 12 months, which of the following external issues are you most concerned with that will impact your company's performance?



Looking at the external issues impeding the progress of plastics industry players, the top issues were global economic uncertainty, increasing competition, and seasonal demands. The injection moulding industry is caught in a delicate balance between maintaining productivity while managing a smooth transition to digital and smart manufacturing processes. This entails high levels of capital and talent disruption within the production processes as companies make the necessary changes to keep pace with emerging, more competitive production technologies. The concern of seasonal demands also highlights the lack of agility in most production processes within the injection moulding industry. Having adaptive and modular set-ups in factories or manufacturing plants would allow firms to adjust and customize production to meet varying demands throughout the year.

Thinking about the next 12 months, which of the following internal issues are you most concerned with that will impact your company's performance?



The top internal issues for the industry are directly linked to the external issues, with talent and capital being the main concerns. As businesses toe the line of upskilling and digital transformations while not disrupting current daily production, they face a catch-22 situation of not being able to make the leap into acquiring higher quality talent while staying afloat. Industry players may be reluctant to invest in human resource due to the difficulties in retaining quality talents (fourth greatest concern) renders the whole recruitment process porous and inefficient. Without the right talents to drive effective process and management change, the internal issues cascade down to the less immediate concerns of automation and product innovation. As companies remain locked-in to the legacy systems that they are not able to transition out of, the prospects of retaining and recruiting new talents are harder to come by.

7.2 Current and Future Skills Needs

A scan of the current process technologies within the injection moulding industry revealed that 98% of firms are using basic processes. This could indicate that most firms are hamstrung by the lack of talent to move into more advanced technologies. With one in five companies using or planning to use 'key' technologies that provide regional and global competitive edge, it is clear that there is a gradual transition in process. Furthermore, there are also pockets of process innovators that are looking into using pacing or emerging technology, especially rapid manufacturing that consist of but is not limited to continuous 3D printing, fused deposition modelling, and laser sintering.

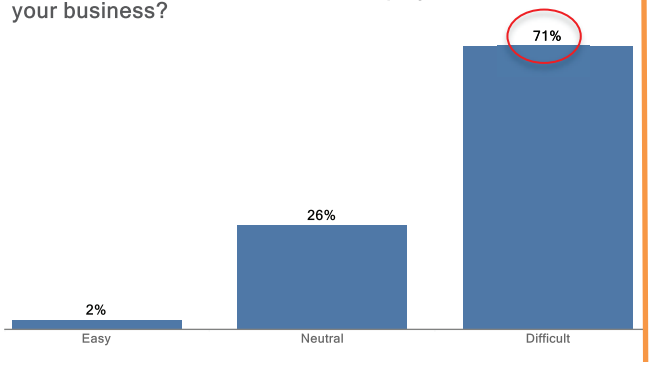
The core issue of talent is echoed by 71% of firms indicating that it is difficult to recruit skilled employees. While talent is in short supply, businesses have been relying on internal and external training. However, the persistence of the skills shortage highlights the ineffectiveness of these measures which would require a more in-depth look at the overall talent ecosystem in the plastics and injection moulding industry.

Deep diving into the specific roles required by companies, it is evident that the difficulties of talent acquisition are pervasive across all roles. The average number of days to hire is 72 days where some technician roles can take up to four months and above. Injection molding machine operators have the highest demand, but most employers indicated that applicants are typically below their expectations and can take up to 64 days to hire.

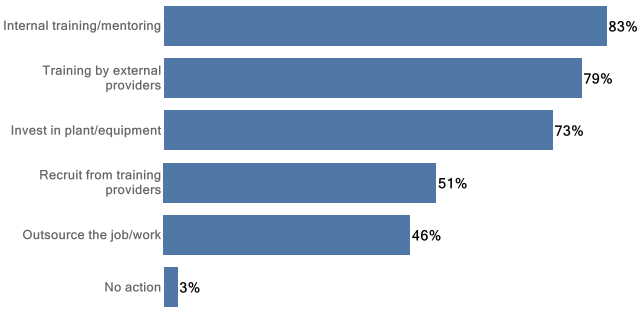
Which of the following manufacturing process technologies are you currently using / intend to use in your organisation?

		Currently using	Intend to use in the future	Not applicable
Basic	'Standard' processes (injection moulding, blow moulding, extrusion, rotomoulding)	98%	2%	0%
Key	Injection blow moulding (including preforms)	20%	24%	56%
	Fusible core moulding and vibration welding for precision hollow parts - automotive/domestic appliances	24%	22%	54%
	Fluid/Gas assisted injection moulding - electronic, electrical, IT markets	15%	24%	61%
	Two-shot moulding	27%	32%	41%
	In-mould labelling	17%	32%	51%
	Metal injection moulding/thixomoulding	12%	22%	66%
	In-mould decoration	10%	25%	65%
	Cleanroom operation - medical/pharmaceutical electronic and electrical markets - injection moulding	22%	37%	41%
	3D-Printing and additive manufacturing (for prototyping, etc.)	17%	39%	44%
	Mucell micro-cellular moulding	3%	21%	77%
	Moulded interconnect devices - electrical and electronic - injection moulding (= 3D printed circuit boards)	3%	20%	78%
	Fusion fitting technology for pressure pipes - construction gas/water	0%	10%	90%
Pacing	Micromoulding	3%	23%	75%
	High pressure blow moulding	8%	13%	80%
	Process modelling	8%	28%	65%
	Rapid manufacturing, e.g. continuous 3D printing, fused deposition modelling, laser sintering	5%	38%	58%
	Resin transfer moulding (Advanced Composites)	0%	23%	78%
	Reaction and reinforced reaction injection moulding (RRIM) of liquid resins, mainly polyurethane (PUs)	0%	10%	90%
Emerging	Thermoform and Blow (TAB)	3%	8%	90%
	Isotec Composite Flow Moulding (placement of reinforcement via pultrusion for high performance)	0%	5%	95%

How difficult is it to recruit skilled employees in your business?



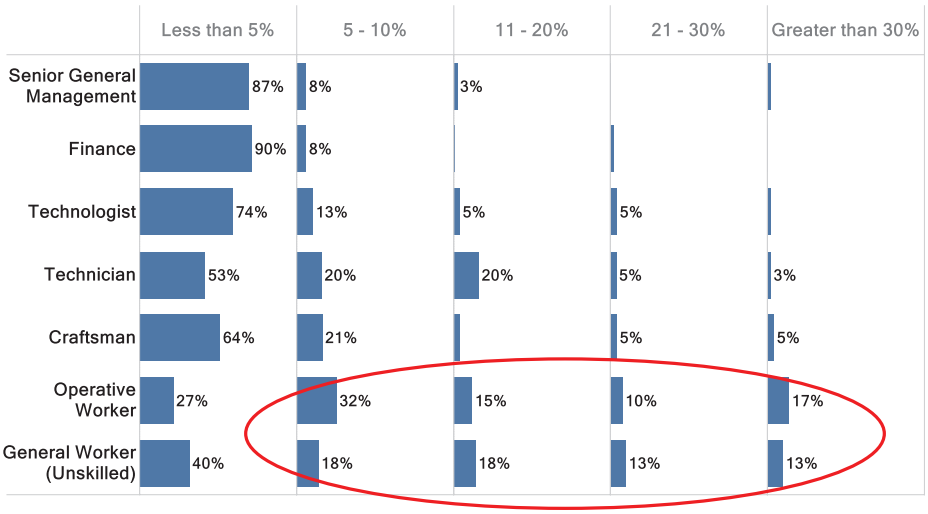
What action is your business likely to take to overcome problems obtaining skilled employees?



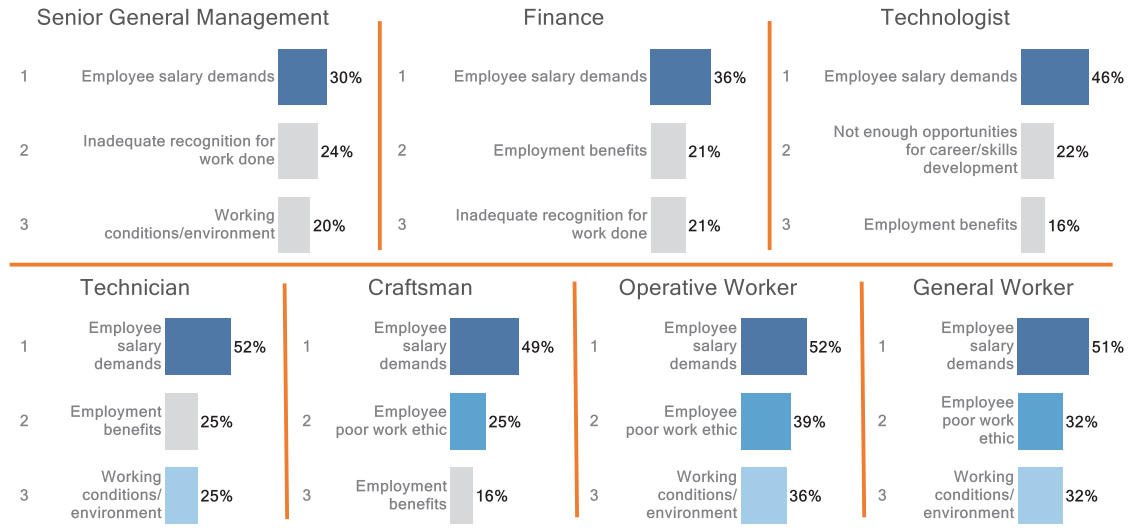
Role Needs and Average Days to Hire

Roles	Sub-roles	Skill level	Days to Hire	People Sought
Craftsman	Plastics Machine Setter	Below Expectations	77	2
	Mould and Die Maker	Below Expectations	72	1
	Team Leader	Below Expectations	47	2
	Quality Control Inspector	Below Expectations	42	3
	Electrician	Below Expectations	27	1
Finance	Finance	Below Expectations	52	1
General Worker	General Worker (Unskilled)	Below Expectations	45	9
Operative Worker	Injection Moulding Machine Operator	Below Expectations	64	16
	Printing Operator	Below Expectations	62	4
	Assembler	Below Expectations	40	6
	Other Plastics Processing Machine Operator	Below Expectations	32	8
	Plastics Fabricator/Welder	Below Expectations	21	2
Senior General Mana..	Senior General Management	Below Expectations	90	1
Technician	Manufacturing/Industrial Engineering Technician	Below Expectations	175	7
	Tooling Technician	Below Expectations	130	1
	CAD-CAM Technician (Tooling)	Below Expectations	87	1
	Mechanical Engineering Technician	Below Expectations	56	4
	Q.C./Q.A. Technician	Below Expectations	50	2
	Supervisor/Foreman	Below Expectations	48	5
	Product/Packaging Development Technician	Below Expectations	46	2
	Production Planner	Below Expectations	45	5
	Electronics/Electrical Engineering Technician	Below Expectations	43	1
	Laboratory/Materials Technician	Below Expectations	20	1
Technologist	CAD-CAM Engineer/Tooling Engineer	Unable to find qualified applicants	75	1
	Moulding Engineer	Below Expectations	67	4
	Product Engineer (Plastics)	Below Expectations	56	1
	Q.C./Q.A. Engineer	Below Expectations	55	2
	Electronics/Electrical Engineer	Unable to find qualified applicants	51	1
	Project Engineer	Below Expectations	47	2
	Manufacturing/Industrial Engineer	Below Expectations	47	4
	Technical Services Engineer	Unable to find qualified applicants	33	5

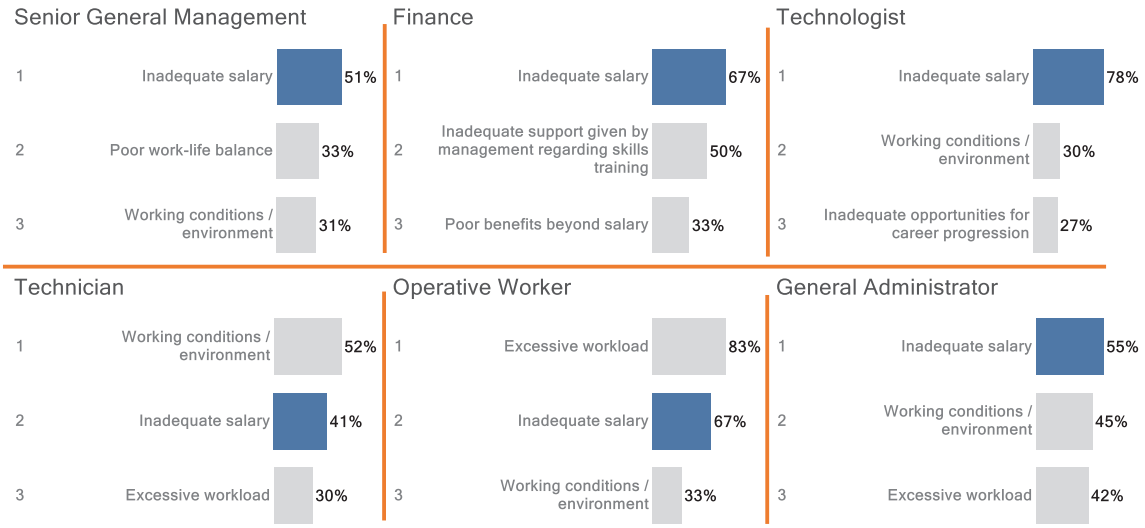
What is the average rate of worker turnover in 2019?



Top reasons for employee turnover (employer perspective)



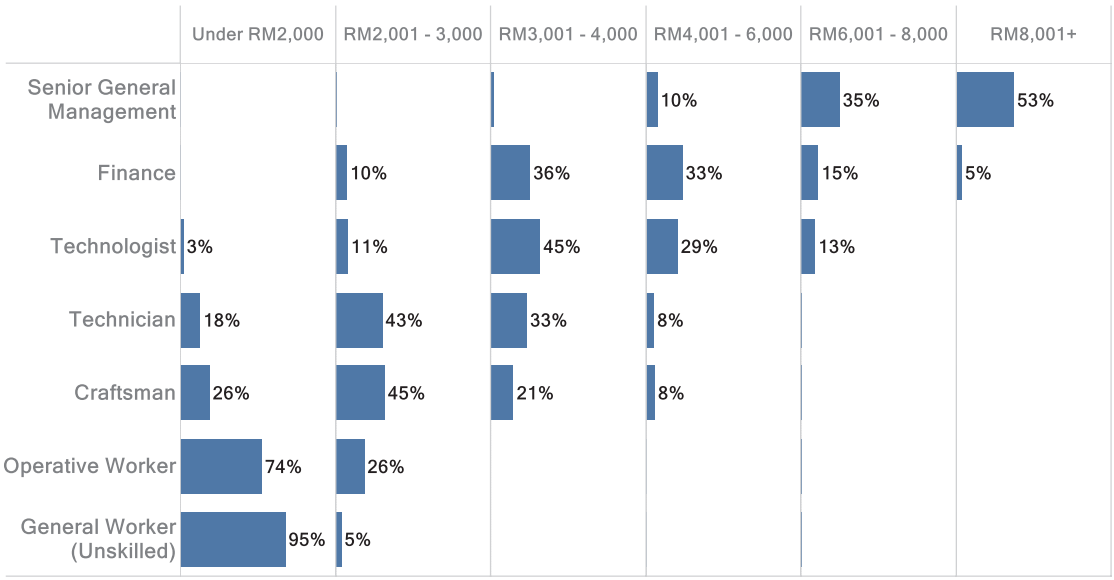
Top reasons for employee turnover (employee perspective)



With the obvious difficulty in hiring technical roles, the alternative approach of internal training and promotion is not attractive for employers either. The roles such as general and operative workers, have the highest rates in number of turnovers which leads to the whole notion of retention in the workforce. About a quarter of the respondents reported that the general and operative worker roles have a turnover rate of more than 20% in 2019, meaning 1 in 5 employees tend to leave each year.

However, the primary reason for such high workforce turnover across all positions point toward salary demands, employment benefits, and working conditions. Whilst, working conditions are major concerns for those in the technician level and below. This is also accompanied by poor work ethics at lower level roles highlighting the risk of over-reliance on foreign or less literate workers which may indicate a necessity to align workers to the same code of work ethics and culture through education and training. Technologist face a unique issue of career progression where technical staff hit a ceiling and have no other pathways beside moving into management roles. Comparing the two figures above, there is a clear gap between employers and employees' salary expectations. Industry salary ranges are often used as an indicator for entry into an industry and this gap could deter potential new talent from entering the

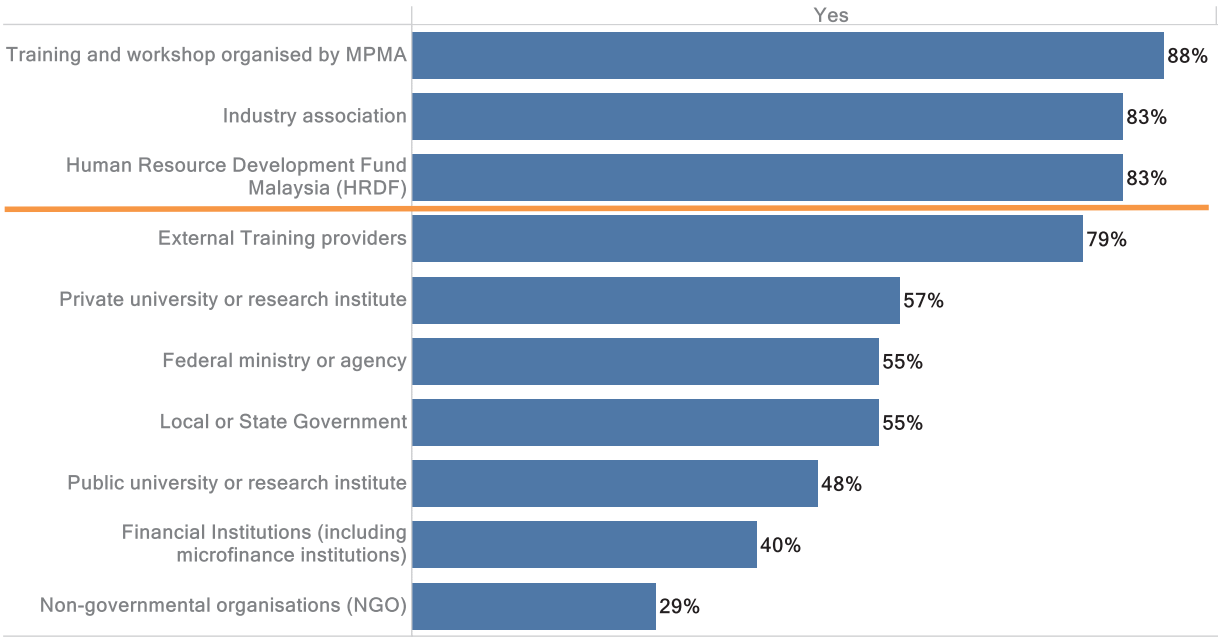
Average salary per month



plastics injection moulding industry and opt for a different career choice. The other key gap shows that employees are dissatisfied with their working environment and amount of monetary compensation provided, while employers are dissatisfied with the standard and quality of work produced by their employees.

While differences in salary perceptions appear to be a perennial issue between employers and employees across the world and industries, the discrepancy could be more pronounced in Malaysia. The results from the previous comparison and the average salary shown above indicates that even at the higher-level technical roles where experienced

Which of the following stakeholders will assist your business to overcome your skills gaps?

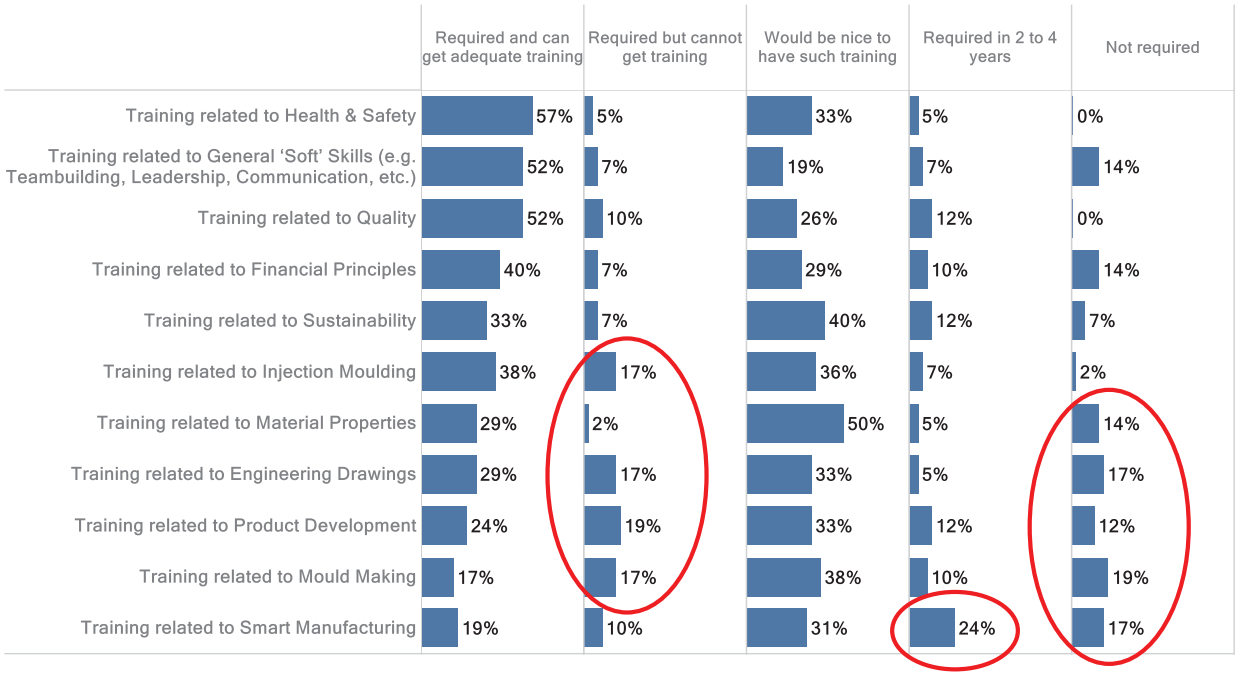


engineers are preferred, most employees at that level report an average salary of about RM 4,500 per month. According to the 2018 Bank Negara Malaysia policy report on living wages[8], RM 4,500 is the minimum living wage for a couple without children. Though there are other factors involved in justifying the wages of employees, this could be a major contributing factor to the issue of acquiring and retaining talent for the industry. A key observation is that a high proportion of workers are earning a salary of below RM2,000 per month. Hence, this is not surprising that this group of workers have the highest turnover.

The entities that have helped employers the most in this area are Malaysian Plastics Manufacturers Association (MPMA), industry associations, and Human Resources Development Fund (HRDF) Malaysia. Interestingly, industries do not see learning institutions (public & private) playing as an important role as industry associations. Only slightly more than half of the respondents see these learning institutions as a source of assistance to overcome their skills gaps. During the roundtable discussion, it was found that the current curriculum does not provide enough real-world application, emphasizing more on theory rather than practical. In addition to that, there exist a geographical disconnect between training institutes and industries. Training institutions are either too remote or students are unable to stay long enough to receive higher level certification.

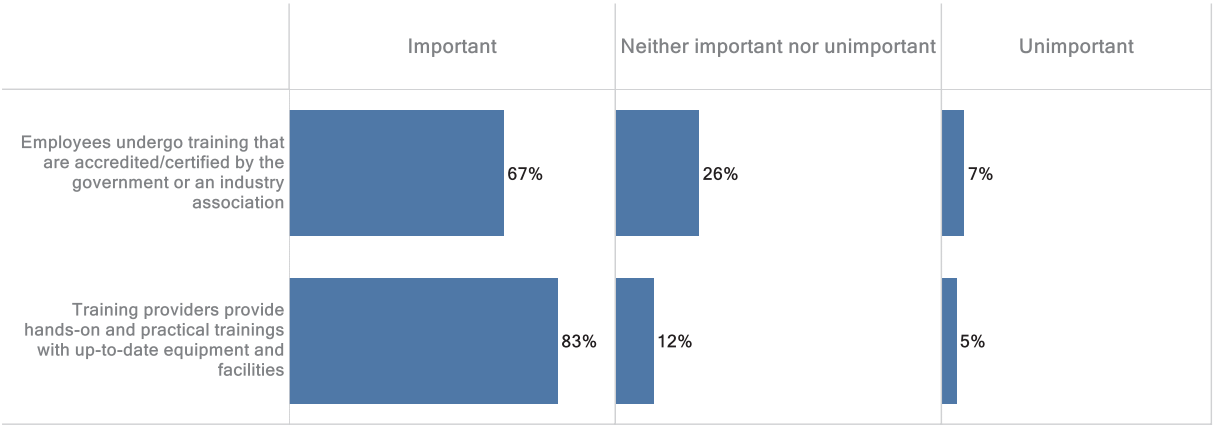
The key trainings that are lacking are mostly technical in nature. With injection moulding, engineering drawings, product development, and mould making having the highest shortages in training courses provided. However, an interesting insight is that Smart Manufacturing is seen as an important aspect in training and many predict that it will be required in two to four years. The concerning trend that is emerging from the survey is that

How important are the following trainings to your business?



[8] From the report https://www.bnm.gov.my/index.php?ch=en_publication&pg=en_work_papers&ac=62&bb=file, a living wage is defined as: "an income level needed for a household to afford a minimum acceptable living standard, which includes the ability to participate in society, the opportunity for personal and family development, and freedom from severe financial stress".

How important are the following trainings to your business?

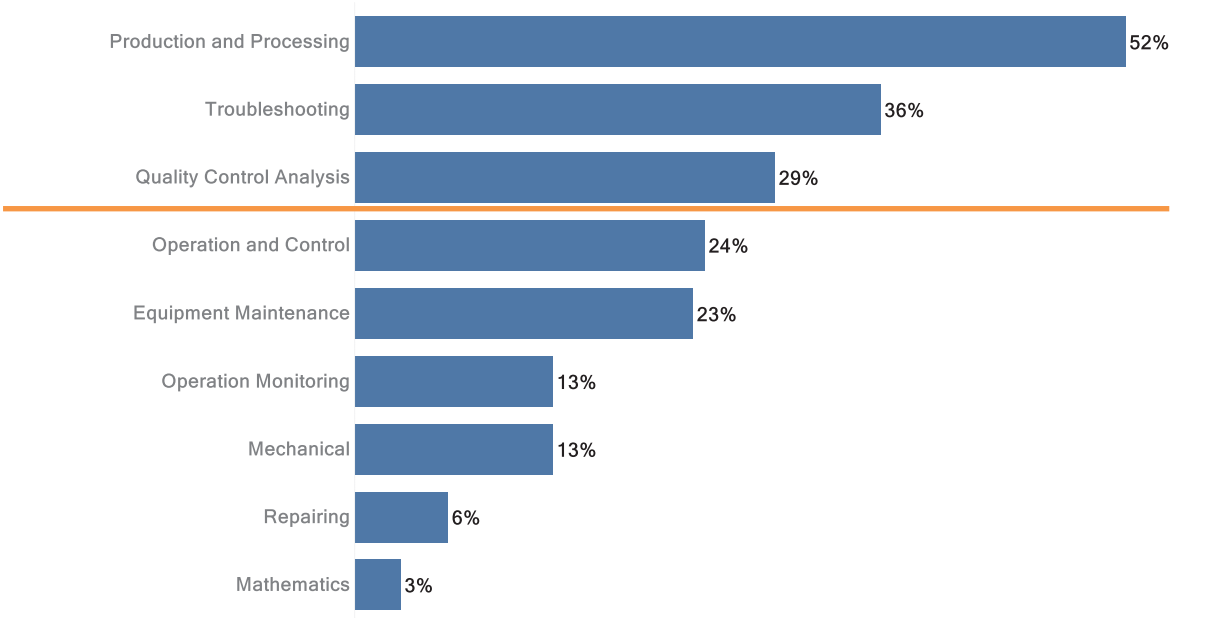


a large proportion of the respondents did not see the importance of training in key areas for the businesses, especially in the area of smart manufacturing. This group of firms are the most likely to be disrupted by the changes taking place in the industry due to the smart manufacturing transformation that is sweeping the global plastics industry.

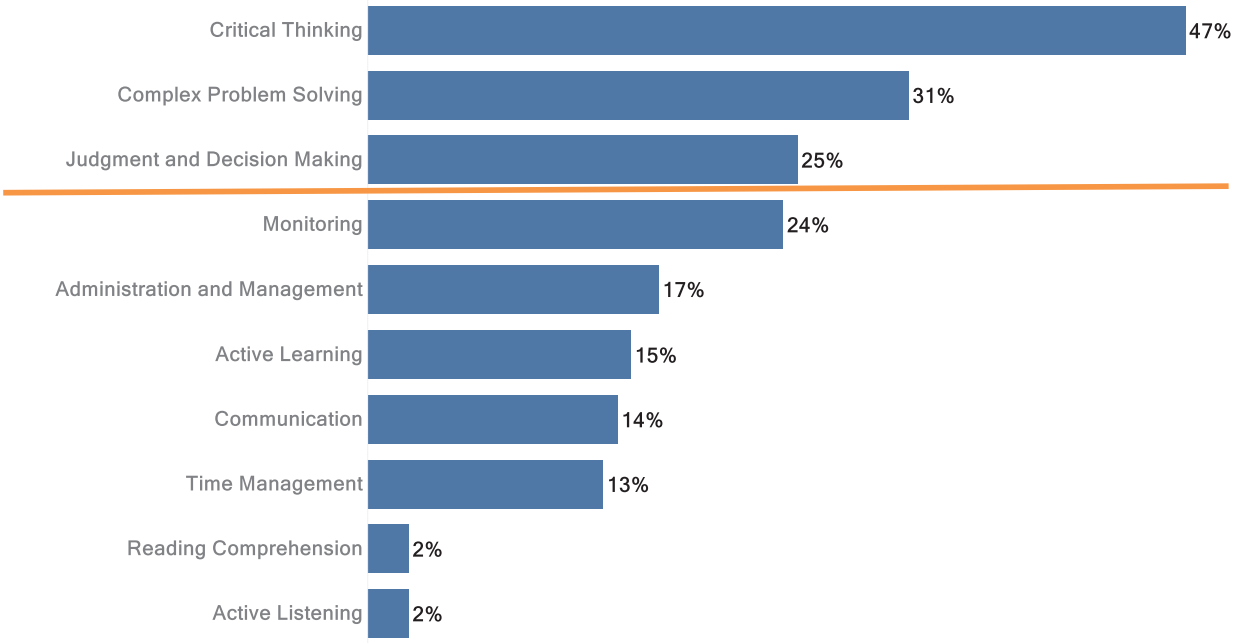
When comparing priorities for training, employers preferred one that provides hands-on and practical training with relevant equipment and facilities rather than training accredited and certified by government that are mostly within the skills certification domain. This could possibly due to the fact that hands-on and equipment-based trainings are more relevant and readily usable upon training.

The top three technical skills business owners demand are production and processing, troubleshooting, and quality control analysis.

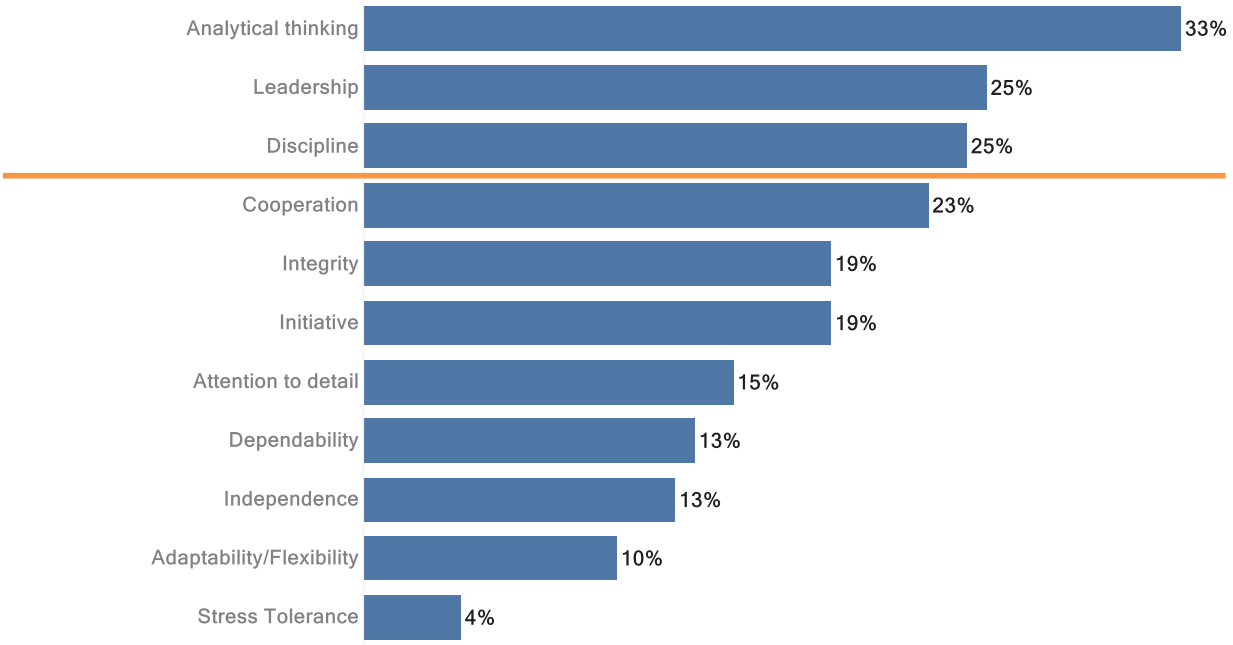
Which of the following technical skills and knowledge do you find most impactful for your company's growth?



Which of the following non-technical skills and knowledge do you find most impactful for your company's growth?



Which of the following work styles do you find most impactful for your company's growth?



while the top three non-technical skills are critical thinking, complex problem solving, and judgement and decision making. The ability to identify and work towards a solution after encountering a problem is invaluable. Graduates and employees need to go beyond 'textbook' or theoretical knowledge and build the right skill- and mind-set that can solve any potential problems. Underpinning technical and critical thinking skills is the ability to analyse problems and situations, discipline, and leadership. Adopting a logical and evidence-based methodology in their work style is in the highest demand. These skills

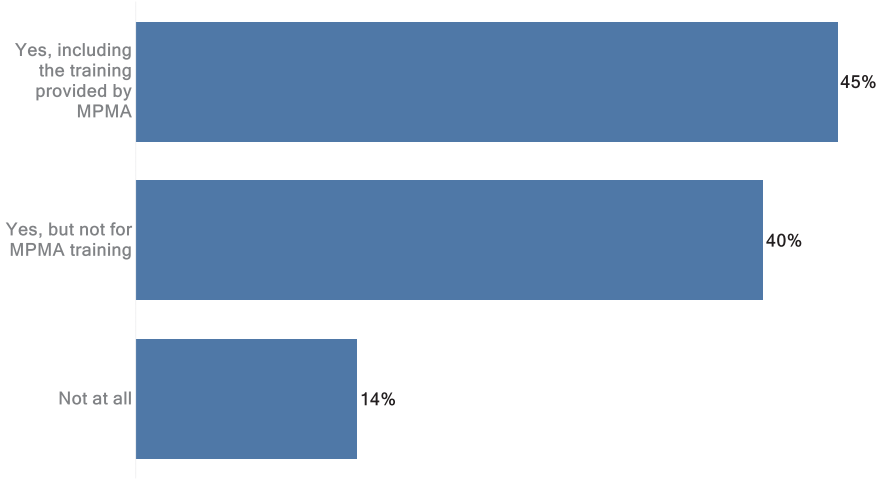
combined is believed by key stakeholders to be most impactful contributing to their company's growth.

7.3 Effectiveness of Training Environment

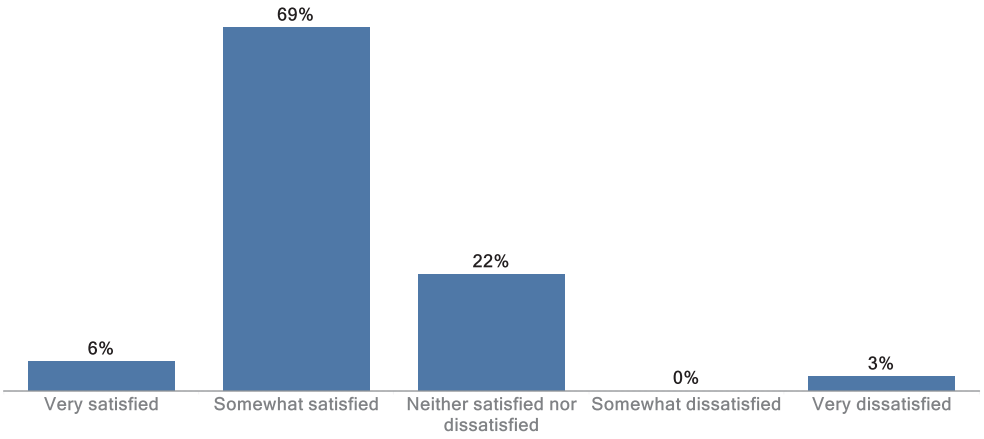
85% of respondents have attended training in the past 12 months, with 75% of them stating that they were either somewhat or very satisfied with the experience and quality of training provided.

However, the top issue listed as dissatisfaction was a lack of emphasis on practical experience. The practical component is highly desired by both employers and employees, in which training providers need to include more hands-on experiences into their training curriculum to meet industry needs. The respondents also felt that there is lack of visual and interactive content and inadequate assessment to ensure mastery of the content from the training programmes. Demand for more visual and interactive content may be due to workers having poor proficiency in reading and/or writing as most of the workers did not complete their formal education. Therefore, training requires more visual aid and more hands-on content to ensure that the information is taught properly to address the gaps. Further, the training programmes needs to ensure that the assessment of the learning

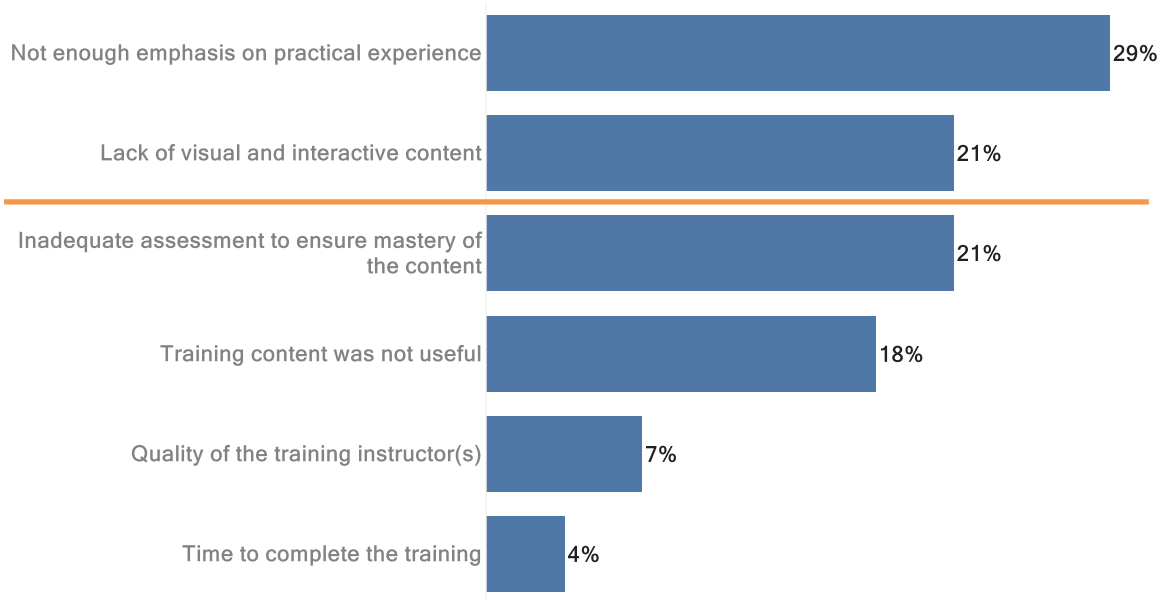
Have your employees undergone training in the past 12 months?



How satisfied were you with the overall quality of training?

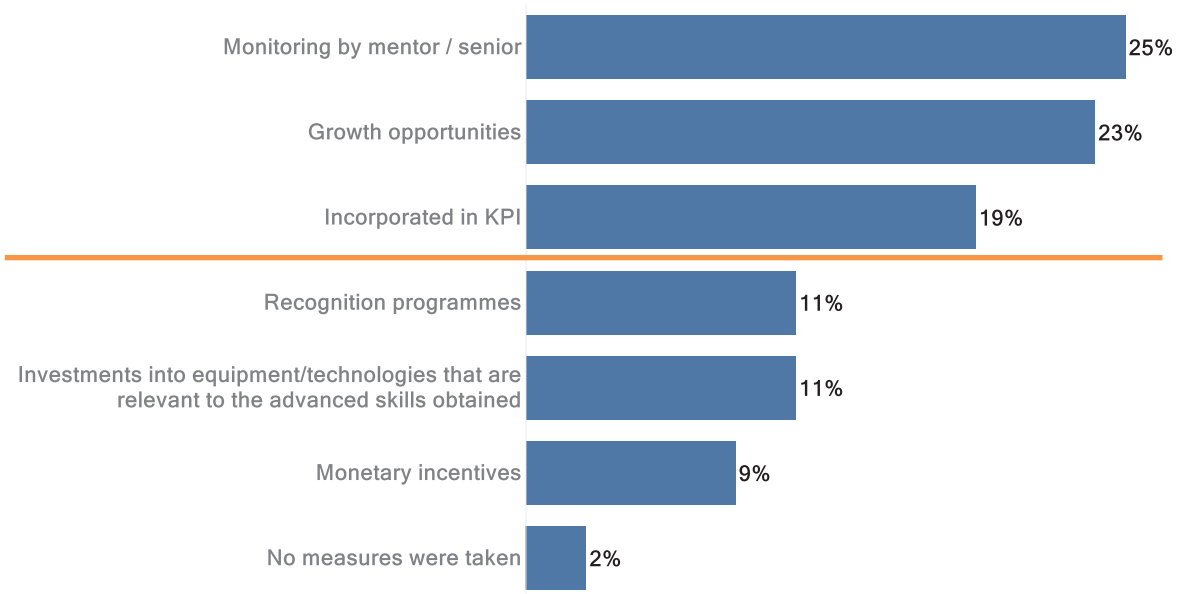


Were there any aspects of the training that you were dissatisfied with?

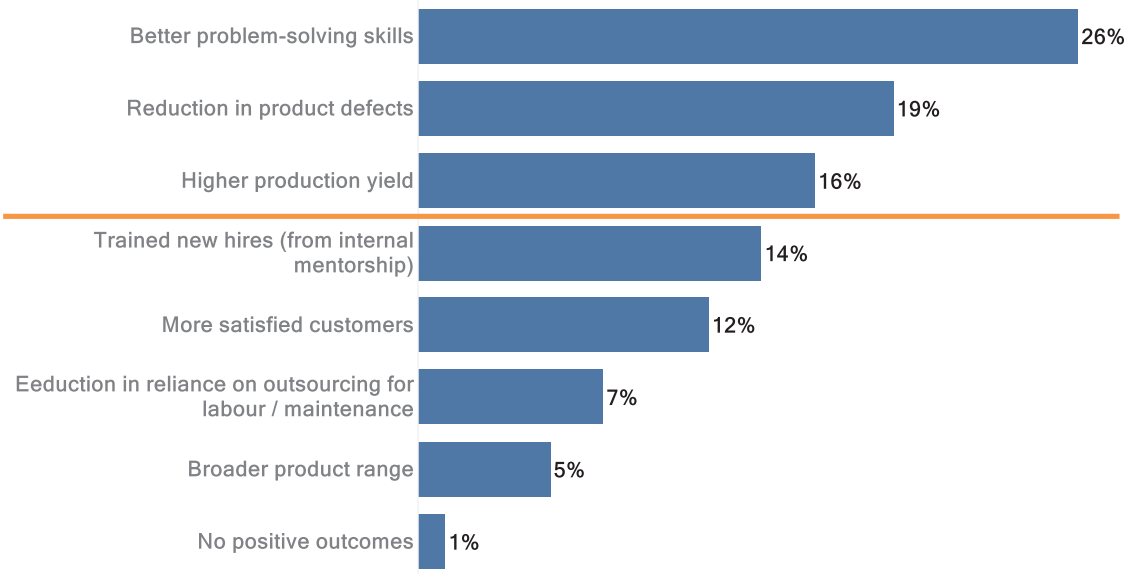


outcomes and competency acquired are clearly articulated to the participants. A major obstacle to training that was not captured by the survey but arose from subsequent focus group discussions is the fact that training is very costly in terms of production downtime and loss of working hours for key personnel, especially for smaller companies. Small and

What measures were taken to ensure skills taught were used/maintained/encouraged?



Upon completion of the training programme, what positive outcomes were achieved?

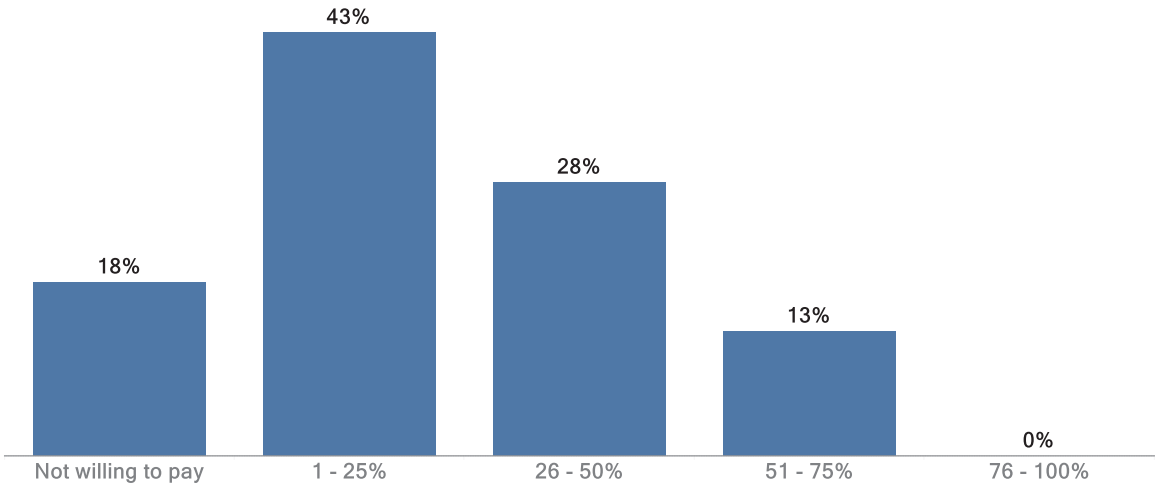


lean companies might not be able to afford sending their employees away for training instead, they are required to be working.

While training is a core part of upskilling, the internal environment of the company to incentivize and maintain the use of the acquired skills is crucial in enabling a knowledge shift in the industry. Most respondents indicated that hands-on mentoring and future growth opportunities were the main methods of ensuring skills enhancement.

Participants who went for training largely reported positive outcomes and better job performances. Aspects that saw improvement includes, problem–solving skills, reduction in product defects and greater production yield.

For non-HRDF approved courses, what percentage of the training cost would you be willing to pay (assuming an average cost of RM 1000/employee)?

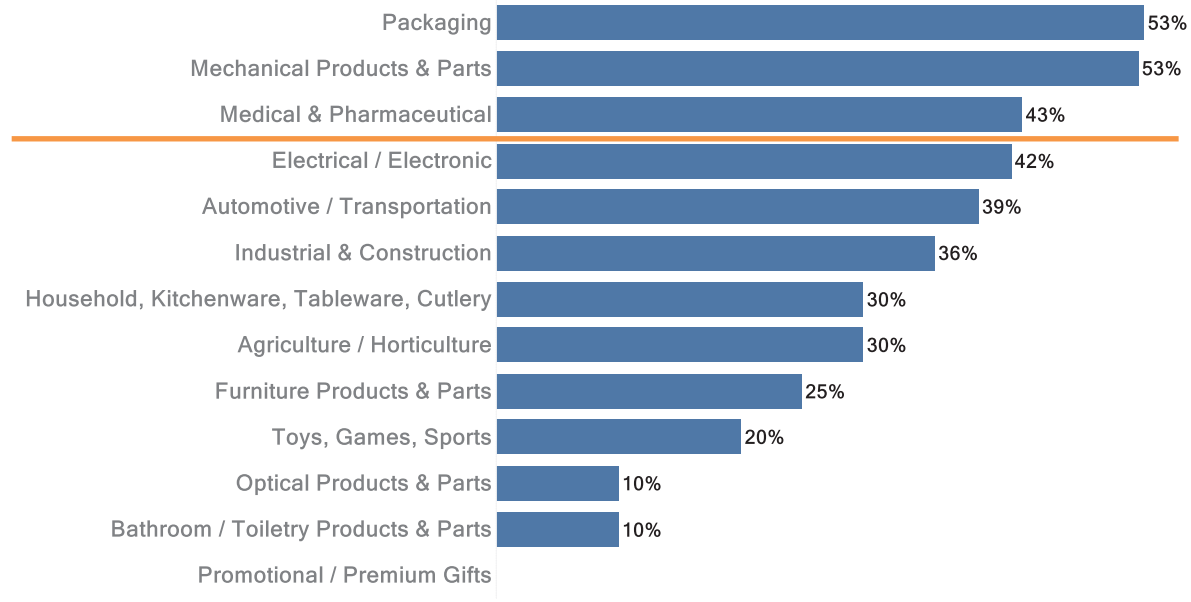


In terms of willingness to pay for non-HRDF approved courses and training, most were only willing to pay from 1% to 25% (assuming an average cost of RM1000 per employee) and 18% of respondents were not willing to pay at all.

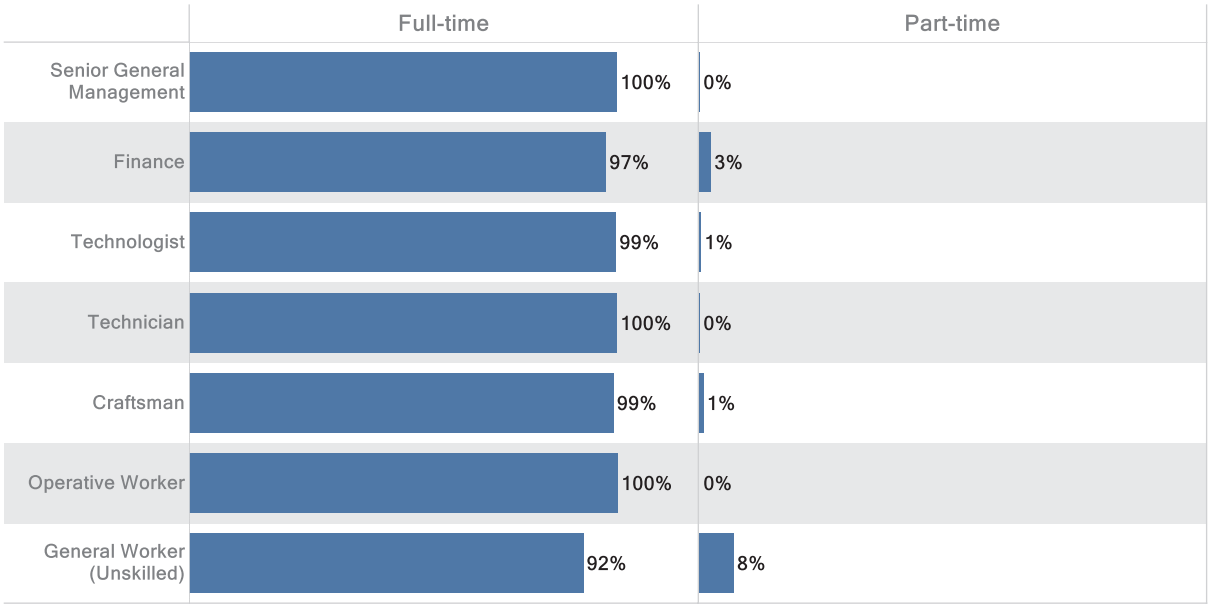
7.4 Nature of Business and Structure of Workforce

This section will provide a description of the business profile of the firms surveyed regarding primary product category and structure, age and education level of the workforce.

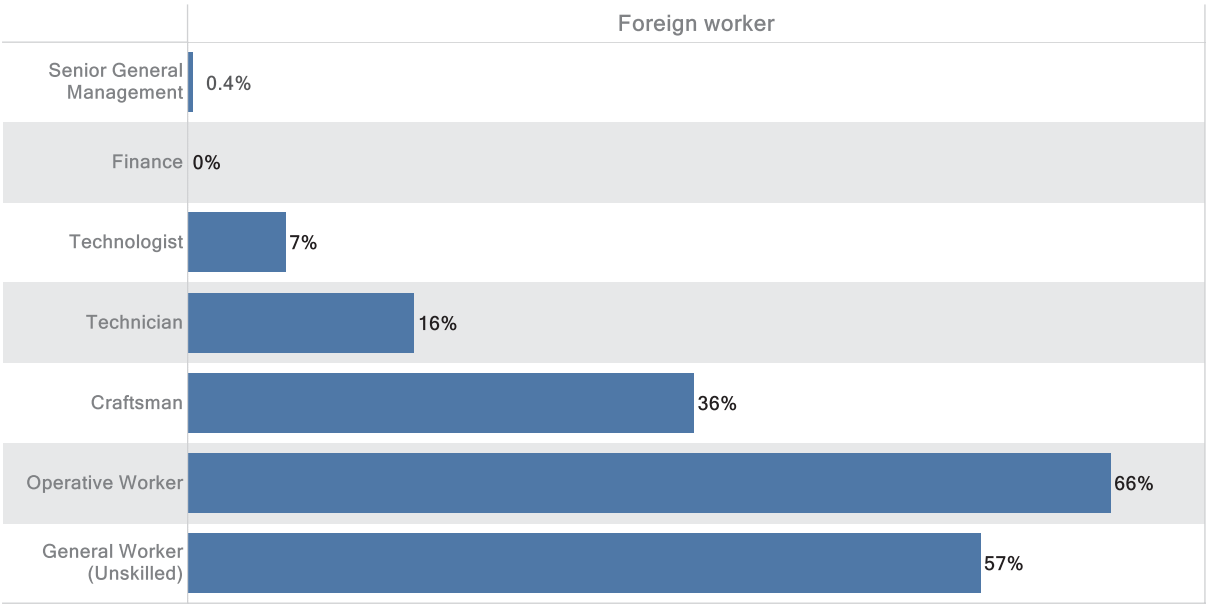
Main Product Line



Workforce Structure



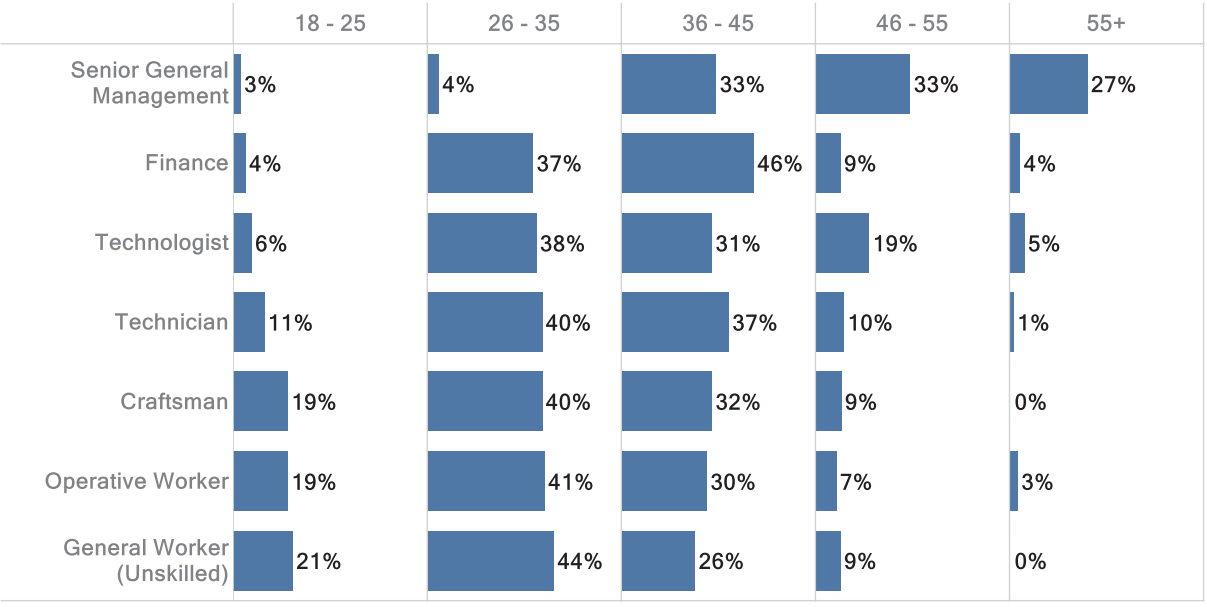
Workforce Structure



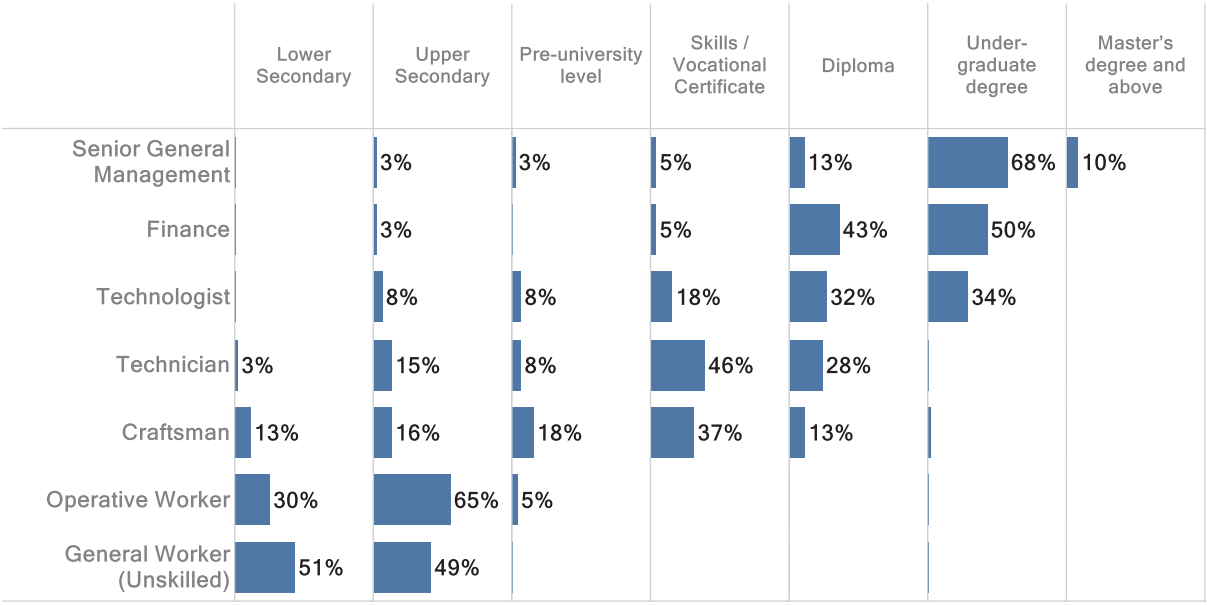
The results indicate most plastics manufacturers in Malaysia produced most of their products belonging in the Packaging and Mechanical Products and Parts category (both tying in at 53%), closely followed by Medical and Pharmaceutical at 43%. Notably, none of the firms surveyed reported manufacturing Promotional and Premium Gift plastics products.

The results show firms had an overwhelming preference for full-time employees for all roles, with only a minor number of part-time workers in General Workers (8%). This

Workforce Age



Workforce Education Levels



indicates the industry is largely dominated by full-time workers, with part-time work accounting for marginal activity. Similarly, local employees dominated positions in Senior General Management (99.6%), Finance (100%), Technologists (93%), Technicians (84%), and Craftsman (64%). Operative Workers and General Workers largely constituted of foreign workers (66% and 57%, respectively), which indicated a sizeable presence of foreign workers in low skill areas.

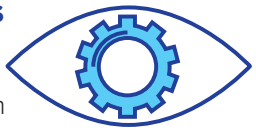
Interestingly, most roles in the industry's workforce is largely comprised of adults mid-career (age 26-45). Most young adults (age 18-25) were Craftsmen (19%), Operative Workers (19%), and General Workers (21%); while Senior General Management roles were largely held by older employees (age 46 and above). The age distribution indicated the industry is only capable of attracting workers in their mid-career as it is unable to entice young adults to enter the industry.

The data shows the general education levels held by Operative Workers and General Workers, requires lower entry level skills, which fell into lower and upper secondary. Similarly seen in the workforce structure, education levels rise as roles begin demanding higher competencies. Roles such as Technician and Craftsman mostly hold Vocational Certification and Diplomas, while Senior Management, Finance and Technologists possessed tertiary education levels.

8 Main Themes from Focus Group Discussions

The main line of discussions from the focus groups centred around enforcement and improvement of education and training for employees. The key concerns of the industry and business owners are as follows:

Industry and Business Owners Perspective



1. The current curriculum does not provide graduates with enough real-world experience or application, while mainly emphasising on theory rather than practical education which is relevant and required by the industry.

2. There is a paradox in the fresh graduate skills gap – the industry requires graduates with hands-on skills obtained from real-world experience, but graduates are unable to acquire these skills in schools or from industry training.

3. Entrenched negative perception of plastics blankets efforts made by educators, industries, and government to focus on skills development

4. National agendas and government messages often contradict, leaving industries unsure of the national direction (i.e., promoting manufacturing but also negative plastics perception).

Technical and Vocational Education and Training (TVET) and Education Institutions Perspective

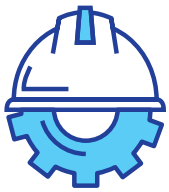
1. Perception of plastics industry as a sunset industry negatively impacts student enrolment and the quality of fresh graduates.

2. Changes in syllabus are infrequent which increasingly affects education standards and produces fresh graduates who are stuck with knowledge on legacy machinery and techniques.

3. Disincentives for employers to send employees for training.

4. Employers and business owners unwilling to cooperate with education institutions, primarily programmes involving industrial visits that may spark interest within students.

Insufficient Real-world Experience and Application in Curriculum and Training



Education was a topic of great interest during the focus group discussions. Firms were in agreement that critical thinking and practical training were lacking in the current syllabus, thus resulting in fresh graduates possessing limited troubleshooting ability and the inability to run machinery prior to a minimum of six months' work experience. With this, firms remarked on the importance of emphasising practical, hands-on training within the TVET curriculum.

Presently, most plastics manufacturers provided training on an ad hoc basis which was usually done through in-house training. The main reason was that external training programmes were unable to equip their employees with the necessary skills,

and that they needed to be further coached even after training was provided. Some firms even preferred short training sessions with machinery suppliers as the scope was more specific, unlike how generalised external training programmes were. Firms opined that training providers needed to tailor training modules to trainee's roles rather than provide a "one size fits all" solution.

Catch-22 Situation for Graduate Skills

Where firms noted a lack of real-world experience in graduates, opinions from education institutions provided stark contrast regarding this issue. Currently, there exists a skills paradox where industries are seeking graduates with work experience, but students cannot gain these experiences due to poor industry internship training. TVET providers, and even some firms, opined that students were not provided adequate real-work training during external programmes – often with internship students doing menial tasks and regarded as "cheap labour". Moreover, education and training providers faced issues arranging industrial visits to plastics manufacturing plants as firms were often reluctant to collaborate on the grounds of confidentially.

Lack of Autonomy, Agility, and Adaptability of TVET Curriculum

TVET institutions lack the necessary agility and autonomy to adapt with the changing pace of industries and technologies, a sentiment felt by both industry and the institutions themselves. The TVET curriculum is regulated by the Department of Skills Development / Jabatan Pembangunan Kemahiran (JPK) and is reviewed once every five years, in tandem with the review of occupational skills by the National Occupational Skills Standard (NOSS) where updates to the curriculum are matched against the NOSS list. Input is also obtained from the Jabatan Tenaga Manusia (JTM), Ministry of Human Resources (MoHR) and the Advanced Technology Training Center (ADTEC). Although changes to the curriculum are derived from all stakeholders, these changes do not occur timely enough to match shifts in technology and industry demand.

This is evident through course offerings, as the current syllabus focuses on basic raw materials, processes and finished goods, but lacks fundamental soft skills and coverage of more advanced raw materials (e.g., biopolymers) and manufacturing processes. These competencies remain adequate for low skill areas, but as students move up the career ladder, they lack the necessary troubleshooting ability and process management skills to progress forward. TVET providers have noted difficulty in imparting these critical soft skills in students as they struggled to fully emulate true industry scenarios. These issues highlight the importance of autonomy and industry collaboration in the design of education.

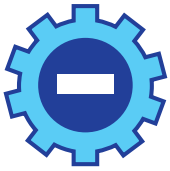
Challenges in Sending Workers for Training

Firms have indicated that they were reluctant to send employees for external training programmes due to possibilities of lower production yield and mismatch in training outcomes. Although firms were in need of higher-level skilled workers, by sending them for training would affect their production due to the reduction of overall headcount or manpower. This becomes an issue for smaller to medium size manufacturers who face skills shortages resulting from an over-reliance on low-skilled foreign labour. These smaller firms generally run production lines around the clock. When the higher-level personnel are sent off for training, these foreign workers are unable to keep production running independently as they lack the critical thinking required to anticipate issues that lead to downtimes. Another reason was that training institutes were often situated far away from manufacturers. This geographical disconnect makes it difficult for employees for extended periods, thus opting out of higher-level certifications.

Employers are also disincentivised in sending workers for training due to employees feeling too intimidated to attend or using their newly acquired skills as leverage for contract negotiations. The former reaction could be due to industries having misplaced expectations far exceeding the training programmes intended outcomes. Employees feeling too intimidated by these expectations often refuse participation, and in some cases,

were said to have threatened resignation if forced upon them. Contrary to this were employees who demanded better remuneration or job promotions upon training completion. Their newly acquired skills are used as leverage, and if the firm refuses to comply, these employees have been noted to also threaten resignation.

Negative Perceptions and Realities of the Plastics Industry and Vocational Education as a Viable Pathway



The plastics industry suffers from negative publicity as plastics is often tied to environmental pollution. This stems from a lack of awareness of the pervasiveness of plastics in our daily lives, ranging from circuit boards in electronic gadgets to household plumbing. The limited view of the plastics industry as merely a producer of plasticd bags, straws, or other disposable items has led to it being viewed as a sunset industry by the general public. This entrenched poor perception of plastics has created challenges in both employee recruitment and student enrolment.

Compounding this issue are the industry's harsh working conditions and lack of student interest. Most domestic plastics manufacturing companies tend to operate under harsh conditions (i.e., hot and noisy environment) and largely ran on legacy equipment and technologies. This is often viewed as unfavourable by graduates, particularly those who were trained to perform and operate higher level jobs and machinery. Regarding interest, even with theoretical examination constituting only 30% of Industrial Training Institute (ILP) programmes, students remained disinterested and were comfortable with low scores so long as employment was still achievable. The plastics industry's lack of appeal coupled by student disinterest posed a problem in cultivating curiosity and employee loyalty.

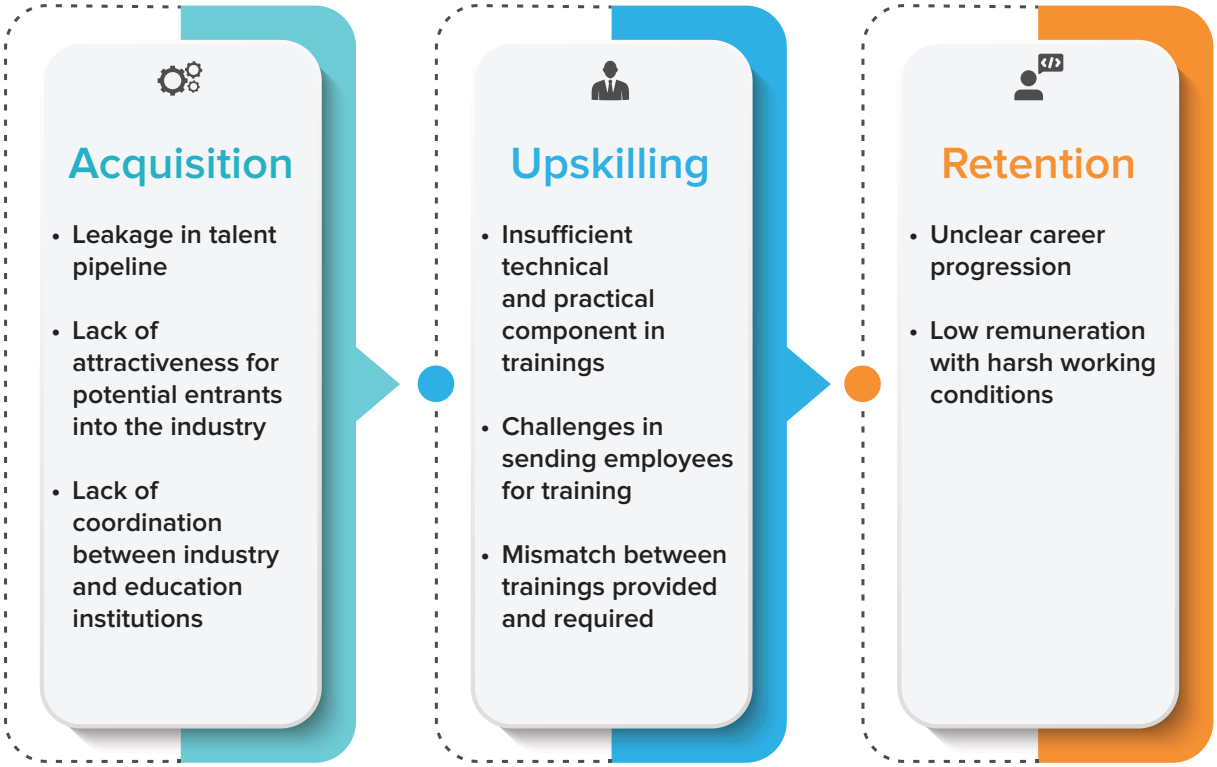
Vocational education has long been perceived as a second option after academic education. Together with plastics' poor perception, plastics-related courses remain the last choice for both students and parents. The general perception of the plastics industry is often tied to its detriment to the environment and unattractive remuneration and career opportunities. As a result, there has been a significant decline in student enrolment numbers and low completion rates in plastics related courses, with student cohort numbers reaching as low as seven in the 2000 and the TVET institutions are struggling to get even one enrolled student into their plastics courses in 2020[9]. This could be due, in part, to the rigidity of TVET education pathways where other TVET courses are introduced mid-secondary by vocational colleges, while plastics related courses are introduced only to secondary school leavers by Industrial Training Institutes (ILPs). In addition, the Malaysian Qualifications Register has also restricted the renaming of TVET courses, such as the substitution of "plastics" for "biopolymers", which limits efforts to target the industry's negative image.

National Initiatives not Aligned with Industry Realities

Firms interviewed have also opined of a lack in clarity within national agendas and that the government held unrealistic expectations of the current manufacturing sector's capabilities. With the country's plans to drive IR4.0, the government has been pushing for a stronger manufacturing sector. However, in a bid to combat environmental pollution, the government has also enforced regulations banning the use of plastics bags and straws. These actions have left firms in limbo as to their position in the government's overall plan. In addition, firms also remarked on the government's unrealistic expectations of the domestic manufacturing sector as a whole. The current state of the plastics manufacturing industry has yet to achieve adequate levels of automation as firms are struggling with employing the necessary skilled workers to move up the value chain. Additionally, smaller manufacturers are often too preoccupied with day-to-day survival, thus requiring further justification for investments in both skilled talents and higher-level technologies.

[9] Reported by TVET representatives in the focus group discussion as of January 2020

9 Key Gaps in the Talent Ecosystem



Distilling down the results from the survey results and focus group discussions, the skills shortage of the plastics injection moulding industry is due to three main gaps in the talent ecosystem.

During the talent **acquisition** phase, the leakage in the talent pipeline from secondary schools presents a key issue for the TVET institutions. As other vocational courses are able to poach potential talents at the mid-secondary level, plastics-related courses can only start recruitment post-secondary. This creates a lack of awareness of the plastics industry at secondary graduation and most graduates would have formed their choice of vocation before that. With the industry saddled with additional negative branding, the common view of plastics as a sunset industry serves as a strong detractor for potential students to enroll in plastics courses. This lack of interest from local vocational students has led to a strong dependency on foreign workers to fill the lower-level roles at an ad hoc basis and creates a break in the flow of talent upstream. The branding and positioning gap is further exacerbated by the lack of coordination between the key stakeholders. While there are efforts to source perspectives from

various stakeholders, these conversations happen too infrequently. The long intervals between curriculum updates further cements the perception of a legacy industry.

Once within the plastics injection moulding industry, the **upskilling** phase is the central solution for bridging the skills gap. As employers face strong difficulties to fill higher-level and technical positions, the only other viable option is to train and promote from within. However, while many employers rely on industry associations such as MPMA or government agencies to provide the necessary training, there is still a mismatch. There is a strong demand for technical training relating to production processes or product development, but more than half of the firms stated that they are unable to obtain such trainings. This demand is, however, undermined by systemic disincentives that prohibit employers from sending employees for further training in the first place. Trainings usually very costly in terms of time and opportunity costs of manpower. These costs are often times too high for smaller companies to absorb and thus, they are stuck in a viscous cycle of struggling for survival and unable to plan or transition for the future. Furthermore, both employers and employees wish to see a stronger practical component in trainings.

After the upskilling phase, the **retention phase** is a crucial component to ensuring longevity of talent in the industry. One of the key reasons for turnover was the lack of career progression. Without a clear career pathway, it is unclear to employees what future career options they have. Employers need to also be mindful of the desired career progressions to avoid locking employees into roles with little growth potential. The second component of retention is a competitive remuneration package. There is a clear gap in remuneration expectations between employees and employers and that is a major contributor to the lack of retention of talent. Additionally, inadequate protection for employees in the harsh working environment results in a high turnover rate as well.

10 Recommendations and Way Forward

The previous section identified key gaps in the talent ecosystem for the plastics industry with respect to acquisition, upskilling and retention. Examining the key gaps in the talent ecosystem through the lens of the 7i framework allows for a more robust and targeted solutions[10]. The 7 pillars are: Infrastructure, Infostructure, Intellectual Capital, Integrity, Incentives, Institutions, and Interaction.

These 7 pillars provide a comprehensive understanding of which aspects of the key gaps requires strengthening within the plastics industry. Descriptions of the 7is are given in the figure below. Using this framework, key strategies to address the gaps pertaining acquisition, upskilling and retention of talent are discussed below.

[10] The 7i-framework was adapted from the *7i-Innovation Helix* Model from Nair (2011), which suggests that for any innovative endeavours, seven key factors are critical to ensure sustainable development.

To ensure that the industry attract a good pipeline of talent into the industry and to ensure they receive the right skills training, the following pillars of the talent ecosystem requires major refinements and transformation. Below we discuss some of the recommendations to strengthen the talent ecosystem for the Malaysian plastics industry.

Infrastructure

Investing in strengthening existing infrastructure in the plastics industry using advanced technology and machinery. This will aid in dispelling the myth that the plastics industry is in decline. This will also attract high caliber students to transform the current state into a highly advanced and modernised industry. To this end, the following should be undertaken:

- Continue to support and develop existing core technology for key industry players, however put in place a transition programme to adopt advanced technological infrastructure that caters for the 4th Industrial Revolution (4IR) - internet of things (IOT); cloud computing; systems integration; autonomous systems and robots; 3D and 4D printing; additive manufacturing; big data; augmented reality; and cyber security.
- Firms and educational training centres should endeavour to build state-of-the-art equipment and processes to excite potential students and make the plastics industry a preferred choice of training and employment for these students.
- Students must have access to these relevant advanced technologies via their training centres and/or via industry apprenticeship programmes.

Infostructure

The younger generation are ICT savvy – they are “digital citizens”. Effort must be put in to provide them the necessary training and work experience using the digital communication architecture to entice them to choose the plastics industry as a preferred place of study and work. Having advanced digital communication technologies will also enable remote access and bridge the geographical challenges between training institutions and manufacturing hubs. For the industry to adopt advanced technology the following must be in place:

- Firms, institutions of learning and training institutes should have access to affordable high-speed internet across the country to facilitate education and training using the 4IR platforms;
- The access to good internet and digital facilities should be extended to all localities in the country, especially rural areas; and,
- appropriate cyber-security systems, cloud computing facilities and other key technologies to facilitate digital network connectivity.

Intellectual capital

A key feature of the talent development strategy is to ensure a steady supply of workforce that meet the current and future needs of the industry. To ensure students choose this industry as their choice of employment and to upskill the existing workforce with key skills to transform this industry into a competitive industrial sector, the following is proposed:

- The curriculum for the education and training programmes must incorporate the use the key technology that meet needs and prepare students for learning about advanced digital technology to help the industry take the next leap into the 4IR and smart manufacturing industry.
- The curriculum (for students and industry workers) must be jointly designed and rolled out by institution of learning and industry, which also include assessment, delivery mode and certification.
- Develop key soft skills in parallel with core technical skills to provide a holistic and progressive talent development model that enables new talent to move up a clear and transparent career pathway[11].
    - o Entrepreneurial skills to link technical processes to business outcomes.

[11] See Section 11 and 12 for proposed career pathway and skillsets.

  - o Leadership skills to open up future management pathways

- The programmes should adapt the German model[12], where a substantial portion of the training is conducted within an industrial setting.
- The curriculum should give adequate time for practical training relevant to the plastics industry, where some of the key anchor industry players become training centres for students.
- A key feature of the training programmes is that it is accredited by national and international professional body.

The skills training programmes being closely linked with the industry will strengthen the attractiveness of the industry for students and recent graduates, improve the overall quality of the workforce, and improve the productivity and competitiveness of the local plastics industry. Further, as the industry adopt these new technologies, it will strengthen its branding and positioning in the global economy; all of which is critical in attracting the best talent into the industry.

Integrity

Good governance of the talent ecosystem is critical to ensure the skills development plan for the plastics industry is effective in developing new training programmes that meet the current and future needs of the industry. A core component of good governance is an effective monitoring and tracking system with clear metrics in place to measure and evaluate existing and proposed initiatives. The following are the key governance system that must be in place:

- Develop a more effective skills development plan, which include identifying talented students in high school, their suitability to undertake training and skills development and build their career in this industry.
- Good governance mechanisms must be in place to ensure the education and skills development programme is continuously reviewed and meet the needs of the industry – within the skills development framework, each programmes must undergo a two years review cycle to ensure efficacy of the programme in meeting the needs of a rapidly changing industry.
- The plan must have key milestones, key performance indicators, timelines, responsibilities and the impact of the policy initiatives on the quantum and quality of talent that joins the sector.
- The industry association, in partnership with government agencies, schools and training institute to promote the attractiveness of careers in this industry and provide a clear career path for these students.
- This performance in the skills development plan is regularly refined to take into consideration the changing global economic and technology landscape.

Incentives

Competition for talent from other sectors of the economy will intensify in the coming years as many of these industries start embracing Industry 4.0 technologies. The plastics industry is plagued by large cheap labour from foreign countries, where the turnover is high. These are low paying jobs and lack job security. Automation of many of these jobs to raise the productivity and competitiveness of the industry is the right step in this direction. However, at the present state, the industry has a challenge of attracting local talent to undertake many of the task. Among the key incentives the industry should put in place to attract high quality local students into the industry are as follows:

- Automation is the way forward and, in the process, create skilled and high paying jobs that will attract local students to undertake training and development.
- Career placement centres should be in place that does regular visits to schools, technical colleges and polytechnics to assist students to be aware of the job prospects in the industry and

[12] See case study 9.1 German Dual VET System

provide them necessary support to acquire the skills to take up these skilled jobs.

- Provide scholarships and living support for students to undertake courses in accredited programmes aligned to the needs of the plastics industry.
- Put in place a clear career pathway for workers in the industry with appropriate training and development for them to take on higher order work.
- Provide support for staff to undertake certification, micro-credentials and training in local institutions to upgrade their qualifications and competency.
- Provide grants and scholarships for students to undertake training in areas aligned to the plastics industry with guaranteed jobs with competitive remuneration packages with local firms in the country.

Interaction (Smart Partnership)

The success of the skills development framework will depend on the level of cooperation between the industry association, industry, government agencies and institutions of learning and training. In this context, the following is proposed:

- Form a joint taskforce between all stakeholders to undertake regular foresighting of technology and other global and national trends that will impact the plastics industry.
- Public-private partnerships to provide the necessary funding to support incentive programmes for upskilling and infra-infostructure development.
- A taskforce is established in each of MPMA industrial subgroups with specific representatives from each stakeholder to review the existing education and training curriculum and propose refinements to ensure the curriculum meet the current and future needs of the industry.
- Establishment of an Industry-Industry Association Council to steer strategic talent growth and developments in the industry. The Malaysian Plastics Industry Talent Accreditation Council (MaPITAC) is a smart partnership initiative of MPMA where MaPITAC serves as the industry's registering and course accreditation body. MaPITAC could play a pivotal role to ensure that only accredited training programmes and courses that meets the quality, standard and needs of the industry are being conducted by registered trainers and training providers. Such strong commitments and collaboration from MaPITAC is crucial to ensure that the plastics industry continues to produce talents and capabilities that are of high standards and quality for the industry to remain competitive to move up the global value chain.
- Work with government and international professional bodies to obtain professional and industry certifications.
- Establish a framework for academics to spend time in industrial setting to ensure they are familiar of the industrial best practices and this knowledge is incorporated in these industrial experiences and best practices in the classroom setting.
- Engage in a coordinated marketing campaign to revamp the branding of the plastics industry from the student's perspective to remove the initial obstacle to the talent inflow for the industry.

Institutional Development

The success of the skills development framework in meeting the needs of the industry will require institutional development, where all stakeholders work towards building a 'collaborative' education and training partnership model, which transition the plastics industry up the global innovation value chain. Among the key initiatives include the following:

- Industry and education providers (technical colleges and TEVT institutions) work closely with government institutions to plug the leak in the talent pipeline and ensure that there is a steady supply of workforce that have the necessary skillset to transform the industry into

a knowledge- and innovation-intensive industry – map key strengths and competence of each institutions and ways they will play a role in building key competence in areas strategic to MPMA.

- Government technical colleges and TVET institutions should work with industry to review existing curriculum, jointly develop the curriculum and ensure the programmes are fit-for-purpose for the plastic industry; and these programmes adhere to global best practices and international standards.
- Government and industry should work closely to develop the technology infrastructure and capability development programmes for their teaching staff in the national institutions of learning and training centres – this is to ensure that students and workforce get access to cutting-edge knowledge and technology to help the industry become globally competitive and adhere to global best practices and international standards.
- Government in partnership with industry to refine the existing core competence framework for the plastics industry, taking into consideration recent technological innovation that is transforming the global economy.
- Refinements in contracts of government staff working in institution of learning and training centres to work for a short period of time in industry to acquire the necessary industry skills that can be imparted to students.

The issues and gaps that prevent the plastics industry from raising their competitiveness require multi-faceted solutions to drive sustainable change within the industry. These recommendations present a multi-pronged approach that targets the key pillars which drive a competitive plastics industry. The pillars of the 7i framework needs to be strengthened as a whole for the overall talent ecosystem to achieve the transformation required to bridge the existing perennial skills gap and build new competencies that will enable the industry to become more knowledge-intensive and globally competitive. In the following section, case studies are presented as global best practices and initiatives that have seen success in addressing similar issues of acquisition, upskilling, and retention for similar manufacturing industries.

11 Case Studies & Best Practices

11.1 German Dual VET System

Germany has long been recognised as a giant in the chemicals industry. The country is the third-largest global chemicals manufacturer, generating 28% of Europe's chemical industry revenue and exporting two-thirds of all manufactured processed chemicals. The industry also boasts some of the most comprehensive chemicals-related infrastructure, such as its chemical pipeline network, Chemical Parks and energy supply diversity[13]. Its success is not only attributed to its national infrastructure initiatives but also its education system supporting the industry's talent pipeline – one of which being the German dual vocational education and training (Dual VET).

The Dual VET system is recognised worldwide as a highly effective model for vocational training and has contributed heavily to supplying its manufacturing sector's employment pipeline. The system is popular amongst German school leavers – over half of the country's population pursues this route – due to its high graduation rate and employment security (92.8% and 96.4% in 2019, respectively)[14]. The success of the Dual VET system is owed to its high industry to government participation ratio in its education and training offering, and its ability to match the labour market skills demand.

In Dual VET, industry to government contribution is incredibly high, at a 70:30 ratio. Participating firms contribute up to 70% of VET, not only in in-house training, but also to developing new standards, curriculum design, and monetary investments in the form of a "training allowances" paid to trainees. Industry chamber organisations oversee examinations and support participating companies in filling trainee vacancies. Meanwhile, the remaining 30% is supplied by the government in terms of regulatory frameworks, and vocational and general education provided by vocational institutes. The Dual VET faces no issues in attracting students as access is given regardless of prior education qualifications, and graduates are almost guaranteed an employment position with the training company or elsewhere, be it a similar or different field within the country. Additionally, the awarded certificate is nationally recognised and functions as a gateway to initial higher education or further vocational education opportunities anywhere within Germany.

This unique collaboration between public and private sector yielded advantageous results for all stakeholders involved (i.e. students, industries and government). Company financial investments paid in training allowances produced returns in work productivity and future skill-matched employees; government and education institutions produced quality graduates with budgetary savings from industry matching funds; and students were guaranteed employment and further education opportunities. The system has allowed Germany to enjoy seamless integration of youths in the workforce and significantly reduced youth unemployment rate – in January 2020, Germany's unemployment rate was at 3.2%, the second lowest

[13] Refer to German Trade and Invest (2019).
[14] Refer to German Office for International Cooperation in Vocational Education and Training (2019).

among the EU countries[15]. The Dual VET has been attempted in many countries to emulate its success, particularly in emerging economies such as China, India, Russia[16], and most recently Malaysia.

A localised version of the Dual VET system is the German Dual Vocational Training (GDVT) system, which was implemented in 2014. The GDVT was aimed at providing secondary school leavers a similar 70:30 industry in-house training to vocational education offering[17]. However, current course offerings only include logistic management, industrial management, mechatronics and electronics. Inclusion of more fields, such as plastics manufacturing, could supply the country's talent pipeline with much needed skilled graduates in order to boost economic growth in the domestic manufacturing sector.

11.2 Michigan Regional Skills Alliances – Developing Balanced Local Skills Strategies

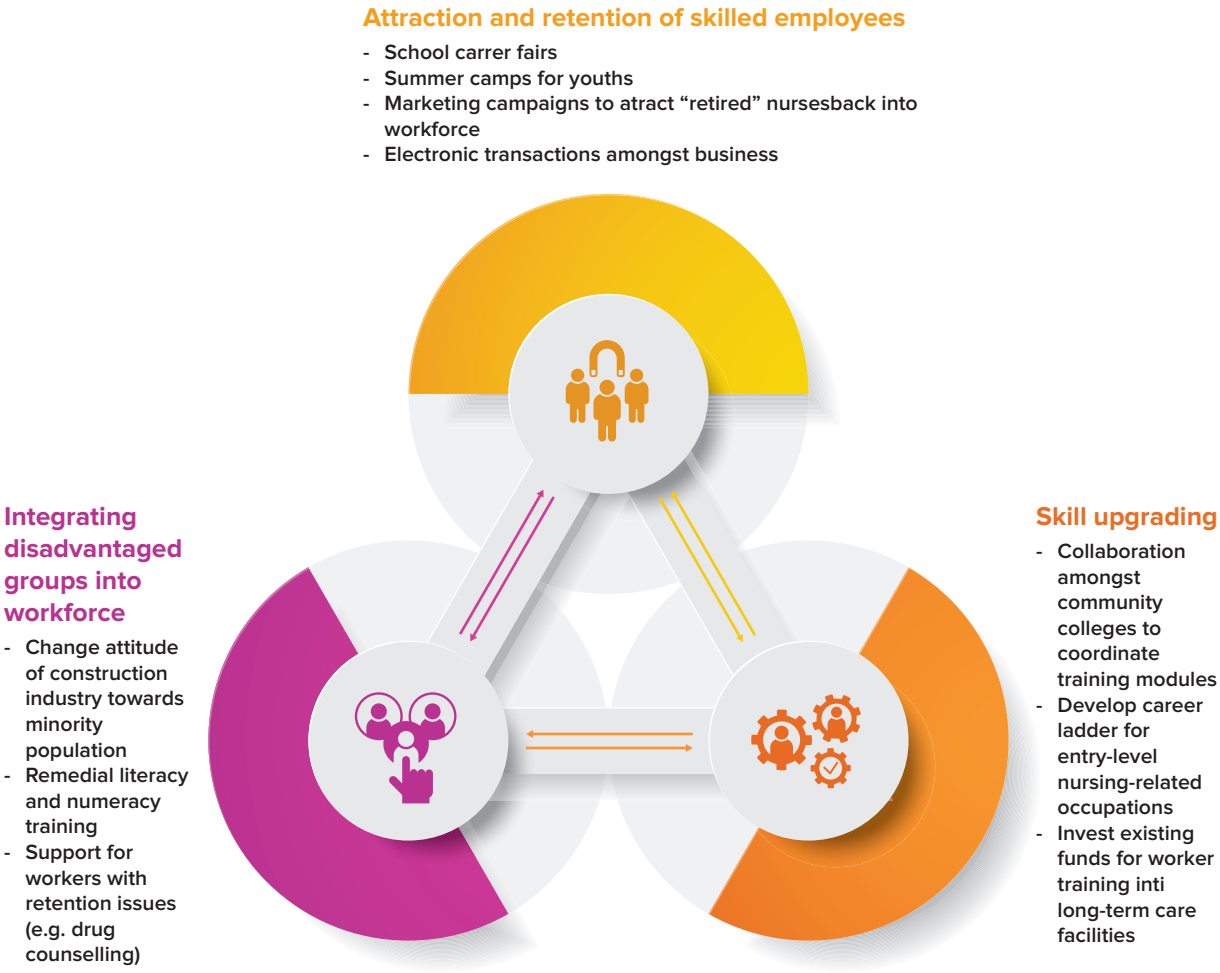
At the beginning of the 20th century, Michigan was the hub of the industrial boom in the US. The state's mass production of automobiles and other manufacturing processes industry accounted for 18% of its outputs and 14.5% of its employment, in comparison to the national average of 12.1% and 10.3%, respectively. However, the rapid reduction of market shares of the "Big Three" domestic automakers a decade later (i.e., General Motors, Ford, and Chrysler Daimler) placed a great toll on its economy – in 2004, Michigan was the worst performing economy in the country[18]. These substantial indirect effects created by economic decline in the auto industry led to loss of jobs, subsequently generating a knock-on effect on other major economic sectors. The worsening economic conditions in Michigan were further exacerbated by its incapacitated workforce resulting from an aging population; and a labour pool that lacked the education levels demanded by businesses due to enrolment decline and low youth college completion rates. In response to Michigan's economic circumstances, the state government launched the Michigan Regional Skills Alliances (MiRSA) to combat these labour force issues.

The MiRSA initiative illustrates a local skills strategy that effectively balanced several distinct strategic elements to produce sustainable change within the state. The goal was to ameliorate the local workforce and improve the education system, as well as in response to cutbacks in federal funds directed towards the labour market. Acknowledging that local entities best understood each local labour market's unique needs, the state collaborated with local stakeholders to distinguish skills in demand and to develop strategic approaches to address insufficiencies. For the initial development of 13 regional skills alliances, the state provided a 1-year start-up grant of over USD1 million[19]. The alliances were conducted using a business-led approach, with aims and objectives strategically developed in collaboration with local employers. Moreover, committees were created to discuss and address the workforce issues encountered by employers within the respective regions.

Each objective was designed to target sectors of importance to the local economy, such as manufacturing, healthcare, utilities, construction, and so on. The key actions carried out included attracting new talents, skills upgrading, as well as addressing barriers to work amongst disadvantaged populations to better integrate them into the workforce. Figure 1 elaborates on the different activities carried out, categorised under the respective key actions.

Overall, the MiRSA were able to identify key industries facing labour shortages, designed skill strategies, and implement them. Through the MiRSA, employers established networks and created collaborative relationships between employers, both of which vital for economic viability and business profitability. Furthermore, the programme successfully introduced 813 individuals

[15] Refer to Statistisches Bundesamt (2020).
[16] Refer to Wiemann and Fuchs (2018).
[17] Refer to https://www.malaysia.ahk.de/en/vocational-training/gdvt-concept (last accessed on 15 March 2020).
[18] Refer to Froy et al. (2009)
[19] Refer to Froy (2008)



Source: Froy et al. (2009)

into employment, and more than 2,100 individuals obtained training. Moreover, business leaders commented that the programme ameliorated their businesses through the provision of training grants, provided a collaborative environment that allowed companies to thrive, and allowed local communities to customise initiatives to meet domestic needs.

11.3 Rebranding and Promoting Vocational Education in Hong Kong

Vocational education and training (VET) in Hong Kong has long had issues with public perception. Its receipt of negative perception stemmed from two major occurrences that happened during the 1990's – a major economic shift from manufacturing to services-oriented, and the massification of higher education to popularise tertiary education[20]. As the government further implemented policy changes which tied academic education to the city's future economic transformation, its actions further entrenched a bias perception towards VET, particularly in parents.

In Hong Kong, parents typically categorised different occupations into a rigid dichotomy of "low skilled" and "high skilled", often linking vocational qualifications with the former which accompanied lower social standing[21]. This led to issues with VET enrolment, with a majority enrolling and

[20] Refer to Yau et al. (2018).
[21] Refer to Yau et al. (2018).

prioritising higher education qualifications rather than vocational. However, in 2014, the Hong Kong government released a policy address which highlighted the reviewal of its vocational education system and the setup of the Task Force on Vocational Education (TFVE)[22]. This measure by the Hong Kong government was taken to combat VET's negative image and was also in response to China's growing demand for vocational graduates to fuel its labour economy and the move towards digitalisation and Industry 4.0.

The TFVE, comprised of various stakeholders involved in VET (i.e., education providers, industries, chambers organisations, parents and youth associations), was established to glean insight on the current VET ecosystem. After a series of interviews, surveys and focus group discussions, the task force provided the government 27 recommendations – all of which was accepted – based on a three-prong approach focusing on the rebranding of VET, its promotion, and sustaining efforts made.

The Vocational Training Council (VTC) – a statutory body and the largest VET provider in the city – was tasked with rebranding efforts, which included the renaming of VET to Vocational and Professional Education Training. The motivation behind this move was to widen the scope of vocational education at the time to encompass specialised professional skills and provide up to degree-level qualifications. Additionally, the council organised a primarily online publicity campaign, a move made to target the younger, more tech-savvy generation[23]. YouTube videos were used to advertise apprenticeship training programmes, success stories of alumni, use of leading technologies in its curriculum, and prospects of overseas training; while Facebook posts highlighted the impact of successful technologies developed by students. Since 2015, VTC's YouTube channel has hit almost 17 million views (from 1.5 million in 2015) and thousands of followers on both its official and alumni Facebook pages.

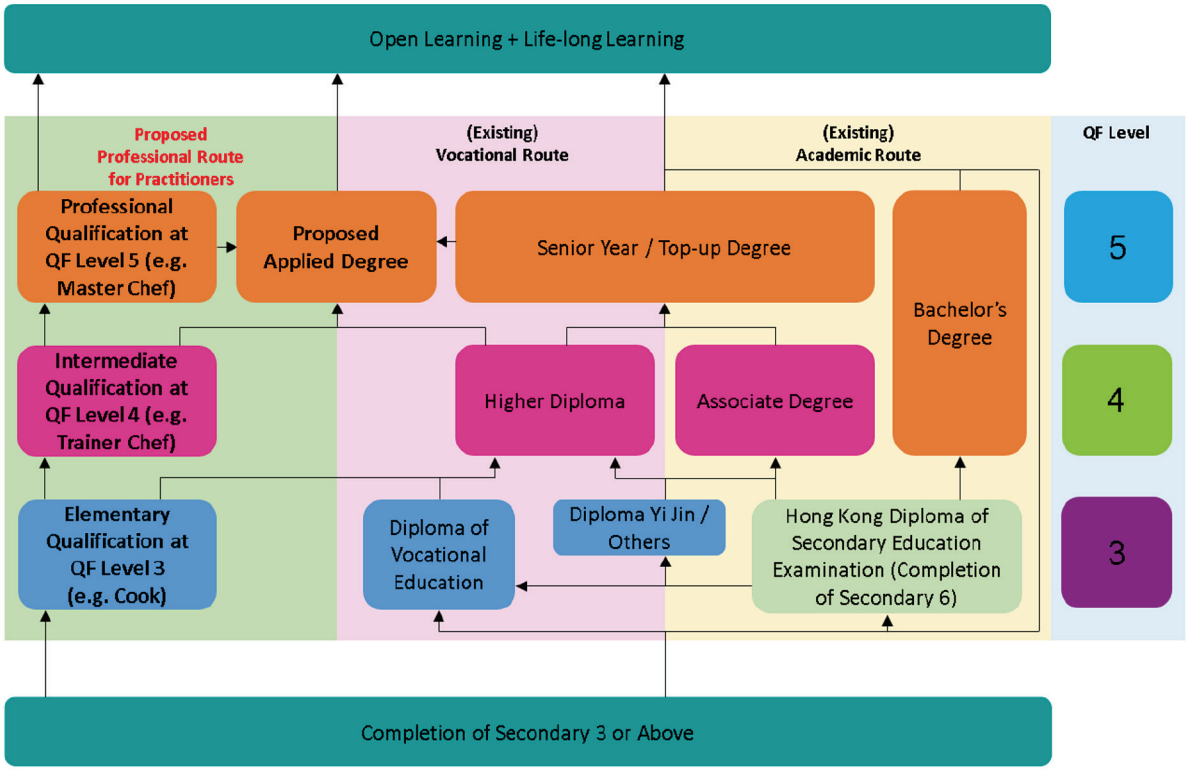
In Hong Kong, the existing secondary school curriculum already encompassed programmes and initiatives which introduced VPET pathways to its students prior to graduation[24]. However, these efforts were often uncoordinated, relied on industry voluntary participation, and required the destigmatisation of VPET. Considering these issues, the government further increased resources and funding to promote and increase stakeholder participation in VPET promotional efforts as a viable education and career pathway. Most notable were VTC's introduction of the Earn and Learn Pilot Scheme and the Study Subsidy Scheme.

The Earn and Learn Pilot Scheme drew inspiration from the German Dual VET system, whereby trainees were offered both foundation education and real-work training (at a one to three-year ratio) with a partnering enterprise. The scheme provided trainees a training allowance throughout the working period which was paid by businesses and topped up with a government incentive – depending on the industry, trainees could be paid up to HKD10,000 per month. Meanwhile, the Study Subsidy Scheme offered subsidies of up to HKD70,000 per annum to students who pursued VPET courses related to industries where labour demand existed. In 2019, the VTC increased training placement numbers and introduced a new scheme – the Pilot Incentive Scheme to Employers – to incentivise businesses to participate in training assessments. These schemes not only allowed the government to motivate student enrolment, but also industry participation via monetary incentives.

Intervention efforts were monitored via tracking surveys, with survey results indicating a more positive overall perception of VPET. In comparison, 60.2% of respondents in 2018 had a good impression of VPET from 50.8% in 2015, with more respondents acknowledging VPET opened more job opportunities. However, there was marginal success with correcting preconceived notions of VPET being a second option to academic education. In resonance with recommendations

[22] Refer to https://www.policyaddress.gov.hk/2014/eng/pdf/PA2014.pdf
[23] Refer to Task Force on Promotion of Vocational Education (2015).
[24] Refer to Task Force on Promotion of Vocational and Professional Education and Training (2020).

Figure 5.4.2 Proposed VPET Route alongside Existing Education Pathway



Source: Task Force on Promotion of Vocational and Professional Education and Training

to sustaining efforts, the government aimed to capitalise on this upward positive momentum with the establishment of a second task force in 2018 – the Task Force on Promotion of VPET.

Through a series of consultation sessions with over 80 organisations involved in education provision, industry, parents and youth associations, the second task force listed a new set of recommendations in 2019. Leveraging on existing initiatives made, new efforts would follow a similar three-pronged approach. Most notable was the restructuring of its current vocational education pathway through the addition of an "Applied Degree" which offers similar qualifications standard as a bachelor's degree. In the current hierarchy (as shown in Figure 2), the typical options available to school leavers were the higher diploma and associate degree, both of which are only equivalent to a bachelor's degree in year 2. Placing both on a par level would elevate VPET pathways to a similar degree of prestige as academic options. By introducing these sustained rebranding and promotional efforts, the Hong Kong government was able to slowly change its citizen's mindset of VPET and is on its way to establishing vocational education as a viable and relevant education and career pathway.

11.4 SkillsFuture – Addressing Skills Mismatch

The plastics industry within Malaysia has experienced gradual decrease in quality hires within the last decade. Among the contributing factors to this phenomenon is skills mismatch within the workplace. According to the OECD, skills use at work is defined as the level of skills that a worker current job observes[25]. Therefore, when skills use

[25] Refer to Organisation for Economic Cooperation and Development (2019)

at work does not match the skills workers possess or when skills or workers are underutilised, the possibility of job dissatisfaction that leads to lack of productivity increases and sub-optimal allocation of human resources.

Based on a study conducted by the OECD[26], not only were STEM and education related skills in short supply in these OECD countries, its list also included transferable skills such as literacy and numeracy, system skills, complex problem solving, and verbal abilities. In contrast, skills such as manufacturing and production, routine occupations that trump physical abilities such as endurance, physical strength, and flexibility were found to be in abundance. The margins between the shortages and surplus of the skills have increased in the last decade, putting a spotlight on the issue of adaptability of individuals and economies to change according to current skills requirements – a problem not unfamiliar in Malaysia's plastics industry labour scene. Addressing this skills mismatch would require better systems for dissemination of information to advise and guide training choices of both employees and employers. Singapore has executed several programmes that target these, one of which being SkillsFuture.

SkillsFuture is a statutory board setup under the country's Ministry of Education to drive and coordinate national skills development through the provision of training programmes, monetary incentives, and skills frameworks. By creating a coordinated national movement, the government is able to direct training provision and the choices made by its citizens[27]. Job competencies and skills are framed with clear classifications of rank and industry via the SkillsFuture Framework to guide both employees and employers on the skills required at every step of the career ladder. Meanwhile, the SkillsFuture Series clearly defines sectors with expected future skills demand to future-proof both students and individuals; and provide training courses in partnership with renowned local institutions such as National University of Singapore and Nanyang Technological Partnership. Through these initiatives, the Singapore government ensures there is access to information and guidance about the labour market and that industry, training providers, and individuals are well informed and aligned with expectations of skills that are required at present and in the future.

While it is important to address skills mismatch, guiding and aiding those in transition are as vital. These include facilitating school-to-work transitions for those entering the workforce, as well as individuals displaced mid-career due to skills mismatch. In response, SkillsFuture offers the Work-Study Post Diploma, a structured training programme post-graduation that provides a career progression pathway which leads to a professional certification equivalent in tandem with potential wage progression or career advancement. Employers are motivated not only by the prospects of acquiring suitable talents but also the receipt of a grant of up to $15,000 per trainee. The SkillsFuture Mid-Career Support Programme/Package offers conversion programmes that aid transitioning mid-career in the event reskilling to fit a new job or job demand is necessary. This gives mid-career individuals more control of over their skillset and better prepares them for any disruptions in the skills landscape.

Since the launch of SkillsFuture in 2015, more than 530,000 individuals and 14,000 businesses have benefitted from the initiative[28]. By acting as an intermediary, the government efficiently linked all its stakeholders to identify key skills and industries to better align skills supply to labour market demands.

11.5 Stimulating Demand for High Level Skills

Even though governments strive to match skills demand between the labour force and industries, skills matching may not always produce the best outcome. According to the OECD, low skills

[26] Refer to Organisation for Economic Cooperation and Development (2019)
[27] Refer to SkillsFuture https://www.ssg-wsg.gov.sg/ (last accessed on 20 March 2020).
[28] Refer to https://www.skillsfuture.sg/NewsAndUpdates/DetailPage/5ed87fff-39df-4dc3-b63b-6f2763db6aa9 (last accessed on 20 March 2020).

equilibrium occurs when a workforce comprising of low skilled individuals are well matched with occupations[29]. When skill sets are matched adequately with industry demand, there is little incentive for both employees and employers to pursue higher level, value-adding skills. Such a scenario could lead to stagnated economic growth, thus leaving these economies susceptible to shocks and disruptions caused by global supply chain interruptions and technological shifts. Combating this inertia would require having comprehensive skills strategies appositely aligned with industrial and innovation policies. This very same phenomenon is occurring in Italy.

Italy's economic growth has been experiencing an overall downward trend over the past two decades, sitting at 0.8% annual GDP growth in 2018 in comparison to 3.8% back in 2000[30]. The country's sluggish economic performance could be due to its workforce's low skill levels and weak demand for high level skills, both of which in part, culminating from the country's enterprise distribution. In 2017, 85% of businesses in Italy were family-operated –contributing up to 70% of total employment – which rarely invested in productivity-enhancing technologies. Additionally, remuneration was often based upon seniority rather than merit[31]. Both these issues resulted in little incentive or motivation to the full utilisation and improvement of skill sets in either employee or employer.

In response, the Italian government launched an ambitious package of policy reforms targeting the development and implementation of skills policies tailored to national and regional challenges. Consultations were organised with over 200 representatives, comprising of stakeholders from industry, education, research institutions and government. The proposed policy reforms targeted the education system, labour market, and innovation initiatives. Policy changes revolving education introduced emphasis in digital competencies by investing into modern learning techniques, and the introduction of compulsory apprenticeship programmes tied with enterprises for secondary school students. Reforms in labour policies meanwhile focused on reducing skills waste and mismatch. With Italy moving towards Industry 4.0, its new innovation-centred policies included the establishment of technological hubs to encourage research and development collaboration to facilitate technology uptake among Italian firms. Having these policies working in tandem was critical to creating an ecosystem which demanded higher skill levels, most crucially initiatives urging research and innovation.

Investment in R&D not only spurs knowledge and skills development in enterprises and industries, but also stimulate demand for skills complementing high-tech production. According to the OECD, over the 2006 to 2015 period, countries that received significant government support (such as China and South Korea) exhibited higher growth in R&D intensity with interventions contributing up to 17% in observed variation[32]. By supporting the R&D landscape through comprehensive policy reforms, Italy is simultaneously stimulating demand and supply for high level skills.

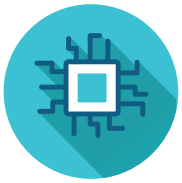
[29] Refer to Organisation for Economic Cooperation and Development (2019).
[30] Refer to World Bank https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=IT (last accessed on 20 March 2020).
[31] Refer to Organisation for Economic Cooperation and Development (2018).
[32] Refer to Organisation for Economic Cooperation and Development (2019).

12 Summary[33] of the Survey, Discussions and Recommendations

The plastics industry is a key sector in the Malaysian economy and will continue to play a pivotal role as the manufacturing industry moves towards advanced materials and smart manufacturing processes in the future. While businesses are cautious about the future of the industry and their own firms, most agree that talent remains the main bottleneck to increasing the competitiveness of the industry. The central role of talent cannot be understated as it forms the foundation of the capabilities of the industry. Without the right talent, investments into machinery and technology would not realise their full potential.

However, the plastics industry has come under heavy pressure from negative perceptions regarding their sustainability and environmental issues. This strongly discourages new entrants into the talent pool as potential students in schools opt for other industries that have a better perceived future. There is also a further disconnect between the education institutions and industry needs which creates a skills mismatch for graduates from the plastics courses. Thus, employers face strong difficulty in hiring the right talent, especially for higher-level technical roles, and promoting from within proved to be difficult as well with the lack of appropriate training courses and necessary training capabilities to upskill employees. The talent ecosystem within the industry faces issues across the three key phases of acquisition, upskilling, and retention and these need to be addressed collectively to plug the various gaps of the talent ecosystem.

The 7i framework identified the key drivers of change within the plastics industry's talent ecosystem and the recommendations for change are as follows:



Infrastructure

Strengthen existing core technology while developing a transition programme to adopt advanced technological infrastructure that caters for the 4th Industrial Revolution.

Infostructure

Establish a modernised digital communication architecture to facilitate access and connectivity, especially in the rural areas.

Intellectual Capital

Conduct industry relevant training programmes by having constant dialogues between industry and education institutions and develop a more open knowledge sharing culture.

[33] Note: This study was conducted in December 2019, therefore the effects of the Malaysian political change and COVID-19 in 2020 were not captured at the time of the study.

Integrity

Strengthen governance mechanisms to develop a more effective and comprehensive skills development and evaluation plan and ensure a sustainable talent pipeline for the future.

Interaction

Public-private partnerships are key to engage in coordinated efforts towards foresighting change in the industry and skills needs, and marketing campaigns to revamp the branding of the industry.

Incentives

Providing fiscal incentives such as scholarships and grants to attract the best talents and offer competitive remuneration to compete with other sectors of the economy. Non-fiscal incentives such as commitment towards technology and automation to create skilled and high-paying jobs, and career placement centres with strong education networks to increase awareness of the industry.

Institutions

Strengthen institutions to bring onboard key stakeholders with the common goal of developing a collaborative education and training partnership model. These institutions need to be empowered with the right autonomy and accountability to enact effective change in the industry and education networks.

By strengthening these pillars of the 7i framework, the industry will have a strong foundation to attract a good pipeline of talent into the industry and ensure their skill sets remain relevant and competitive throughout their career. Having this sustainable pool of talent will ensure that the industry can successfully transition away from legacy and laggard systems and build new competencies that enable the industry to become less labour-intensive and move up the value-chain to compete regionally and globally.

13 Conclusion

The Malaysian plastics industry remain a core component of the manufacturing sector. As an important source of revenue and employment for the nation, it should be a priority area that receives consistent investments in capital and talent to ensure its vibrancy as an industry. However, the industry has been beset by a prolonged skills gap and mismatch between the talent available and industry needs. This coupled with the recent severe bad press surrounding its products have damaged the industry's reputation and changed public perception of its future. Plastics manufacturers are facing great pressures from embracing digital transformations, up taking sustainability initiatives, and managing cost of running the business.

The findings of this study highlights that the skills shortage within the talent ecosystem is not a standalone issue. It is a multi-factorial problem that needs all of its gaps and weaknesses addressed before progress can be made. The industry needs to tackle all three phases (acquisition, upskilling, and retention) and strengthen all pillars of the 7i framework for the talent ecosystem to ensure that a consistent and sustainable talent pipeline can be developed. The various case studies provide the necessary blueprints for adapting solutions to the Malaysian plastics industry's context.

The talent available for an industry is a key driver of its competitiveness. By enriching the talent pool, it enables companies within the industry to transition away from legacy systems to next generation processes and products. This in turn helps producers to move up the value-chain and maintain a stronger competitive edge over regional and global competitors. All these would help position Malaysia as a leading plastics manufacturer in the region and the world.

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15 Appendix

15.1 Employer Survey

Industry and business sentiments

	Be much worse	Be a little worse	Remain unchanged	Be a little better	Be much better
1. In your opinion, do you think the plastics injection moulding market conditions over the next 12 months will:	1	2	3	4	5
	Very not confident	**Somewhat not confident**	**Neither confident nor not confident**	**Somewhat confident**	**Very confident**
2. How confident are you about your company's prospects for the next 12 months?	1	2	3	4	5

3. Thinking about the next 12 months, which of the following internal issues are you most concerned with that will impact your company's performance? (Please rank your TOP THREE (3) only, where 1 is the issue you are most concerned with, 2 is the second issue you are most concerned with and 3 is the third issue you are most concerned with)

_____ Difficulty attracting quality talents
_____ Difficulty retaining quality talents
_____ Lack of investment in research and development
_____ Lack of investment in training / upskilling workers
_____ Cost of doing business
_____ Aging / dated equipment
_____ Lack of new product development
_____ Lack of automation
_____ Increasing employee benefit costs
_____ Increasing salary costs
_____ Others.
Please specify:
_____

4. Thinking about the next 12 months, which of the following external issues are you most concerned with that will impact your company's performance? (Please rank your TOP THREE (3) only, where 1 is the issue you are most concerned with, 2 is the second issue you are most concerned with and 3 is the third issue you are most concerned with)

_____ Sustainability initiatives
_____ Demand for biodegradable plastics
_____ Seasonal demands
_____ Maintaining customer loyalty
_____ Increasing competition
_____ Tighter enforcement of regulation
_____ Disruptive technology (including industry 4.0 technologies)
_____ Changes in public policies
_____ Global economic uncertainty
_____ Weakening of the Ringgit
_____ Others. Please specify: _____

5. Which of the following plastics manufacturing process technologies are you currently using / intend to use in your organisation? (Tick the appropriate options).

Technologies	Currently Using	Intend to use in the future	Not applicable
'Standard' processes (injection moulding, blow moulding, extrusion, rotomoulding)	❑	❑	❑
Fusible core moulding and vibration welding for precision hollow parts - automotive/domestic appliances	❑	❑	❑
Fluid/Gas assisted injection moulding - electronic, electrical, IT markets	❑	❑	❑
Two-shot moulding	❑	❑	❑
Cleanroom operation - medical/pharmaceutical electronic and electrical markets - injection moulding	❑	❑	❑
3D-Printing and additive manufacturing (for prototyping, etc.)	❑	❑	❑
Injection blow moulding (including preforms)	❑	❑	❑
In-mould labelling	❑	❑	❑
In-mould decoration	❑	❑	❑
Fusion fitting technology for pressure pipes - construction gas/water	❑	❑	❑
Mucell micro-cellular moulding	❑	❑	❑
Moulded interconnect devices - electrical and electronic - injection moulding (= 3D printed circuit boards)	❑	❑	❑
Metal injection moulding/thixomoulding	❑	❑	❑
Reaction and reinforced reaction injection moulding (RRIM) of liquid resins, mainly polyurethane (PUs) -	❑	❑	❑
Auto and construction markets	❑	❑	❑
Micromoulding	❑	❑	❑
Process modelling	❑	❑	❑
Rapid manufacturing, e.g. continuous 3D printing, fused deposition modelling, laser sintering	❑	❑	❑
Resin transfer moulding (Advanced Composites)	❑	❑	❑
High pressure blow moulding	❑	❑	❑
Isotec Composite Flow Moulding (placement of reinforcement via pultrusion for high performance)	❑	❑	❑
Thermoform and Blow (TAB)	❑	❑	❑

Source: SQW Ltd/Rapra Technology Ltd (Rapra – UK Rubber and Plastics Research Association

Your current and future skills need

	Yes	No
6. Does your company have a talent development strategy? (e.g. roadmap from on-boarding of new hires to consistent upskilling of existing employees)	❑	❑

	Very low importance	Low importance	Moderate importance	High importance	Very high importance
7. How important is skills enhancement to your business competitiveness?	1	2	3	4	5

	Very Easy	Easy	Neutral	Difficult	Very Difficult
8. How difficult is it to recruit skilled employees in your business?	1	2	3	4	5

9. Please specify the importance of the following skills for manufacturing and technical positions in your business.

		Not required	Required but do not adequately possess	Required and adequately possess	Would be nice to possess	Required in 2 to 4 years
9.1	Chemical Engineering Technology	1	2	3	4	5
9.2	Production Engineering Technology	1	2	3	4	5
9.3	Manufacturing Engineering Technology	1	2	3	4	5
9.4	Process Control/Automation	1	2	3	4	5
9.5	Electrical/Mechanical Technology	1	2	3	4	5
9.6	Maintenance	1	2	3	4	5
9.7	Others. Please specify:	1	2	3	4	5

10. What percentage of **learning occurs on the job?** In other words, other than formal qualifications and certificates, how much learning do your employees undertake during the course of their employment?

		Less than 10%	10 – 25%	26 – 50%	51 – 75%	Greater than 75%
10.1	Senior General Management [a]	1	2	3	4	5
10.2	Finance [b]	1	2	3	4	5
10.3	Technologist [c]	1	2	3	4	5
10.4	Technician [d]	1	2	3	4	5
10.5	Craftsman [e]	1	2	3	4	5
10.6	Operative Worker [f]	1	2	3	4	5
10.7	General Worker (Unskilled) [g]	1	2	3	4	5

a ***Senior General Management:*** *Chief Executive Officer (CEO), Chief Operating Officer (COO), etc.*
b ***Finance:*** *Costing Personnel*
c ***Technologist:*** *Product Engineer, Manufacturing/Industrial Engineer, CAD-CAM Engineer/Tooling Engineer, Project Engineer, Q.C./Q.A. Engineer, Electronics/Electrical Engineer, Technical Services Engineer, Moulding Engineer, Production Operations Manager*
d **Technician:** *Supervisor/Foreman, Mechanical Engineering Technician, Electronics/Electrical Engineering Technician, Q.C./Q.A. Technician, Product/Packaging Development Technician, Laboratory/Materials Technician, Manufacturing/Industrial Engineering Technician, Tooling Technician, CAD-CAM Technician (Tooling), Production Planner*
e ***Craftsman:*** *Team Leader, Electrician, Mould and Die Maker, Model/Prototype Maker, Plastics Machine Setter, Quality Control Inspector*
f ***Operative Worker:*** *Injection Moulding Machine Operator, Other Plastics Processing Machine Operator, Printing Operator, Assembler, Plastics Fabricator/Welder*
g ***General Worker (Unskilled):*** *Factory Worker (involved in manual work such as loading and unloading goods, sprue removal, packing etc.)*

11. What action is your business likely to take to overcome problems obtaining skilled employees?

		Very unlikely	Unlikely	Neutral	Likely	Very likely
11.1	No action	1	2	3	4	5
11.2	Outsource the job/work	1	2	3	4	5
11.3	Invest in plant/equipment	1	2	3	4	5
11.4	Recruit from training providers	1	2	3	4	5
11.5	Internal training/mentoring	1	2	3	4	5
11.6	Training by external providers	1	2	3	4	5
11.7	Others (please specify):	1	2	3	4	5

12. Have you **hired or attempted to hire** for the following positions in the last six months? If YES, please specify the number of people you sought, the number of days it took to hire for the position and indicate the level of skills and knowledge of the qualified candidates for each of the position.

Positions	No	Yes	If Yes, Number sought	If Yes, Number of days to hire	Level of skills and knowledge exceed expectations	Level of skills and knowledge met expectations	Level of skills and knowledge was below expectations	Unable to find qualified applicant(s)
12.1 Senior General Management	❑	❑→			1	2	3	4
12.2 Finance	❑	❑→			1	2	3	4
Technologist								
12.3 Product Engineer (Plastics)	❑	❑→			1	2	3	4
12.4 Manufacturing/Industrial Engineer	❑	❑→			1	2	3	4
12.5 CAD-CAM Engineer/Tooling Engineer	❑	❑→			1	2	3	4
12.6 Project Engineer	❑	❑→			1	2	3	4
12.7 Q.C./Q.A. Engineer	❑	❑→			1	2	3	4
12.8 Electronics/Electrical Engineer	❑	❑→			1	2	3	4
12.9 Technical Services Engineer	❑	❑→			1	2	3	4
12.10 Moulding Engineer	❑	❑→			1	2	3	4
Technician								
12.11 Supervisor/Foreman	❑	❑→			1	2	3	4
12.12 Mechanical Engineering Technician	❑	❑→			1	2	3	4
12.13 Electronics/Electrical Engineering Technician	❑	❑→			1	2	3	4
12.14 Q.C./Q.A. Technician	❑	❑→			1	2	3	4
12.15 Product/Packaging Development Technician	❑	❑→			1	2	3	4
12.16 Laboratory/Materials Technician	❑	❑→			1	2	3	4
12.17 Manufacturing/Industrial Engineering Technician	❑	❑→			1	2	3	4
12.18 Tooling Technician	❑	❑→			1	2	3	4
12.19 CAD-CAM Technician (Tooling)	❑	❑→			1	2	3	4
12.20 Production Planner	❑	❑→			1	2	3	4
Craftsman								
12.21 Team Leader	❑	❑→			1	2	3	4
12.22 Electrician	❑	❑→			1	2	3	4
12.23 Mould and Die Maker	❑	❑→			1	2	3	4
12.24 Plastics Machine Setter	❑	❑→			1	2	3	4
12.25 Quality Control Inspector	❑	❑→			1	2	3	4
Operative Worker								
12.26 Injection Moulding Machine Operator	❑	❑→			1	2	3	4
12.27 Other Plastics Processing Machine Operator	❑	❑→			1	2	3	4
12.28 Printing Operator	❑	❑→			1	2	3	4
12.29 Assembler	❑	❑→			1	2	3	4
12.30 Plastics Fabricator/Welder	❑	❑→			1	2	3	4
General Worker								
12.31 General Worker (Unskilled)	❑	❑→			1	2	3	4

13. What is the average rate of **worker turnover** in 2019?

	Less than 5%	5 – 10%	11 – 20%	21 – 30%	Greater than 30%
13.1 Senior General Management	1	2	3	4	5
13.2 Finance	1	2	3	4	5
13.3 Technologist	1	2	3	4	5
13.4 Technician	1	2	3	4	5
13.5 Craftsman	1	2	3	4	5
13.6 Operative Worker	1	2	3	4	5
13.7 General Worker (Unskilled)	1	2	3	4	5

14. For each of the following positions, what are the top THREE (3) reasons for employee turnover rate? (Please rank your TOP THREE (3) only, where 1 is the top reason, 2 is the second top reason and 3 is the third top reason; refer to Example column)

	Example:	Senior General Management	Finance	Technologist	Technician	Craftsman	Operative Worker	General Worker (Unskilled)
14.1 Working conditions/ environment								
14.2 Inadequate recognition for work done	3							
14.3 Employee poor work ethic	1							
14.4 Employee salary demands	2							
14.5 Employment benefits								
14.6 Not enough opportunities for career/skills development								
14.7 Downsizing of business								
14.8 Mismatch of employee skills and job requirements								
14.9 Others. Please specify:								
14.10 Don't know								

15. Please indicate **average salary** per month for each position

	Under RM2000	RM2001 – 3000	RM3001 – 4000	RM4001 – 6000	RM6001 – 8000	RM8001+
15.1 Senior General Management	1	2	3	4	5	6
15.2 Finance	1	2	3	4	5	6
15.3 Technologist	1	2	3	4	5	6
15.4 Technician	1	2	3	4	5	6
15.5 Craftsman	1	2	3	4	5	6
15.6 Operative Worker	1	2	3	4	5	6
15.7 General Worker (Unskilled)	1	2	3	4	5	6

	Never	Rarely	Sometimes	Often	Always
16. In your opinion, does your company pay more than 'market' wages for well-qualified candidates?	1	2	3	4	5

		1 – 5% more	6 – 10% more	11 – 15% more	16 – 20% more	Over 20% more
17.	How much more above market wages are you willing to pay for an ideal candidate?	1	2	3	4	5

18. Please TICK which of the following stakeholders will assist your business to overcome your skills gaps. If you indicate YES, please select the level of importance as a source of assistance/support.

	Stakeholders	No	Yes	Very low importance	Low importance	Neutral	High importance	Very high importance
18.1	Federal ministry or agency	❑	❑→	1	2	3	4	5
18.2	Local or State Government	❑	❑→	1	2	3	4	5
18.3	Public university or research institute	❑	❑→	1	2	3	4	5
18.4	Private university or research institute	❑	❑→	1	2	3	4	5
18.5	Non-governmental organisations (NGO)	❑	❑→	1	2	3	4	5
18.6	Industry association	❑	❑→	1	2	3	4	5
18.7	Financial Institutions (including microfinance institutions)	❑	❑→		1	2	3	4
18.8	External Training providers	❑	❑→	1	2	3	4	5
18.9	Human Resource Development Fund (HRDF) Malaysia	❑	❑→	1	2	3	4	5
18.10	Training and workshop organised by MPMA	❑	❑→	1	2	3	4	5

19. How much did you spend on staff training in 2019 and how many employees were trained for the following employment roles?

	RM	Number of employees trained
19.1 Senior General Management		
19.2 Finance		
19.3 Technologist		
19.4 Technician		
19.5 Craftsman		
19.6 Operative Worker		
19.7 General Worker (Unskilled)		

20. Please specify the importance of the following training to your business.

	Training Types	Not required	Required but cannot get training	Required and can get adequate training	Would be nice to have such training	Required in 2 to 4 years
20.1	Training related to Injection Moulding.	1	2	3	4	5
20.2	Training related to Mould Making.	1	2	3	4	5
20.3	Training related to Engineering Drawings.	1	2	3	4	5
20.4	Training related to Material Properties.	1	2	3	4	5
20.5	Training related to Fluid Power.	1	2	3	4	5
20.6	Training related to Product Development	1	2	3	4	5
20.7	Training related to Smart Manufacturing (e.g. real-time network of sensors and data analysis to maintain quality and minimize defects)	1	2	3	4	5
20.8	Training related to Quality.	1	2	3	4	5
20.9	Training related to Health & Safety.	1	2	3	4	5
20.10	Training related to Sustainability	1	2	3	4	5
20.11	Training related to Financial Principles.	1	2	3	4	5
20.12	Training related to General 'Soft' Skills (e.g. Teambuilding, Leadership, Communication, etc.)	1	2	3	4	5
20.13	Others. Please specify: _____	1	2	3	4	5

21. Please specify the importance for the following when deciding on a training provider.

		Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
21.1	Employees undergo training that are accredited/certified by the government or an industry association	1	2	3	4	5
21.2	Training providers provide hands-on and practical trainings with up-to-date equipment and facilities	1	2	3	4	5

22. Which of the top THREE (3) technical skills and knowledge do you find most impactful for your company's growth? (Please rank your TOP THREE (3) only, where 1 is top skill, 2 is the second top skill and 3 is the third top skill)

_____ Operation Monitoring - *Watching gauges, dials, or other indicators to make sure a machine is working properly.*

_____ Operation and Control - *Controlling operations of equipment or systems.*

_____ Quality Control Analysis - *Conducting tests and inspections of products, services, or processes to evaluate quality or performance.*

_____ Troubleshooting - *Determining causes of operating errors and deciding what to do about it.*

_____ Repairing - *Repairing machines or systems using the needed tools.*

_____ Equipment Maintenance - *Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.*

_____ Production and Processing - *Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.*

_____ Mechanical - *Knowledge of machines and tools, including their designs, uses, repair, and maintenance.*

_____ Mathematics – *Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications*

_____ Physics - *Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.*

_____ Others. Please specify: _____

23. Which of the top THREE (3) 'soft' skills and knowledge do you find most impactful for your company's growth? (Please rank your TOP THREE (3) only, where 1 is top skill, 2 is the second top skill and 3 is the third top skill)

_____ Critical Thinking - *Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.*

_____ Active Learning - *Understanding the implications of new information for both current and future problem-solving and decision-making.*

_____ Monitoring – *Monitoring/Assessing performance of yourself, other individuals, or your organization to make improvements or take corrective action*

_____ Time Management – *Managing one's own time and the time of others*

_____ Communication – *Communicating effectively in writing/speech as appropriate for the needs of the audience*

_____ Reading Comprehension – *Understanding written sentences and paragraphs in work related documents*

_____ Active Listening – *Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times*

_____ Judgment and Decision Making - *Considering the relative costs and benefits of potential actions to choose the most appropriate one.*

_____ Complex Problem Solving - *Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.*

_____ Administration and Management - *Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.*

_____ Others. Please specify: _____

24. Which top THREE (3) work styles do you find most impactful for your company's growth? (Please rank your TOP THREE (3) only, where 1 is top work style, 2 is the second top work style and 3 is the third top work style)

_____ Dependability

_____ Attention to detail

_____ Cooperation

_____ Integrity

_____ Independence

_____ Initiative

_____ Stress Tolerance

_____ Analytical thinking

_____ Discipline

_____ Adaptability/Flexibility

_____ Leadership

_____ Others. Please specify: _____

Training assessment and feedback

25. Have your employees undergone training in the past 12 months?

- ❑ Yes, including the training provided by MPMA ➔ *Skip 25b and go to 25c*
- ❑ Yes, but not for MPMA training ➔ *Skip 25b and go to 25c*
- ❑ Not at all ➔ *Go to 25b and skip to 34*

25b. Why have your employees not undergone any training in the past 12 months? [You may select more than one]

- ❑ There were no trainings available
- ❑ The trainings available were not relevant for their job function
- ❑ I do not believe going for training would improve their job performance
- ❑ The training takes too much time away from their job
- ❑ The training costs too much
- ❑ Others. Please specify: _____

25c. What type of training have your employees undergone in the past 12 months? [You may select more than one]

- ❑ Training related to Injection Moulding
- ❑ Training related to Mould Making.
- ❑ Training related to Engineering Drawings.
- ❑ Training related to Material Properties.
- ❑ Training related to Fluid Power.
- ❑ Training related to Product Development
- ❑ Training related to Smart Manufacturing *(e.g. real-time network of sensors and data analysis to maintain quality and minimize defects)*
- ❑ Training related to Quality.
- ❑ Training related to Health & Safety.
- ❑ Training related to Sustainability
- ❑ Training related to Financial Principles.
- ❑ Training related to General 'Soft' Skills *(e.g. Teambuilding, Leadership, Communication, etc.)*
- ❑ Others. Please specify: _____

		Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very Satisfied
26	How satisfied were you with the overall quality of training?	1	2	3	4	5

27. If you were **very dissatisfied / somewhat dissatisfied** with the training, what were the reasons for your dissatisfaction? [You may select more than one]

- ❑ Training content was not useful
- ❑ Not enough emphasis on practical experience
- ❑ Facilities for practical component were outdated
- ❑ Time to complete the training
- ❑ Quality of the training instructor(s)
- ❑ Inadequate assessment to ensure mastery of the content
- ❑ Lack of visual and interactive content
- ❑ Others. Please specify: _____
- ❑ Not applicable (i.e. was satisfied / neither satisfied not dissatisfied)

		Much worse	A little worse	About the same	A little better	Much better
28.	Since your employees have undergone training, their job efficiency has been:	1	2	3	4	5

29. What measures were taken to ensure skills taught were used / maintained / encouraged? [You may select more than one]

- ❑ Monetary incentives
- ❑ Incorporated in KPI
- ❑ Monitoring by mentor / senior
- ❑ Recognition programmes
- ❑ Growth opportunities
- ❑ Investments into equipment/technologies that are relevant to the advanced skills obtained
- ❑ No measures were taken
- ❑ Others. Please specify: _____

30. What were your **expectations** of this training programme? [You may select more than one]

- ❑ Higher production yield
- ❑ Reduction in product defects
- ❑ More satisfied customers
- ❑ Reduction in reliance on outsourcing for labour / maintenance
- ❑ Broader product range
- ❑ Trained new hires (from internal mentorship)
- ❑ Better problem-solving skills
- ❑ Others. Please specify: _____

31. Upon completion of the training programme, what positive outcomes were achieved? [You may select more than one]

- ❑ Higher production yield
- ❑ Reduction in product defects
- ❑ More satisfied customers
- ❑ Reduction in reliance on outsourcing for labour / maintenance
- ❑ Broader product range
- ❑ Trained new hires (from internal mentorship)
- ❑ Better problem-solving skills
- ❑ No positive outcomes
- ❑ Others. Please specify: _____

	Yes	Benefits were about the same as cost	No
32. Overall, did the benefits of the training outweigh its cost of implementation?	1	2	3

33. For each of the training types below, would you send your employees for similar training programmes in the future?

	Training Types	Yes	No
33.1	Training related to Injection Moulding.	❑	❑
33.2	Training related to Mould Making.	❑	❑
33.3	Training related to Engineering Drawings.	❑	❑
33.4	Training related to Material Properties.	❑	❑
33.5	Training related to Fluid Power.	❑	❑
33.6	Training related to Product Development	❑	❑
33.7	Training related to Smart Manufacturing *(e.g. real-time network of sensors and data analysis to maintain quality and minimize defects)*	❑	❑
33.8	Training related to Quality.	❑	❑
33.9	Training related to Health & Safety.	❑	❑
33.10	Training related to Sustainability	❑	❑
33.11	Training related to Financial Principles.	❑	❑
33.12	Training related to General 'Soft' Skills *(e.g. Teambuilding, Leadership, Communication, etc.)*	❑	❑
33.13	Others. Please specify: _____	❑	❑

		Not willing to pay	1 – 25%	26 – 50%	51 – 75%	76 – 100%
34	For non-HRDF approved courses, what percentage of the training cost would you be willing to pay (assuming an average cost of RM 1000/employee)?	1	2	3	4	5

35. Have you identified any other area(s) where you need development or new skills for your current or future job functions?

- ❑ Yes. Please specify the area(s): _____
- ❑ No.

Nature of business and the structure of existing workforce

36. Please indicate **total number of employees** in your business. (Please circle only ONE)

a. 1 - 4	b. 5 - 19	c. 20 - 75	d. 76 - 200	e. 201 - 499	f. 500+

37. What is the structure of your current workforce? Please indicate the **number of employees** in the following categories.

		Full-time		Part-time		Foreign worker	
		Male	Female	Male	Female	Male	Female
37.1	Senior General Management						
37.2	Finance						
37.3	Technologist						
37.4	Technician						
37.5	Craftsman						
37.6	Operative Worker						
37.7	General Worker (Unskilled)						

38. What is the **age** profile of your current workforce (in percentage; refer to example in the first row)?

		18 - 25	26 - 35	36 - 45	46 – 55	55+
E.G.	Technician	10%	30%	40%	20%	0%
38.1	Senior General Management					
38.2	Finance					
38.3	Technologist					
38.4	Technician					
38.5	Craftsman					
38.6	Operative Worker					
38.7	General Worker (Unskilled)					

39. Please indicate typical **education** level for each position.

	Lower Secondary	Upper Secondary	Pre-university level	Skills/ Vocational Certificate	Diploma	Under-graduate degree	Master's degree and above
39.1 Senior General Management	1	2	3	4	5	6	7
39.2 Finance	1	2	3	4	5	6	7
39.3 Technologist	1	2	3	4	5	6	7
39.4 Technician	1	2	3	4	5	6	7
39.5 Craftsman	1	2	3	4	5	6	7
39.6 Operative Worker	1	2	3	4	5	6	7
39.7 General Worker (Unskilled)	1	2	3	4	5	6	7

40. For the following product categories, please indicate the top three (3) categories and their respective percentage (%) in your product line. **(Example: Agriculture / Horticulture 50%, Industrial & Construction 30%, Packaging 20%)**

Categories	Examples	Percentage (%) of Product Line
Agriculture / Horticulture	Agricultural purposes and gardening products	
Automotive / Transportation	Transportation and vehicular parts	
Electrical / Electronic	Electrical and telecommunication components (e.g. TV, computers, telephones), consumer electronics, etc.	
Household, Kitchenware, Tableware, Cutlery	Houseware, kitchenware, tableware, cutlery, stationery, pet / animal products, etc.	
Industrial & Construction	Piping joints, etc.	
Toys, Games, Sports	Toys, sports items, recreational items, etc.	
Medical & Pharmaceutical	Medical products (e.g. syringes, medical grade containers), pharmaceutical products & packaging (closures), etc.	
Packaging	Containers, etc.	
Optical Products & Parts	Frames for glasses, lens, parts and accessories	
Promotional / Premium Gifts	Tumblers, sandwich boxes, key chains, etc	
Furniture Products & Parts	Stools, chairs, tables, parts and accessories	
Bathroom / Toiletry Products & Parts	Bathtubs, faucets, flush valves, toothbrush holder, soap dispenser, etc	
Mechanical Products & Parts	Jigs, fixtures, gears	
Others (please specify)		

Your name:

Position:

Company Name:

MPMA membership Number:

Company Address:

Thank You for Your Cooperation and Support. Individual company data will not be published and remains confidential.

15.2 Employee Survey

Your current and future skills need

	Never	Rarely	Sometimes	Often	Always
1. In your opinion, does your company pay more than 'market' wages for well-qualified candidates?	1	2	3	4	5
	1 – 5% more	**6 – 10% more**	**11 – 15% more**	**16 – 20% more**	**Over 20% more**
2. If you believe you are an ideal candidate for an employment, how much more above market wages would you require to be paid?	1	2	3	4	5

3. Which of the following are the top THREE (3) reasons given by the **employee** for the turnover rate? (Please rank your TOP THREE (3) only, where 1 is the top reason, 2 is the second top reason and 3 is the third top reason)

_____ Inadequate salary
_____ Inadequate opportunities for career progression
_____ Inadequate support given by management regarding skills training
_____ Excessive workload
_____ Inadequate recognition for work done
_____ Working conditions/environment
_____ Nature of work is not challenging enough
_____ Poor work-life balance
_____ Poor benefits beyond salary
_____ Others. Please specify:
_____

	Less than 10%	10 – 25%	26 – 50%	51 – 75%	Greater than 75%
4. What percentage of learning occurs on the job? In other words, other than formal qualifications and certificates, how much learning do you undertake during the course of your employment?	1	2	3	4	5

5. Please specify the importance of the following training for your current role in your organisation.

Training Types	Not required	Required but cannot get training	Required and can get adequate training	Would be nice to have such training	Required in 2 to 4 years
5.1 Training related to Injection Moulding.	1	2	3	4	5
5.2 Training related to Mould Making.	1	2	3	4	5
5.3 Training related to Engineering Drawings.	1	2	3	4	5
5.4 Training related to Material Properties.	1	2	3	4	5
5.5 Training related to Fluid Power.	1	2	3	4	5
5.6 Training related to Product Development	1	2	3	4	5

5.7	Training related to Smart Manufacturing *(e.g. real-time network of sensors and data analysis to maintain quality and minimize defects)*	1	2	3	4	5
5.8	Training related to Quality.	1	2	3	4	5
5.9	Training related to Health & Safety.	1	2	3	4	5
5.10	Training related to Sustainability	1	2	3	4	5
5.11	Training related to Financial Principles.	1	2	3	4	5
5.12	Training related to General 'Soft' Skills *(e.g. Teambuilding, Leadership, Communication, etc.)*	1	2	3	4	5
5.13	Others. Please specify:	1	2	3	4	5

6. Please specify the importance for the following aspects of trainings provided.

		Very unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Very important
6.1	Your skills training is recognized with a certificate awarded by an accreditation body formed by an industry association or government agency	1	2	3	4	5
6.2	Training providers provide hands-on and practical trainings with up-to-date equipment and facilities	1	2	3	4	5

7. Which top THREE (3) work styles do you find most impactful for your company's growth?
(Please rank your TOP THREE (3) only, where 1 is the top work style, 2 is the second top work style and 3 is the third top work style)

_____ Dependability
_____ Cooperation
_____ Integrity
_____ Independence
_____ Initiative
_____ Stress Tolerance
_____ Attention to detail
_____ Analytical thinking
_____ Discipline
_____ Adaptability/Flexibility
_____ Leadership
_____ Others. Please specify: _____

8. Which of the top THREE (3) **technical** skills and knowledge do you find most impactful for your company's growth?
(Please rank your TOP THREE (3) only, where 1 is the top skill, 2 is the second top skill and 3 is the third top skill)

_____ Operation Monitoring - Watching gauges, dials, or other indicators to make sure a machine is working properly.

_____ Operation and Control - Controlling operations of equipment or systems.

_____ Quality Control Analysis - Conducting tests and inspections of products, services, or processes to evaluate quality or performance.

_____ Troubleshooting - Determining causes of operating errors and deciding what to do about it.

_____ Repairing - Repairing machines or systems using the needed tools.

_____ Equipment Maintenance - Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.

_____ Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

_____ Mechanical - Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

_____ Mathematics – Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications

_____ Physics - Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.

_____ Others. Please specify: _____

9. Which of the top THREE (3) 'soft' skills and knowledge do you find most impactful for your company's growth? (Please rank your TOP THREE (3) only, where 1 is the top skill, 2 is the second top skill and 3 is the third top skill)

_____ Critical Thinking - Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

_____ Active Learning - Understanding the implications of new information for both current and future problem-solving and decision-making.

_____ Monitoring – Monitoring/Assessing performance of yourself, other individuals, or your organisation to make improvements or take corrective action

_____ Time Management – Managing one's own time and the time of others

_____ Communication – Communicating effectively in writing/speech as appropriate for the needs of the audience

_____ Reading Comprehension – Understanding written sentences and paragraphs in work related documents

_____ Active Listening – Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times

_____ Judgment and Decision Making - Considering the relative costs and benefits of potential actions to choose the most appropriate one.

_____ Complex Problem Solving - Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

_____ Administration and Management - Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modelling, leadership technique, production methods, and coordination of people and resources.

_____ Others. Please specify: _____

Training assessment and feedback

10. Have you undergone training in the past 12 months?

- ❑ Yes, including the training provided by MPMA ➔ *Skip 11b and go to 11c*
- ❑ Yes, but not for MPMA training ➔ *Skip 11b and go to 11c*
- ❑ Not at all ➔ *Go to 11b and skip to 19*

10b. Why have you not undergone any training in the past 12 months? [You may select more than one]

- ❑ There were no trainings available
- ❑ The trainings available were not relevant for my job function
- ❑ I do not believe going for training would improve my job performance
- ❑ I do not believe it is beneficial for me to attend the trainings
- ❑ Others. Please specify: _____

10c. What type of training have you undergone in the past 12 months? [You may select more than one]

- ❏ Training related to Injection Moulding
- ❏ Training related to Mould Making.
- ❏ Training related to Engineering Drawings.
- ❏ Training related to Material Properties.
- ❏ Training related to Fluid Power.
- ❏ Training related to Product Development
- ❏ Training related to Smart Manufacturing *(e.g. real-time network of sensors and data analysis to maintain quality and minimize defects)*
- ❏ Training related to Quality.
- ❏ Training related to Health & Safety.
- ❏ Training related to Sustainability
- ❏ Training related to Financial Principles.
- ❏ Training related to General 'Soft' Skills *(e.g. Teambuilding, Leadership, Communication, etc.)*
- ❏ Others. Please specify: _____

		Very dissatisfied	Somewhat dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Very Satisfied
11	How satisfied were you with the overall quality of training?	1	2	3	4	5

12. If you were very **dissatisfied / somewhat dissatisfied** with the training, what were the reasons for your dissatisfaction? [You may select more than one]

- ❏ Training content was not useful
- ❏ Not enough emphasis on practical experience
- ❏ Facilities for practical component were outdated
- ❏ Time to complete the training
- ❏ Quality of the training instructor(s)
- ❏ Inadequate assessment to ensure mastery of the content
- ❏ Lack of visual and interactive content
- ❏ Others. Please specify: _____
- ❏ Not applicable (i.e. was satisfied / neither satisfied not dissatisfied)

		Much worse	A little worse	About the same	A little better	Much better
13.	Since you have undergone training, your job efficiency has been:	1	2	3	4	5

14. What measures were taken to ensure skills taught were used / maintained / encouraged? [You may select more than one]

- ❏ Monetary incentives
- ❏ Incorporated in KPI
- ❏ Monitoring by mentor / senior
- ❏ Recognition programmes
- ❏ Growth opportunities
- ❏ Investments into equipment/technologies that are relevant to the advanced skills obtained
- ❏ No measures were taken
- ❏ Others. Please specify: _____

15. What were your expectations of this training programme? [You may select more than one]

- ❏ Higher production yield
- ❏ Reduction in product defects
- ❏ Higher chances of promotion
- ❏ Reduction in reliance on outsourcing for labour / maintenance
- ❏ Higher confidence in your skills
- ❏ Increased job scope
- ❏ Higher salary
- ❏ Better problem-solving skills
- ❏ Others. Please specify: _____

16. Upon completion of the training programme, what positive outcomes were achieved? [You may select more than one]

- ❏ Higher production yield
- ❏ Reduction in product defects
- ❏ Increased job scope
- ❏ Higher salary
- ❏ Higher chances of promotion
- ❏ Reduction in reliance on outsourcing for labour / maintenance
- ❏ Higher confidence in your skills
- ❏ Better problem-solving skills
- ❏ Others. Please specify: _____

17. For each of the training types below, would you go for similar training programmes in the future?

	Training Types	Yes	No
17.1	Training related to Injection Moulding.	❑	❑
17.2	Training related to Mould Making.	❑	❑
17.3	Training related to Engineering Drawings.	❑	❑
17.4	Training related to Material Properties.	❑	❑
17.5	Training related to Fluid Power.	❑	❑
17.6	Training related to Product Development	❑	❑
17.7	Training related to Smart Manufacturing (e.g. real-time network of sensors and data analysis to maintain quality and minimize defects)	❑	❑
17.8	Training related to Quality.	❑	❑
17.9	Training related to Health & Safety.	❑	❑
17.10	Training related to Sustainability	❑	❑
17.11	Training related to Financial Principles.	❑	❑
17.12	Training related to General 'Soft' Skills (e.g. Teambuilding, Leadership, Communication, etc.)	❑	❑
17.13	Others. Please specify: _____	❑	❑

18. Have you identified any other area(s) where you need development or new skills for your current or future job functions?

❑ Yes. Please specify the area(s): _____

❑ No.

19. What is your job function in your organisation?

❑ Senior General Management [a]
❑ Finance [b]
❑ Technologist [c]
❑ Technician [d]
❑ Craftsman [e]
❑ Operative Worker [f]
❑ General Worker [g]
❑ Others. Please specify: _____

***a* Senior General Management:** *Chief Executive Officer (CEO), Chief Operating Officer (COO), etc.*

***b* Finance:** *Costing Personnel*

***c* Technologist:** *Product Engineer, Manufacturing/Industrial Engineer, CAD-CAM Engineer/Tooling Engineer, Project Engineer, Q.C./Q.A. Engineer, Electronics/Electrical Engineer, Technical Services Engineer, Moulding Engineer, Production Operations Manager*

***d* Technician:** *Supervisor/Foreman, Mechanical Engineering Technician, Electronics/Electrical Engineering Technician, Q.C./Q.A. Technician, Product/Packaging Development Technician, Laboratory/Materials Technician, Manufacturing/Industrial Engineering Technician, Tooling Technician, CAD-CAM Technician (Tooling), Production Planner*

***e* Craftsman:** *Team Leader, Electrician, Mould and Die Maker, Model/Prototype Maker, Plastics Machine Setter, Quality Control Inspector*

***f* Operative Worker:** *Injection Moulding Machine Operator, Other Plastics Processing Machine Operator, Printing Operator, Assembler, Plastics Fabricator/Welder*

***g* General Worker (Unskilled):** *Factory Worker (involved in manual work such as loading and unloading goods, sprue removal, packing etc.)*

20. How long have you been employed by your current company?

❑ < 1 year
❑ 1 – 3 years
❑ 3 – 5 years
❑ 5 – 10 years
❑ > 10 years

21. What is your age?

❑ 18-25
❑ 26-35
❑ 36-45
❑ 46-55
❑ 55+

22. What is your highest education level attained?

- ❑ Lower secondary
- ❑ Upper secondary
- ❑ Pre-university level
- ❑ Skills/Vocational Certificate
- ❑ Diploma
- ❑ Undergraduate degree
- ❑ Master's degree and above

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