MSIC C17 : MANUFACTURE OF PAPER AND PAPER PRODUCTS 2024

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OCCUPATIONAL FRAMEWORK

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SECTION C : MANUFACTURING
DIVISION 17 : MANUFACTURE OF PAPER AND PAPER PRODUCTS

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OCCUPATIONAL FRAMEWORK
SECTION C: MANUFACTURING
DIVISION 17: MANUFACTURE OF PAPER AND PAPER PRODUCTS

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ABSTRACT

The Manufacture of Paper and Paper Products division (C17) is a significant contributor to the economy, requiring a skilled workforce to meet its demands. The main objective of this research is to develop an Occupational Framework (OF) for C17. This framework will include three groups: manufacture of pulp, paper, and paperboard; manufacture of corrugated paper and paperboard and containers of paper and paperboard; and manufacture of other articles of paper and paperboard. The research involved various methods, such as document review, Focus Group Discussion (FGD), Fuzzy-Delphi method, and industrial visit. The FGD sessions were used to generate qualitative data on the job areas and titles, while the Fuzzy-Delphi method provided quantitative data on the current state of the industry, including the skilled worker requirements, competency in demand, jobs in demand, emerging skills, occupations related to Industrial Revolution, related issues and challenges that hinder the growth of this sector. The FGD was conducted in two sessions, with the first session focused on the identification of occupational structures (OS) and occupation responsibilities (OR). The second session focused on the identification of occupational descriptions for jobs in demand. An industrial overview was given, highlighting the definition and scope of the sector, current analysis of the local sector, and industry trends. Industrial visits with industry experts and stakeholders ensured that the OF accurately reflected the competency requirements of the sector. From the FGD, six areas of C17 industry had been established. These six areas include the raw material, stock preparations (production and quality), paper machine (production and quality), and converting process. The study identified 35 job titles, with 17 job titles being relevant to the industrial revolution and 35 job titles classified as critical job titles in the industry. From the OS, there are levels that have more than one job title. The highest level of the job title is in level six which is named Superintendent and the Section manager job title. The OF that is developed will provide as an indication basis for the development of the National Occupational Skills Standard (NOSS) document and model the development of curricula for educational provider including universities and training institutes. The study provides constructive insights into the competency requirements of the workforce in this sector, proposing a roadmap for the development of skills training programmes and certification standards that will backing the growth of this important sector.

ABSTRAK

Sektor Pembuatan Kertas dan Produk Kertas (C17) merupakan penyumbang penting kepada ekonomi dan memerlukan tenaga kerja mahir untuk memenuhi permintaannya. Objektif utama penyelidikan ini adalah untuk membangunkan Rangka Kerja Pekerjaan (OF) untuk C17. Rangka kerja ini akan merangkumi tiga kumpulan: pembuatan pulpa, kertas dan papan kertas; pembuatan kertas beralun dan papan kertas dan bekas kertas dan papan kertas; dan pembuatan artikel lain dari kertas dan papan kertas. Penyelidikan melibatkan pelbagai kaedah, seperti semakan dokumen, Focus Group Discussion (FGD), kaedah instrument Fuzzy-Delphi, dan lawatan industri. Sesi FGD digunakan untuk menjana data kualitatif mengenai bidang pekerjaan dan tajuk, manakala kaedah Fuzzy-Delphi menyediakan data kuantitatif mengenai keadaan semasa industri, termasuk keperluan pekerja mahir, kecekapan yang berpermintaan tinggi, pekerjaan yang berpermintaan tinggi, kemahiran yang diperlukan pada masa depan, pekerjaan yang berkaitan dengan Revolusi Perindustrian, isu berkaitan dan cabaran yang menghalang pertumbuhan sektor ini. FGD dijalankan dalam dua sesi, dengan sesi pertama tertumpu kepada pengenalpastian struktur pekerjaan (OS) dan tanggungjawab pekerjaan (OR). Sesi kedua memfokuskan pada pengenalpastian huraian pekerjaan untuk pekerjaan dalam permintaan. Tinjauan industri telah diberikan, menonjolkan definisi dan skop sektor, analisis semasa sektor tempatan dan arah aliran industri. Lawatan industri bersama pakar industri dan pihak berkepentingan telah dibuat bagi memastikan OF mencerminkan keperluan kecekapan sektor tersebut dengan tepat. Daripada FGD, enam bidang industri C17 telah diwujudkan. Enam bidang ini termasuk bahan mentah, persediaan stok (pengeluaran dan kualiti), mesin kertas (pengeluaran dan kualiti), dan proses penukaran. Kajian itu mengenal pasti 35 tajuk pekerjaan, dengan 17 jawatan adalah relevan dengan revolusi industri dan 35 jawatan diklasifikasikan sebagai jawatan kritikal dalam industri. Daripada OS, terdapat tahap pekerjaan yang mempunyai lebih daripada satu tajuk kerja. Peringkat tertinggi jawatan jawatan adalah di tahap enam yang dinamakan Superintenden dan jawatan pengurus Seksyen. OF yang dibangunkan akan menyediakan sebagai asas petunjuk untuk pembangunan dokumen Standard Kemahiran Pekerjaan Kebangsaan (NOSS) dan model pembangunan kurikulum untuk penyedia pendidikan termasuk universiti dan institut latihan. Kajian ini memberikan pandangan yang membina tentang keperluan kecekapan tenaga kerja dalam sektor ini, mencadangkan pelan hala tuju untuk pembangunan program latihan kemahiran dan piawaian pensijilan yang akan menyokong pertumbuhan sektor penting ini.

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ABBREVIATION

12 MP	Twelfth Malaysian Plan
4IR	National Fourth Industrial Revolution (4IR)
COL	Critical Occupation List
DoSM	Department of Statistic Malaysia
EPU	Economic Planning Unit
FGD	Focus Group Discussion
ICA	Industrial Coordination ACT
IMP3	Third Industrial Master Plan
IIP	Index of Industrial Production
IR 4.0	Industrial Revolution 4.0
ISIC	International Standard Industrial Classification of All Economics
MASCO	Malaysia Standard Classification of Occupation
MCO	Movement Control Order
MIDA	Malaysian Investment Development Authority
MIGHT	Malaysian Industry-Government Group
MITI	Ministry of International Trade and Industry
MQA	Malaysian Qualifications Agency

MQF	Malaysian Qualification Framework
MSIC	Malaysia Standard Industrial Classification
n.e.c	Not Elsewhere Classified
NOSS	National Occupational Skills Standard
OA	Occupational Analysis
OC	Occupational Competency
OCD	Occupational Competency Description
OF	Occupational Framework
OR	Occupational Responsibilities
OS	Occupational Structure
PEMANDU	Performance and Management Delivery Unit
PENJANA	National Economic Recovery Plan
SME	Subject Matter Expert
SPKM	*Sistem Pensijilan Kemahiran Malaysia*
Talentcorp	Talent Corporation Malaysia Berhad
TVET	Technical and Vocational Education and Training
UNIDO	United Nations Industrial Development Organization

GLOSSARY

Gross Domestic Product (GDP	Gross domestic product (GDP), or value added, is the value of the goods and services produced by the nation's economy less the value of the goods and services used up in production. GDP is also equal to the sum of personal consumption expenditures, gross private domestic investment, net exports of goods and services, and government consumption expenditures and gross investment.
Index of industrial production (IIP)	Index of industrial production (IIP) Indicator that describes changes in the volume of goods produced in industrial sectors over time. Its main purpose is to provide a measure of short-term changes in value added over a given reference period.
Job	Job is defined as a set of tasks and duties performed by a person.
Malaysian Industry Classification Standard (MSIC) 2008	The industrial classification of productive economic activities in Malaysia is registered by the Department of Statistics Malaysia (DoSM).
Malaysian Skills Certification System (SPKM)	Policies, Standard mechanisms, and procedures involved in awarding a Certificate by KPPK.
Manufacturing Activity	The term "manufacturing activity" is defined by the Industrial Co-ordination Act 1975 as "the making, altering, blending, ornamenting, finishing or otherwise treating or adapting any article or substance with a view to its use, sale, transport, delivery or disposal; and includes the assembly of parts and ship repairing but shall not include any activity normally associated with retail or wholesale trade."

CHAPTER I

INTRODUCTION

1.1 Introduction

This chapter is the introductory section of the Occupational Framework (OF) and includes a preview of the context of the background, the problem statement, the objectives of the study, the scope of study, the significance of study, and the chronological arrangement of each chapter.

1.2 Research Background

According to a statement released by the Malaysian Investment Development Authority (MIDA) in 2020, the manufacturing sector remains an integral part of Malaysia's ongoing economic transformation. Despite the prevailing global economic uncertainties, this sector's significant contribution to the country's export revenue and job creation has ensured its sustained growth. MIDA emphasises that Malaysia's manufacturing sector will continue to prioritise the development of a skilled and capable workforce, as well as the implementation of Industry 4.0 initiatives. These efforts aim to not only facilitate the growth of well-established industries but also to create new opportunities for emerging sectors. In alignment with this vision, the Malaysian government has implemented the National Fourth Industrial Revolution (4IR) policy as part of the Twelfth Malaysia Plan (12MP). This policy seeks to further augment job creation and foster greater demand for individuals equipped with the specialised skills necessary to thrive in the modern industrial landscape.

According to a report by the Ministry of International Trade and Industry (MITI), the manufacturing sector has been significantly impacted by the Covid-19 pandemic ((MIDA), 2021). The implementation of the Movement Control Order (MCO) as a measure to contain the spread of the virus has resulted in the temporary closure of industries within this sector. However, as the government has recently lifted restrictions and allowed the manufacturing sector to resume operations at full capacity, there have been notable improvements in its

performance throughout 2022. This development has facilitated increased production levels for businesses, alongside enhancements in production efficiency and effectiveness. Moreover, the government has initiated various programs aimed at assisting employers, employees, micro, small, and medium enterprises (MSMEs), as well as graduates and young individuals, in coping with the adverse consequences of the COVID-19 pandemic.

The Department of Statistics Malaysia (DoSM) recently published the performance report for the Manufacturing Sector in 2022, which unveiled noteworthy developments. A surge of 17.4% was observed in the sector's sales value, reaching an impressive RM1,609.3 billion compared to the previous year (DOSM, 2023b). Moreover, the number of employees in this sector experienced a modest increase of 3.4%, totalling 2.34 million individuals. Simultaneously, salaries and wages saw a 3.3% rise, amounting to RM89.5 billion. Remarkably, the sales value per employee also witnessed an increment of 12.1%, reaching an impressive RM771,048. The Industrial Production Index (IPI) registered a growth of 7.23% between April and May 2023, escalating from 116.5 to 125 on the IPI Index. The Manufacturing industry was instrumental in driving this expansion, contributing 3.1% to the overall growth.

The ASEAN Statistical Yearbook 2022 presents findings on the Index of Industrial Production (IIP) and Annual Change of IIP for all manufacturing industries across ASEAN nations for the period 2010-2020, with mention of an increment evident in the year 2021. The report highlights the three countries within ASEAN that exhibited the highest annual changes in IIP, namely the Philippines, Singapore, and Malaysia. Notably, these countries experienced respective increases in their IIP figures and annual changes in the year 2021. Specifically, the Philippines recorded an IIP of 50.8 in 2020, which rose to 75.8 in 2021, resulting in an annual change of 49.2%. Similarly, Singapore demonstrated an IIP of 107.5 in 2020, increasing to 121.8 in 2021, indicating an annual change of 13.3. Lastly, Malaysia exhibited an IIP of 116.9 in 2020, which grew to 128.1 in 2021, leading to an annual change of 9.5. (ASYB, 2022).

China has emerged as the largest global producer of paper and paperboard, surpassing all other nations by a significant margin. Its output soared to over 125 million metric tons in 2021. In comparison, the United States ranked as the second-largest producer during the same year. It is noteworthy that this dominance of China in the paper and paperboard industry is a relatively recent phenomenon. Just four decades ago, countries such as Finland, Sweden, and Germany

were annualizing similar quantities of paper and paperboard production as China, while Japan and the United States were producing significantly higher amounts. However, with rapid economic growth, China experienced a meteoric rise in production, surpassing its counterparts in 2005. Since then, China's production has nearly doubled, while the United States has witnessed a decline of almost 20% in its output (Statisca, 2022).

The manufacture of paper and paper products holds significant importance for Malaysia's economy due to its ability to generate export revenue and create employment opportunities. This crucial sector, categorically identified as C17 Manufacture of paper and paper products, necessitates a considerable level of technical expertise and advanced manufacturing capabilities. Consequently, this creates high-value job prospects for skilled workers who possess the necessary knowledge and skills. Notably, C17 Manufacture of paper and paper products acts as a vital contributor to Malaysia's economic growth by actively participating in generating export revenue. By exporting its products to various countries worldwide, this industry significantly contributes to Malaysia's trade surplus, thereby bolstering the country's economy.

Furthermore, the C17 Manufacture of paper and paper products division also supports the development of related industries, such as stationaries and packaging. Overall, the C17 Manufacture of paper and paper products is an important sector for Malaysia's economy, creating high-value jobs, generating export revenue, and supporting the development of related industries.

The C17 division plays a crucial role in Malaysia's manufacturing sector. Its growth potential has been acknowledged by the government through various initiatives and policies. Specifically, the National Fourth Industrial Revolution (4IR) policy, outlined in the Twelfth Malaysia Plan (12MP), highlights the significance of prioritising the manufacturing industry to achieve the country's Industry 4.0 objectives.

A focal aspect of the 12MP is the introduction of the Graduate Marketability Strategic Plan 2021-2025 and the Job Creation Strategic Plan 2021-2023. These plans aim to address labor market imbalances and address labour-related challenges in specific industries (12th Malaysian Plan, 2021). To bridge the skills gap, the development of a comprehensive Occupational Framework for C17 manufacturing is crucial. This framework will identify critical job titles and

the necessary competencies required, guiding educational institutions and individuals aspiring to join the C17 division. By ensuring that the industry has a skilled workforce, Malaysia can sustain its competitiveness and strive towards industry growth.

The government's continuous support and investment in the C17 division will further augment Malaysia's position as a prominent player in the global manufacturing arena.

The primary purpose of this document, known as the Occupational Framework (OF), is to serve as the fundamental building block in the development of occupational standards within the domain of Section C Division 17, specifically focusing on the manufacture of paper and paper products. Additionally, the OF outlines the Occupational Structure, which encompasses the distinct tasks and job titles that are tailored to meet the unique demands and objectives of the industry. Furthermore, the OF delineates the Occupational Description, Occupational Responsibilities, and the requisite competencies and skills that are in high demand or emerging within the context of the industrial revolution.

Possessing the information contained within the OF document would greatly assist industry participants in their endeavour to identify viable employment opportunities within this sector. It would consequently enable organisations to design coherent organisational charts to facilitate the seamless integration of these roles within respective companies, thereby fostering the creation of new job prospects. Taking cognizance of this need, the Department of Skills Development, operating under the purview of the Ministry of Human Resource, has undertaken the responsibility of developing the Occupational Framework specifically for this industry.

1.3 Problem Statement

The paper and pulp industry are currently confronted with formidable challenges related to deforestation and the consequential loss of biodiversity. As attested by a report conducted by the World Wildlife Fund (WWF, 2023), an alarming 80% of the world's remaining intact forest landscapes are at risk of degradation or outright destruction due to human activities, with the paper industry being a key contributor to this phenomenon. Further underscoring these concerns, the Environmental Paper Network reveals in their report that the paper industry ranks as the fifth-largest consumer of energy on a global scale, while also standing as the third-largest industrial emitter of greenhouse gases. To put this into perspective, it is estimated that the

industry accounts for approximately 5% of worldwide carbon emissions. Despite the considerable value of approximately $400 billion attributed to the global paper and pulp industry in 2021, projections indicate a decline at a compound annual growth rate of 0.5% from 2021 to 2028. This anticipated decline is largely attributable to the burgeoning popularity of digital media and electronic devices, as highlighted in research conducted by (Niti Samani, 2022).

From the site visits and Fuzzy Delphi Instruments done in this research, the aspect of occupational problems is also indeed an issue in the paper manufacturing industry. The industry is seen to be in short supply of skilled workers, certified workers and local talent. This issue contributes to the hiring of foreign workers which in the long term will cause loss to the country and the industry.

Moreover, critical issues in paper manufacturing are environmental impact, recycling, digitalisation, globalisation, cost, supply chain management, innovation and changing consumer preferences (Niti Samani, 2022). Despite the significance of the C17 manufacturing sector for paper and paper products, there is a lack of a clear occupational framework that covers this sector.

1.4 Objectives of Study

The objectives of the study are as stated below:

a) To identify the relationship between previous research with current and future industrial needs.
b) To establish Occupational Structure (OS) for the C17 Manufacture of paper and paper products sector based on MSIC 2008 by examining job areas, job titles and relevant competency levels.
c) To determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job title.
d) To determine Occupational Descriptions (OD) for each job title in demand based on the proposed OS.
e) To identify the critical job titles and jobs in demand in the Manufacture of paper and paper products section.

In order to achieve the above objectives, a design and developmental research approach was employed using multiple data collection techniques, including document review, focus group discussion, brainstorming, and Fuzzy Delphi methods.

1.5 Scope of Study

The scope of work for this study covers the occupation in the MSIC 2008 for Section C Division 17 Manufacture of paper and paper products in Malaysia (JPK, 2020). Under this section, there is only one group namely Group 170: Manufacture of paper and paper products.

The scope of C17 Manufacture of paper and paper products includes the manufacture of pulp, paper and paperboard; manufacture of corrugated paper and paperboard and of containers of paper and paperboard; manufacture of other articles of paper and paperboard. The activity of production involves creating or making a new product or item from raw materials, components, or parts. This process may involve various steps, such as designing, planning, sourcing materials, manufacturing, testing, and quality control. The goal of production is to create a finished product that meets the desired specifications, requirements, and standards of the customer or end-user. This study will be conducted in Malaysia with the participation of experts from various organisations in the Manufacture of Paper and Paper Products division.

1.6 Significance of Study

The outcomes of this investigation will serve as a definitive and authoritative reference document for various manufacturing industries. The resultant occupational framework (OF) report will comprehensively outline the occupational structure, occupational descriptions and responsibilities, critical jobs, and competencies in demand within this sector.

Furthermore, this study has compiled a list of emerging skills, and technology-related expertise that are essential in this industry. The OF report serves as a valuable resource that can be utilised by government bodies, private enterprises, investors, employers, and employees alike, in order to enhance skills training programmes and individual development plans.

1.7 Structure of Chapters

This chapter concludes with a brief overview of the overall study which includes:

a) Chapter 1: Introduction

This Chapter serves to introduce the background of the research, problem statement, research objectives, scope of study and summary of the major contents in each Chapter for this OF.

b) Chapter 2: Literature Review

A review of the research is explained in this chapter to give further understanding about the research. The information is gained from different sources such as the Department of Statistics Malaysia and others.

c) Chapter 3: Methodology

This chapter clarifies the process of researching this topic adopted in this study. It identifies its analytical framework beginning with its methodology and methods of study implementation which include document review, focus group discussions and surveys population and sampling, instruments used, and data collection and procedures, as well as chapter conclusions.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

The purpose of this study is to develop the occupational framework for Section C Division 17 Manufacture of paper and paper products that covers three groups: 1) manufacture of pulp, paper, and paperboard; 2) manufacture of corrugated paper and paperboard and of containers of paper and paperboard; and 3) manufacture of other articles of paper and paperboard. The objective of this study is to develop occupational structure, occupational description, and responsibilities and to identify job and competencies in demand and emerging skills for this sector. This study will also review the relationship between technology and the industrial revolution in this sector.

In this chapter, a comprehensive literature review is presented to examine the current condition of the Paper Industries in Malaysia. The discussion encompasses multiple aspects, such as government policies and legislation, development plans, supporting government bodies, associations, training institutions, and competitiveness at the international level. The findings of this chapter are derived from a detailed investigation involving a literature review, document analysis, and engaging in focus group discussions with industry experts. This approach aims to gain valuable insights into the aforementioned areas, specifically from the viewpoint of practitioners.

2.2 National Skills Development Act 2006 (Act 652)

On June 29, 2006, the National Skills Development Act (Act 652) was officially promulgated. Its primary objective is to stimulate the cultivation and enhancement of individual talents essential for a specific profession through skill training, while also addressing other pertinent concerns. Essentially, this Act serves as the central legislation in Malaysia for establishing, advancing, and implementing skill and training development standards. The Department of

Skills Development (DSD) assumes sole responsibility for initiating, supervising, and overseeing all processes and procedures established under the Malaysia Skills Competency Standards (MSCS). In essence, this Act aims to facilitate the implementation of the MSCS. The National Skills Development Act serves as a means to promote the development and refinement of a person's vocational abilities, essential for their profession, through skill training, while also addressing other associated matters. Notably, the national occupational skills standards are to be utilised to:

a) to develop A national curriculum for skills training programmes,
b) to conduct skills training, all accredited programmes shall conform to the national occupational skills standards,
c) shall be used as a measure of proficiency leading to the award of a certificate, and
d) maybe utilized in any other way as the director general deems fit.

The MSCS is comprised of six processes that work in unison to collectively contribute to the promotion of skilled labour growth in Malaysia. These processes encompass the identification of industry-specific skills requirements, the establishment and development of four essential public documents namely the Occupational Framework (OF), the National Occupational Skills Standard (NOSS), the Written Instruction Materials (WIM), and the Questions and Assessments. Following this documentation stage, the next phase involves the implementation of training programs within industries and training institutes, culminating in an examination and assessment of industry needs. The whole cycle of the MSCS is depicted in Figure 2.1.

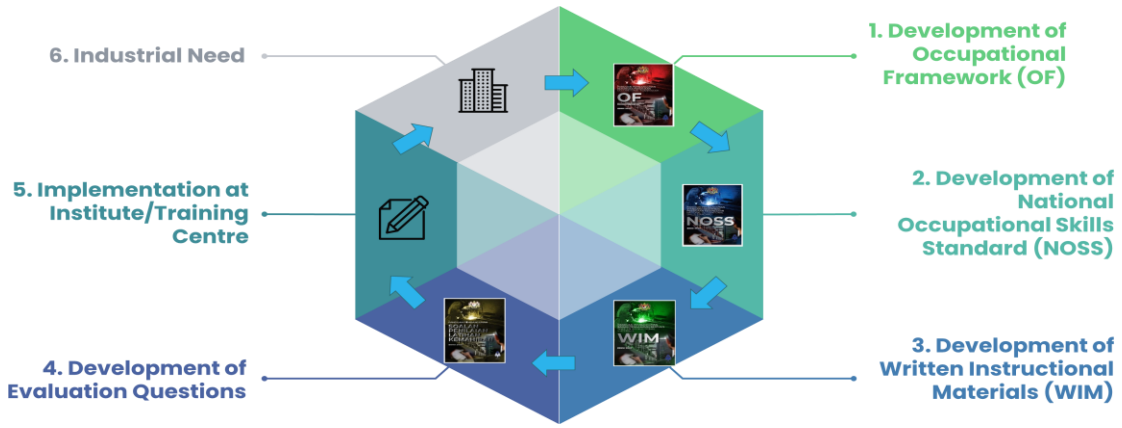

Figure 2-1 Cycle of Malaysian Skills Certification Ecosystem

Source: Department of Skills Development

2.3 OCCUPATIONAL FRAMEWORK (OF) DEVELOPMENT

The Occupational Framework (OF) is a document that describes the Occupational Structure (OS), which includes occupations and job titles that correspond to occupational levels in Malaysian industries. The OF document describes critical jobs, jobs in demand, skills in demand, jobs related to technological advances relevant to the current industry, and job responsibilities (ORs) and job descriptions (ODs). OF is designed to cover different types of industries, from small to large industries, and is also a step in the process of creating relevant NOSS. The OF classification is based on the Malaysian Standard Industrial Classification (MSIC, 2008).

2.3.1 National Occupational Skills Standard (NOSS)

The National Occupational Skills Standards (NOSS) is a document that sets out competency requirements in specific fields and job levels for skilled workers in Malaysia, as well as pathways for acquiring these skills ((DSD), 2020). NOSS is developed according to the current requirements of the speciality and the career structure of the industry speciality. It has been developed by a group of subject matter experts, industry practitioners and skilled workers, according to their respective industries, under the guidance of trained and certified facilitators. NOSS also describes the minimum knowledge and skill requirements related to the ability of skilled workers to perform tasks, functions and roles according to their area of expertise. As of December 2022, there are 3,549 NOSS; and 2,062 active NOSS (2000 NOSS + 33 NCS + 29 NDTS) ((DSD), 2022).

2.3.2 Written Instructional Materials (WIM)

WIM is a document created by instructors for instructors and trainees to support the teaching and learning process. The purpose of WIM is to (a) serve as the primary learning material in the teaching and learning process; (b) ensure that the learning outcomes in the Unit of Competency (CU) are achieved; and (c) help instructors build confidence and prepare to deliver lessons.

2.3.3 Evaluation Questions

In the context of teaching and learning, assessment can be simply defined as a systematic

process for determining the extent to which teaching and learning objectives are being achieved in classrooms and laboratories (DSD), 2022). Assessment under the Malaysian Competency Certification System "MSCS" is a process of assessing the knowledge and competency level and safety/environmental attitudes/practices of candidates participating in competency training programmes conducted at JPK-certified centres. Assessments are carried out using a variety of suitable methods to assess the candidate's skills as desired. The three main characteristics of assessment are validity, reliability, and representativeness ((CIAST), 2021).

Validity is the degree to which an assessment measures what it measures, reliability is the consistency and stability of assessment results. Over time, representativeness is the extent to which an assessment meets the requirements of the job.

2.3.4 Implementation at Institute / Training Centre

Accredited Centre is a competency training provider approved by JPK to conduct competency training and provide Malaysian competency certification for specific areas and competency levels based on NOSS ((DSD), 2020). There are two categories of certification centres: public certification centres and private certification centres.

The programmes offered are based on the developed National Employment Skills Standard (NOSS). Competency training means job-related and industry-oriented activities aimed at providing the knowledge, skills, and attitudes necessary for the effective and efficient performance of a task or job, and that is reviewed, extended, updated and includes specific job-related training (DSD, 2020).

2.3.5 Industrial Needs

When it comes to skill development in the industrial sector, there are specific skills and competencies that industries need to increase productivity, efficiency, and profitability. The nature of these skills can be technical or non-technical and vary by industry. To develop training curricula and materials that meet the needs of the industry, training centres may design full-time programmes or programmes tailored to the specific needs of the industry. To develop the right training programme, it is important for training centres to have a clear understanding of the skills needed in the industry. Additionally, a fundamental assessment of trainers and trainer

retraining needs should be conducted to ensure that trainers and trainers have the necessary skills to meet current industry needs (DSD, 2020).

2.4 Malaysia Standard Industrial Classification (MSIC) 2008

Malaysia Standard Industrial Classification 2008 (MSIC) Ver. 1.0 is a classification of all economic activities in Malaysia, adopting the International Standard Industrial Classification (ISIC) Revision 4 published in December 2006 and meeting national requirements. It replaces MSIC 2000, which is based on ISIC Revision 3. The main purpose of MSIC is to provide a set of activity categories that can be used to collect and display statistics corresponding to these activities. Industries are then formed by grouping units with common core activities according to established similarity criteria. MSIC allows you to create statistics by activity or industry for both companies and establishments or activity unit types. The purpose of an industrial classification system is to classify economic data of activities with similar characteristics.

MSIC is a classification of economic activities, not a classification of goods and services, or a classification of occupations.

2.4.1 Scope of Occupational Framework Based on MSIC 2008 – Manufacture of Paper and Paper Products

Based on the MSIC 2008 classification, the Manufacture of Paper and Paper Products is categorised under section C and division 17 (C17). The scope of the Occupational Framework for C17 includes 1) the manufacture of pulp, paper, and paperboard; 2) the manufacture of corrugated paper and paperboard and of containers of paper and paperboard; and 3) the manufacture of other articles of paper and paperboard. Table 2.1 presents the summary of C17 scope based on the category, while Table 2.2 shows the description of scope based on MSIC 2008.

Table 2-1 C17: Manufacture of Paper and Paper Products scope based on MSIC 2008 category.

Category	Code	Description
Section	C	Manufacturing
Division	17	Manufacture of Paper and Paper Products
Group	1701	Manufacture of pulp, paper, and paperboard
	1702	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
	1709	Manufacture of other articles of paper and paperboard

Table 2-2 Description of scope based on MSIC Classification for Division C17 (MSIC, 2008)

CLASSIFICATION	CODE	DESCRIPTION
SECTION	C	Manufacturing
DIVISION	17	MANUFACTURE OF PAPER AND PAPER PRODUCTS This division includes the manufacture of pulp, paper and converted paper products. The manufacture of these products is grouped because they constitute a series of vertically connected processes. More than one activity is often carried out in a single unit. There are essentially three activities: The manufacture of pulp involves separating the cellulose fibres. from other impurities in wood or used paper. The manufacture of paper involves matting these fibres into a sheet. Converted paper products are made from paper and other materials by various cutting and shaping techniques, including coating and laminating activities. The paper articles may be printed (e.g. wallpaper, gift wrap, etc.), as long as the printing of information is not the main purpose. The production of pulp, paper and paperboard in bulk is included in class 1701, while the remaining classes include the production of further-processed paper and paper products
GROUP	170	Manufacture of paper and paper products This group includes the manufacture of pulp, paper and paperboard; the manufacture of corrugated paper and paperboard and of containers of paper and paperboard; and the manufacture of other articles of paper and paperboard.
CLASS	1701	Manufacture of pulp, paper and paperboard

CLASSIFICATION	CODE	DESCRIPTION
ITEM	17010	Manufacture of pulp, paper and paperboard Includes: (a) manufacture of newsprint and other printing or writing paper (b) manufacture of carbon paper or stencil paper in rolls or large sheets (c) manufacture of bleached, semi-bleached or unbleached paper pulp by mechanical, chemical (dissolving or non-dissolving or semi-chemical processes) (d) manufacture of cotton-linter pulp (e) removal of ink and manufacture of pulp from wastepaper (f) manufacture of paper and paperboard intended for further industrial processing. (g) further processing of paper and paperboard: • coating, covering and impregnation of paper and paperboard • manufacture of creped or crinkled paper • manufacture of laminates and foils, if laminated with paper or paperboard (h) manufacture of handmade paper (i) manufacture of cellulose wadding and webs of cellulose fibres. (g) manufacture of printing and writing paper ready for use (k) manufacture of computer printout paper ready for use (I) manufacture of self-copy paper ready for use (m) manufacture of duplicator stencils and carbon paper ready for use
CLASS	1702	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
ITEM	17020	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard Includes: (a) manufacture of corrugated paper and paperboard

CLASSIFICATION	CODE	DESCRIPTION
		(b) manufacture of containers of corrugated paper and paperboard (c) manufacture of folding paperboard containers (d) manufacture of containers of solid board (e) manufacture of other containers of paper and paperboard (f) manufacture of sacks and bags of paper (g) manufacture of office box files and similar articles Excludes: (a) manufacture of envelopes and letter-card, see 17091 (b) manufacture of moulded or pressed articles of paper pulp (e.g. boxes for packing eggs, moulded pulp paper plates, etc.), see 17099
CLASS	1709	Manufacture of other articles of paper and paperboard
ITEM	17091	Manufacture of envelopes and letter-card.
	17092	Manufacture of household and personal hygiene paper. Excludes: (a) manufacture of paper or paperboard in bulk, see 17010 (b) printing on paper products, see 1811. (c) manufacture of playing cards, see 3240. (d) manufacture of games and toys of paper or paperboard, see 3240. Includes: manufacture of correspondence cards or plain postcards. Includes: a) manufacture of cleansing tissue. b) manufacture of handkerchiefs, towels and serviettes. c) manufacture of toilet paper. d) manufacture of textile wadding and articles of wadding: sanitary towels and tampons e) manufacture of napkins and napkin liners for babies (D manufacture of cups, dishes and trays

CLASSIFICATION	CODE	DESCRIPTION
ITEM	17093	Manufacture of gummed or adhesive paper in strips or rolls, and labels and wallpaper [(1)].
	17094	Manufacture of effigies, funeral paper goods, joss paper
	17099	Manufacture of other articles of paper and paperboard n.e.c. [(2)]

(1) Includes: manufacture of the label, whether printed or not

(2) Includes:

(a) manufacture of cigarette papers and Chinese lanterns
(b) manufacture of boxes, pouches, wallets and writing compendiums
(c) manufacture of filter papers and paperboards
(d) manufacture of paper novelties
(e) manufacture of papers and paperboard bobbins (e.g. spools, cops, etc.)
(f) manufacture of egg trays and other moulded pulp packaging products, etc.
(g) manufacture of registers, accounting books, binders, albums and similar educational and commercial stationery

2.5 Malaysian Occupational Skills Qualification Framework (MOSQF)

The Malaysian Occupational Skills Framework (MOSQF) is a comprehensive system for classifying and organising vocational skills and competencies in Malaysia. This framework categorises professional skills and competencies into eight different levels, ranging from novice to expert. As shown in Table 2.3, each competency level addresses the varying levels of complexity, knowledge, and autonomy required to demonstrate the competency that corresponds to that level of knowledge, experience, and versatility in application. These levels correspond to different stages of an individual's professional development, from early-stage apprenticeships to advanced levels of proficiency.

Table 2-3 Malaysian Occupational Skills Qualification Framework (MOSQF) Table

Level	Level Descriptors
8	Achievement at this level reflects the ability to develop original understanding and extend a sub-area of knowledge or professional practice. It reflects the ability to address problematic situations that involve many complex, interacting factors through initiating, designing, and undertaking research, development or strategic activities. It involves the exercise of broad autonomy, judgement and leadership in sharing responsibility for the development of a field of work or knowledge, or for creating substantial professional or organisational change. It also reflects a critical understanding of relevant theoretical and methodological perspectives and how they affect the field of knowledge or work.
7	Achievement at this level reflects the ability to reformulate and use relevant understanding, methodologies, and approaches to address problematic situations that involve many interacting factors. It includes taking responsibility for planning and developing courses of action that initiate or underpin substantial change or development, as well as exercising broad autonomy and judgment. It also reflects an understanding of theoretical and relevant methodological perspectives, and how they affect their sub-area of study or work.
6	Achievement at this level reflects the ability to refine and use relevant understanding, methods, and skills to address complex problems that have limited

Level	Level Descriptors
	definitions. It includes taking responsibility for planning and developing courses of action that can underpin substantial change or development, as well as exercising broad autonomy and judgment. It also reflects an understanding of different perspectives, approaches, or schools of thought and the theories that underpin them.
5	Achievement at this level reflects the ability to identify and use relevant understanding, methods, and skills to address broadly defined, complex problems. It includes taking responsibility for planning and developing courses of action as well as exercising autonomy and judgment within broad parameters. It also reflects the understanding of different perspectives, approaches, or schools of thought and the reasoning behind them.
4	Achievement at this level reflects the ability to identify and use relevant understanding, methods, and skills to address problems that are well-defined but complex and non-routine. It includes taking responsibility for overall courses of action as well as exercising autonomy and judgment within fairly broad parameters. It also reflects the understanding of different perspectives or approaches within a sub-area of study or work.
3	Achievement at this level reflects the ability to identify and use relevant understanding, methods and skills to complete tasks and address problems that are well-defined with a measure of complexity. It includes taking responsibility for initiating and completing tasks and procedures as well as exercising autonomy and judgments within limited parameters. It also reflects awareness of different perspectives or approaches within a sub-area of study or work.
2	Achievement at this level reflects the ability to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward problems. It includes taking responsibility for completing tasks and procedures and exercising autonomy and judgment subject to overall direction or guidance.

Level	Level Descriptors
1	Achievement at this level reflects the ability to use relevant knowledge, skills and procedures to complete routine and predictable tasks that include responsibility for completing tasks and procedures subject to direction or guidance.

2.6 Malaysia Standard Classification of Occupations (MASCO)

The Malaysian Standard Occupational Classification (MASCO) is the national benchmark for classifying occupations in the country's employment structure. MASCO was developed according to the International Standard Occupational Classification (ISCO), with changes and modifications to meet national needs. MASCO lists the description duties and code for each position listed.

It includes 10 major groups of categories that are:

Major Group 1: Managers

Major Group 2: Professionals

Major Group 3: Technicians and Associate Professionals

Major Group 4: Clerical Support Workers

Major Group 5: Service and Sales Workers

Major Group 6: Skilled Agricultural, Forestry, Livestock and Fishery Workers

Major Group 7: Craft and Related Trades Workers

Major Group 8: Plant and Machine Operators and Assemblers

Major Group 9: Elementary Occupations

Major Group 0: Armed Forces

Normally, Major Groups 2 to 9 consider the level of education and the level of skills in determining its classification. Group 1 and Group 0 are not tied to their level of education.

It needs to be mentioned that, in the development of the OF for C17 Manufacture of Paper and Paper Products MASCO classification will be used as the benchmark but not in the establishment of OS, OD or OR.

2.7 Background of Manufacture of Paper and Paper Product

The C17 division, which encompasses the manufacture of paper and paper products, is a significant contributor to Malaysia's economy. This industry is characterised by its diverse range of applications, including the production of paper and paper products manufacture of pulp, paper and paperboard manufacture of corrugated paper and paperboard and of containers of paper and paperboard manufacture of other articles of paper and paperboard.

In Malaysia, the C17 division is a key driver of economic growth and development, contributing to the country's industrialization and technological advancement. The industry is also a significant source of employment and investment, with prominent existing producers including GS Paper & Packaging, Muda Paper Mills and Pascorp Paper Industries.

Apart from wastepaper and virgin pulp sourcing, biomass is increasingly being used as a raw material to produce paper. Eco Palm Paper is a pioneer company in producing paper from empty fruit bunches (EFB) (MIDA, 2023).

The prospects in this industry are encouraging as Malaysia is attracting much interest from top global players looking to expand their business. It is estimated that Malaysia’s paper production capacity could jump exponentially from the involvement of such investors. Malaysia is expected to be a substantial exporter in the region for paper packaging products (MIDA, 2023).

According to the Malaysian Pulp and Paper Association, in 2006 there were 67 paper mills company in Malaysia. Out of these 19 small paper companies use wood fibre as the source of production (Roda, 2006).

From the latest data in the ASEAN Statistical Yearbook 2022, we can see the number of establishments and number of persons engaged by division. Table 2-4 and Table 2-5 show the number of Establishments and a number of people engaged respectively to the year of the different countries. From the tables, Vietnam had the highest number of establishments and people engaged in the C17 Division. The Philippines had the second-largest number and Thailand had the third-largest number of establishments. Malaysia although the data are from 2015 the number of establishments and number of people engaged are still quite large (ASYB, 2022).

Table 2-4 Number of Establishments by Division in Manufacturing Industry in ASEAN (in thousand) (ASYB, 2022)

Divison	Brunei Darussalam	Cambodia	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
	2019	2011	2020	2015	2021	2019	2020	2022	2020
17 Manufacture of paper and paper products	2	283	820	936	576	2,082	798	1,137	12,763

Table 2-5 Number of Persons Engaged by Division of Manufacturing Industry in ASEAN (in thousand) (ASYB, 2022)

Divison	Cambodia	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
	2011	2020	2015	2021	2019	2020	2022	2020
17 Manufacture of paper and paper products	1,265	158	54	6	31	3	57	159535

2.8 Industry and Market Analysis

The significance of the C17 division in Malaysia is reflected in its contribution to the country's exports, particularly in paper packaging products. According to the UN Comtrade Database, the Paper And Paperboard; Articles Of Paper Pulp, Of Paper or Paperboard accounted for USD 1.4 billion in exports in 2021, representing a significant increase from the USD 0.9 billion recorded in 2016 (WITS, 2023).

Apart from wastepaper and virgin pulp sourcing, biomass is increasingly being used as a raw material to produce paper. Eco Palm Paper is a pioneer company in producing paper from empty fruit bunches (EFB) (MIDA, 2023).

The prospects in this industry are encouraging as Malaysia is attracting much interest from top global players looking to expand their business. It is estimated that Malaysia’s paper production capacity could jump exponentially from the involvement of such investors. Malaysia is expected to be a substantial exporter in the region for paper packaging products (MIDA, 2023).

Paper and paper products also have been contributing to 0.4% of Malaysia's GDP in 2022 which is equivalent to RM5.6 billion where the manufacturing sector contributes 24.1% of overall GDP (MITI, 2023). Figure 2.2 shows the contribution of the C17 division compared to other sectors in contributing to Malaysia's GDP in 2022.

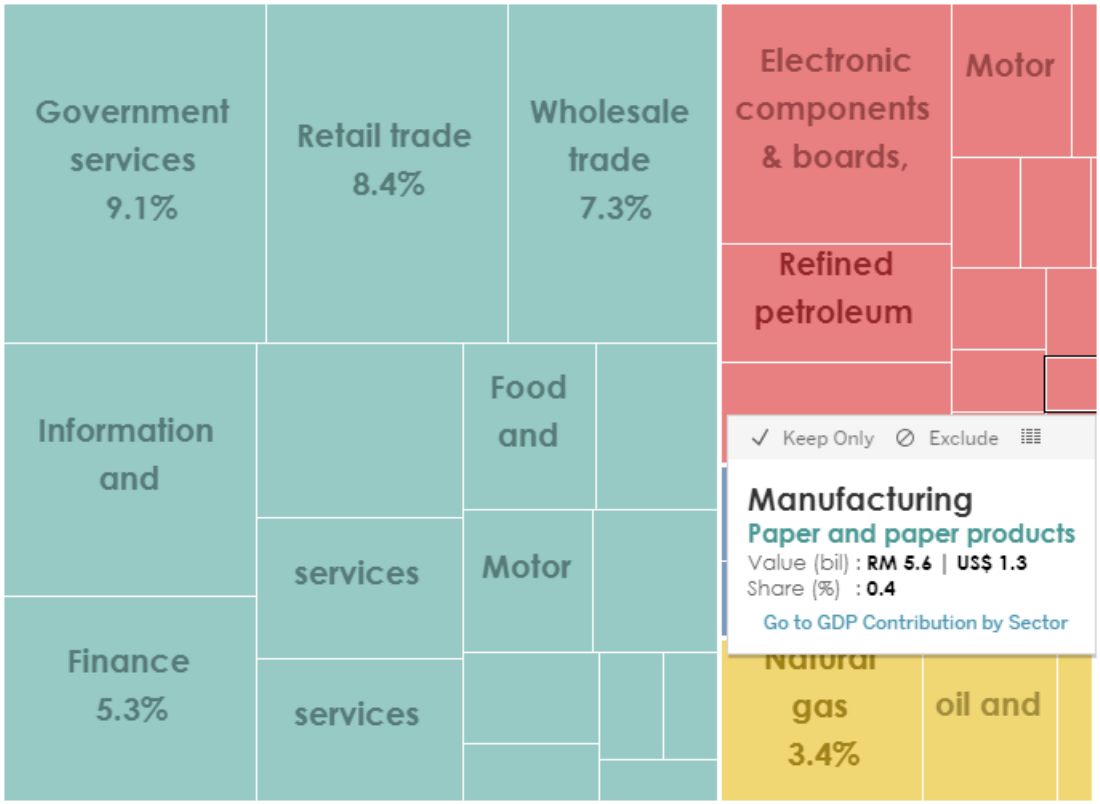

Figure 2-2 Manufacture of paper and paper products contribute 0.4% of Malaysia GDP 2022 (MITI, 2023).

2.8.1 Growth of Manufacturing of Paper and Paper Products

Opportunities abound for investors in this industry as new applications and production techniques for paper and its components are emerging. For example, apart from virgin pulp and wastepaper, paper can also be produced through the use of biomass (MIDA, 2023).

Malaysia, which has oil palm plantations spanning 5.8 million hectares, offer a competitive and comparative advantage for companies producing paper from empty fruit bunch (EFB). Notably, paper production via biomass has garnered significant interest from large foreign industry players.

The paper, printing and publishing industry is moving into an interesting decade as many parts of the industry are advancing due to the rise of new technologies (MIDA,2023). This includes:

1. Industry 4.0 elements such as sensors,
2. Waste to Energy Technology (Cogeneration Plants)
3. Zero Waste Management

In terms of salaries and wages paid in the C17 Manufacture of paper and paper products, many groups have seen positive increments through the year 2020 to 2022. Table 2-6 shows the annual percentage change from 2020 to 2022. Overall change in the C17 division shows a positive change of 0.7% in 2021 and 4.1 % in 2022.

Table 2-6 Salaries and Wages Paid of Manufacturing Sector by Group: Annual Percentage Change (DOSM, 2023a)

Kod Kumpulan ***Group code***	**Keterangan Kumpulan/Tempoh**		**2020**	**2021**	**2022**
170	**Pembuatan kertas dan produk kertas**		**-5.8**	**0.7**	**4.1**
	17010	Pembuatan pulpa, kertas dan kertas tebal	-2.3	-1.9	12.1
	17020	Pembuatan kertas gelugur dan kertas tebal dan bekas daripada kertas dan kertas tebal	-10.5	0.9	3.9
	17091	Pembuatan sampul surat dan kad surat	-6.4	1.5	-8.9
	17092	Pembuatan kertas kegunaan rumah dan pembersih peribadi	-1.0	2.3	8.3
	17093	Pembuatan kertas bergam atau pelekat yang berjalur atau bergulung dan label dan kertas dinding	-7.5	-12.8	-12.4
		Industri lain	6.7	27.3	14.3

2.8.2 Value Chain Related to Manufacture of Paper and Paper Products.

Value chain analysis is a powerful tool for understanding the key activities and costs involved in a manufacturing process, and for identifying opportunities to enhance competitiveness and

optimize performance. In the case of the manufacturing of paper and paper products, conducting a value chain analysis can provide insights into how to create and sustain a competitive advantage in this industry. Figure 2.3 and Figure 2.4 illustrate the value chain model for the manufacturing of paper and paper products and activities related to them. Normally paper manufacturing includes process of processing the raw materials from woods or other materials like recycle papers into pulp making and processing. Next the pulp will be processed into paper finished which then is used as finish product or inputs to converting process that turns to other specific paper products such as tissue, packaging and etc.

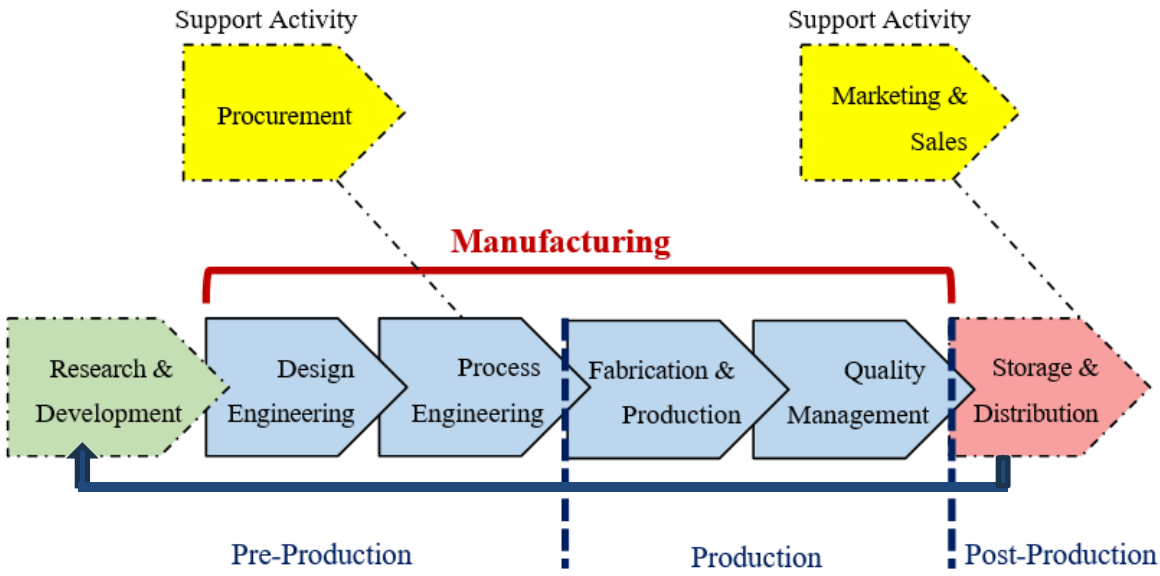

Figure 2-3 Value chain for manufacturing. (Adapted from the Stan Shih commodity chains and added value concept (Rodrigue, 2020).

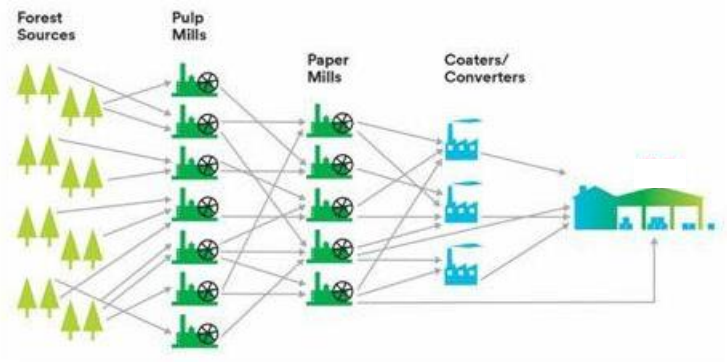

Figure 2-4 Value chain of paper manufacturing (Foundation, 2018).

The paper manufacturing process typically includes several stages, including preparation of raw materials, pulping, refining, forming, pressing, drying, and finishing (Gary A., 2016). During each of these stages, the pulp mixture undergoes various treatments to improve its properties, such as strength, brightness, and printability, and to create the final paper product. Figure 2.5 illustrates the basic of paper making processes.

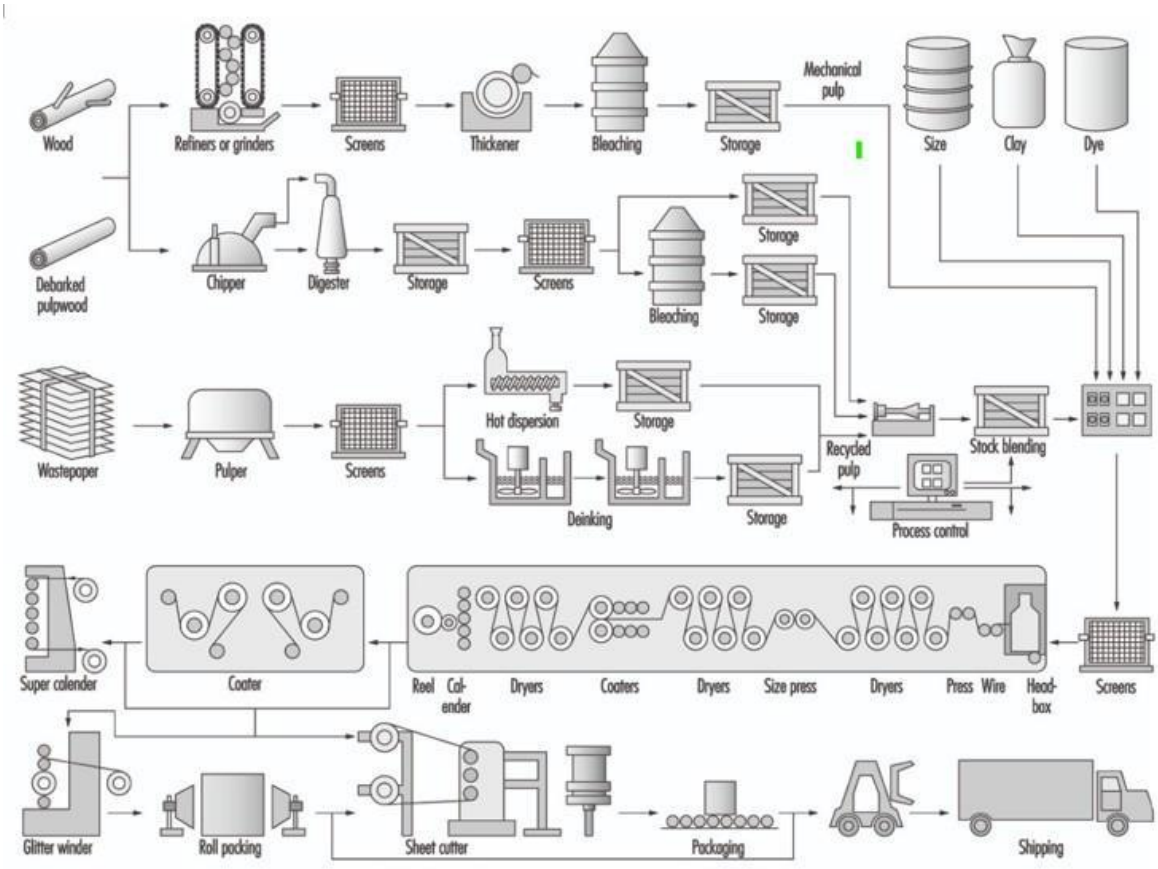

Figure 2-5 Basic paper making process.

2.8.3 Employment Statistics

To date, DSD has developed three (3) NOSS under Section C Division 17. The details of the existing NOSS title relevant to the Manufacture of Paper and Paper Products are provided in Table 2.7.

Table2-7 Summary of NOSS developed under Section C, Division 17.

MSIC Group	Relevant NOSS	
C170 - Manufacture of Paper and Paper Products 3 NOSS	1. Paper Packaging - Paperboard Packaging Manufacturing	1. Paperboard Packaging Manufacturing (18-12-2012) (PG-100-3:2012) 2. Paperboard Packaging Manufacturing (18-12-2012) (PG-100-2:2012) 3. Paperboard Packaging Manufacturing (18-12-2012) (PG-100-1:2012)

According to the Department of Statistics Malaysia (DOSM), 95.6% of jobs that have been offered by wood products, furniture, paper products and printing had been filled, leaving only 4.4 % vacancies. Figure 2-5 shows the employment statistics of manufacturing activities in Q2 of 2023.

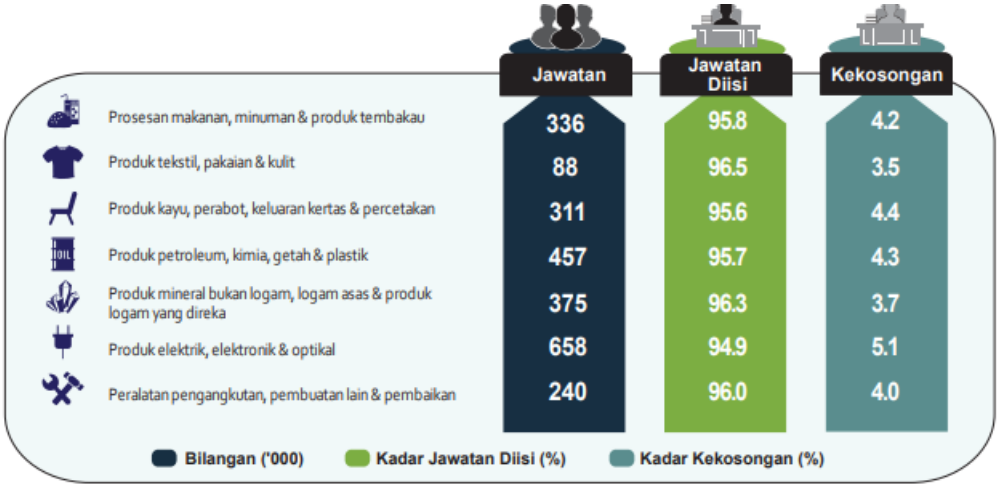

Figure 2-6 Employment Statistic of Wood, Paper & Printing Products compare with others manufacturing activities sector in Malaysia for Q3 2023 (DOSM, 2023c)

As mentioned in the previous section, positive increments of salaries and wages had been paid by companies in C17 division. Table 2-8 shows the number of salaries and wages paid by the C17 division companies from 2019 to 2022 with the amount in 2022 exceeding RM 2 billion.

Table 2-8 Salaries and Wages Paid of Manufacturing of Paper and paper Products (DOSM, 2023b)

Kod Kumpulan ***Group code***	**Keterangan Kumpulan/Tempoh**		**2019**	**2020**	**2021**	**2022**
			(RM Juta/Million)			
170	**Pembuatan kertas dan produk kertas**		**2,128**	**2,003**	**2,018**	**2,100**
	17010	Pembuatan pulpa, kertas dan kertas tebal	283	276	271	304
	17020	Pembuatan kertas gelugur dan kertas tebal dan bekas daripada kertas dan kertas tebal	891	798	805	836
	17091	Pembuatan sampul surat dan kad surat	62	58	59	54
	17092	Pembuatan kertas kegunaan rumah dan pembersih peribadi	341	338	345	374
	17093	Pembuatan kertas bergam atau pelekat yang berjalur atau bergulung dan label dan kertas dinding	382	353	308	270
		Industri lain	169	180	230	263

2.9 Critical List in The Paper Manufacturing Industry According to Malaysia Critical Occupations List (MyCOL)

The Malaysia Critical Occupations List (MyCOL) covers a list of occupations for which there are strong facts that there are important labour market deficiencies that may be improved through government action. Occupations on the MyCOL encounter the criteria of being skilled, sought-after, and strategic. The MyCOL seeks to recognise and portray stakeholder attention to this set of occupations that are critical to the endured growth and development of the Malaysian economy but that are presently difficult to fill.

The Critical Skills Monitoring Committee (CSC) was formed as part of the Eleventh Malaysian Plan with the obligation to monitor skills differences in the Malaysian labour market. Jointly led by Talent Corporation Malaysia Berhad (TalentCorp) and the Institute of Labour Market Information and Analysis (ILMIA), the CSC has established and published a Critical Occupations List (MyCOL) on an annual basis since 2015 to assist as a platform for the harmonisation of human capital development policies.

Under the MyCOL 2022-2023 report, Pulp and Papermaking Plant Operators are listed as 100% of indicators passing threshold shortage (MOHR, 2023). Other than that, it is stated that manufacturing managers, mechanical engineers, manufacturing professionals, mechanical engineering technicians, industrial and production technicians and manufacturing supervisors are among the 37 occupations listed in the report as critical job list.

2.10 Industry Comparison Between Malaysia and Selected Countries

This section provides an overview of the selected Asian countries, European countries and ASEAN countries, and the United States of America. According to the United Nations Industrial Development Organisation (UNIDO, 2022), the top five countries with the largest manufacturing sector and their share in Manufacturing Value Added (MVA) are China, United States of America, Japan, Germany and India. However, Malaysia, Cambodia, Indonesia, Myanmar, and Vietnam are among the list of countries included in Emerging Industrial Economies (EIEs). In 2020, at the height of the pandemic, this group’s MVA grew by 2.6 per cent, while in 2021 it picked up speed and reached 8.0 per cent. (UNIDO, 2022). The data in Table 2.9 shows the latest data from the United Nations Industrial Development Organisation (UNIDO, 2022). UNIDO reveals that China's Index of Industrial Production (IIP) has increased to 133.0, with a

1.6% change compared to the previous month and a 2.9% change compared to the same month of the previous year. This suggests a positive trend in China's industrial production. In contrast, Japan's IIP has risen slightly to 88.1, indicating a stable trend, with a 0.9% change compared to the previous month and a 0.8% change compared to the same month of the previous year. India's IIP has dropped to 107.4, showing a negative trend, with a -7.0% change compared to the previous month and a -1.6% change compared to the same month of the previous year. Similarly, the Republic of Korea's IIP has decreased to 68.9, indicating a negative trend, with a -6.3% change compared to the previous month and a 2.8% change compared to the same month of the previous year. In summary, the latest data highlights a strong performance of China's industrial production, stability in Japan's production, and negative trends in the Republic of Korea and India.

Table 2-9 shows the latest trend data from UNIDO, as of June 2023. The data shows that the total manufacturing Industrial Production Index (IIP) for the United States of America (USA) is 102.2.7. This represents a 0.43% decrease compared to the previous month. Additionally, the data for the manufacturing of paper and paper products in the USA shows 38.8% shares in total manufacturing sectors in 2000 and had decreased to 25.4% in 2020. The table also shows data from China, Japan and Germany as the leaders in the sector performances.

Table 2-9 Manufacturing of Paper and Paper products: Index of Industrial Production (IIP) for Leading manufacturers.

LEADING PAPER MANUFACTURER COUNTRIES (2023)			
Country	**Index of Industrial Production (2015=100): (Output in USD)**		
	2000	**2020**	**2021**
China	-	115.7 (USD 19210.7M)	125.2 (USD 228231.8M)
United States	121.8 (USD 163434 M)	92.3 (USD 181828.7M)	93.8 (USD 198257.6 M)
Japan	110.5 (USD 73344.4 M)	88.7 (USD 64542.6 M)	91.4 (USD 66127.8 M)
Germany	87.7 (USD 28587 M)	94.0 (USD 41660.5 M)	99.1 (USD 46714.5M)
Malaysia	56.3 (USD 1759.4M)	116.5(USD 4747 M)	133.8 (USD 5404.6M)

Source: United Nations Industrial Development Organization (UNIDO, 2023). *Latest Trends*

This data suggests that the manufacturing sector in the USA is experiencing an overall decline, as demonstrated by the increase in the total manufacturing IIP. Furthermore, the manufacturing of paper and paper products is decreasing at a faster rate compared to the rest of the

manufacturing sector. This could be due to various factors, such as an increase in demand for equipment or the introduction of new technologies and innovations in this industry. Overall, the data indicates a negative trend in the USA's manufacturing sector, with growth in both the total manufacturing IIP and the manufacturing of paper and paper products.

IIP for selected ASEAN countries are shown in Table 2.10 for the year 2016 – 2021. According to the IIP data for 2021, the Manufacture of paper and paper products industry in Indonesia's had an IIP reading of 91.2, indicating a 2.5% annual decrease from the previous year. Malaysia's IIP reading for the same industry in 2021 was 133.8, with a 14.85% annual increase from the previous year. The difference between Indonesia and Malaysia's IIP values was about 17.35%. The Philippines' IIP reading for manufacturing paper and paper products was 106.2, indicating an 11.09% annual increase from the previous year. Other countries like Singapore and Vietnam also had more than the 100 IIP index Singapore had an IIP reading in 2021, of 100.3,.1 and Vietnam's IIP was 104.1.

The IIP statistics are important indicators of the performance and productivity of different industries in a country and can provide insights into economic trends and potential opportunities or challenges for businesses.

Table 2-10 Manufacture of paper and paper products: Index of Industrial Production (IIP) 2016 – 2021 (Source: ASEAN Statistical Yearbook 2022)

Country /Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Indonesia IIP	92.1	89.8	89.7	94.6	88.7	91.2
Annual Change in Percent (%)	-2.50	-0.11	5.46	-6.24	2.82	-2.50
Malaysia IIP	120.6	126.0	115.0	120.0	116.5	133.8
Annual Change in Percent (%)	3.88	4.48	-8.73	4.35	-2.92	14.85
Philippines IIP	81.2	84.3	100	110.3	95.6	106.2
Annual Change in Percent (%)	2.27	3.82	18.62	10.30	-13.33	11.09
Singapore IIP	94.6	93.5	100.1	100	96.3	100.3
Annual Change in Percent (%)	-2.67	-1.16	7.06	-0.10	-3.70	4.15
Viet Nam	107.2	109.6	113.9	111.6	107.5	104.1
Annual Change in Percent (%)	-4.03	2.24	3.92	-2.02	-3.67	-3.16

2.11 Industrial Revolution 4.0 Related to Industry Under Manufacture of Paper And Paper Products

The growth of the manufacturing industries around the world including Malaysia is driven by

the Industrial Revolution 4.0 (IR 4.0). Technologies have been seen rapidly evolving in recent years which in turn, manufacturing industries improve drastically, particularly in terms of productivity, efficiency, cost reduction and quality. The technological advancement does help to increase research and development activities, as well as new skills and talent among workers globally (MITI, 2023).

According to MITI (2018), nine (9) important technology advancement pillars that are outlined under IR 4.0 as shown in Figure 2.6 (MITI, 2018). As the IR 4.0 is the driving factor with the main focus is to manufacturing industries, thus, all the pillars under the IR 4.0 are relevant to all industries under the Manufacture of paper and paper products (C17) group.

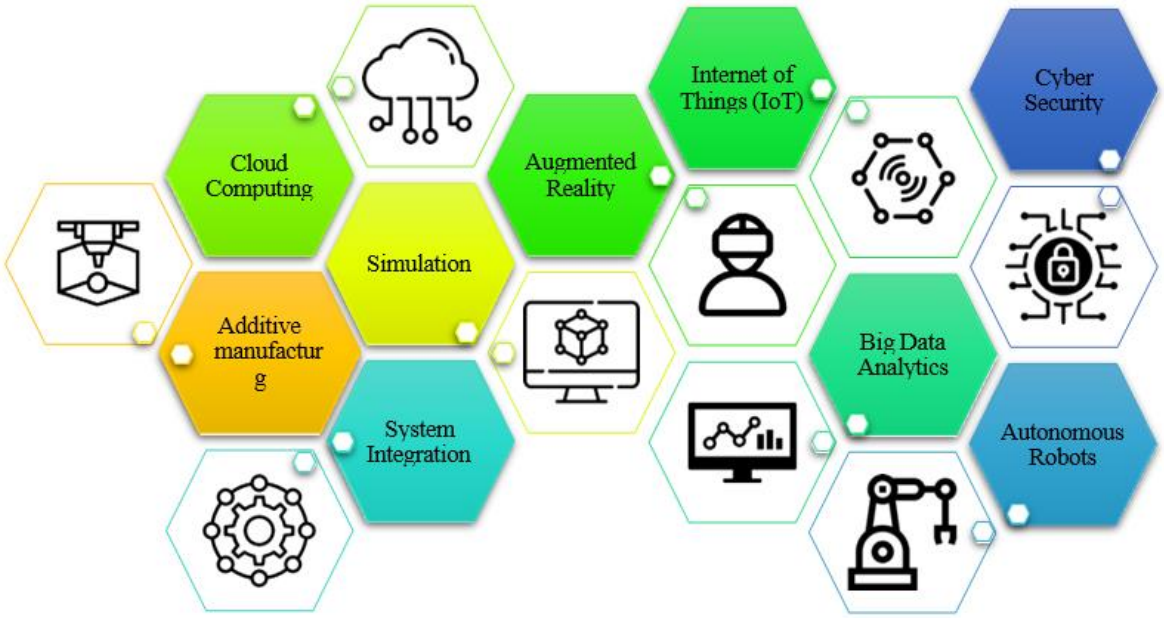

Figure 2-7 The nine (9) important pillars of technology advancement under the IR 4.0.

Industry 4.0 technologies such as the Internet of Things (IoT), artificial intelligence (AI), and digital twins can be used in pulp, paper and paperboard manufacturing to improve production efficiency, reduce costs, and enhance safety. For example, IoT sensors can be used to monitor the performance of ship engines, hulls, and other critical systems in real-time, allowing for predictive maintenance and reducing downtime (Schimek, 2016).

Industry 4.0 technologies such as IoT, AI, and 3D printing can be used in the manufacture of paper and paper products to improve production efficiency, reduce costs, and enhance safety. For example, IoT sensors can be used to monitor the performance of pulp and paper machines and reduce downtime. AI algorithms can be used to optimise production planning and reduce the number of materials and energy used in production. 3D printing can be used to produce complex

parts and prototypes quickly and cost-effectively. Automation can be used to improve the speed and consistency of production processes, reducing costs, and improving quality.

2.12 New Industrial Master Plan (NIMP)

Malaysia's strength in manufacturing has been largely driven by the implementation of a robust and forward-looking Industrial Master Plan, first launched in 1986. The success of IMP3 (2006-2020) was based on innovation, research and development (R&D) and human capital development to promote high-value-added industries and transform Malaysia into a knowledge-based economy. The path to developing the NIMP 2030 is underscored by the need to build a robust industrial sector as a key enabler of socio-economic prosperity. The past three Industrial Master Plans have promoted Malaysia's industrial development, with the government adopting relevant industrial development strategies for each period to transform the economy. Malaysia thrives on a low-productivity agricultural economy and is on track to achieve developed country status, supported by strong manufacturing and service industries. The strategy has succeeded in raising the living standards of the Rakyat people and has fostered impressive growth in gross national income (GNI) per capita, increasing 34 times between 1967 and 2019, making Malaysia the fastest-growing country in modern history. It has made it one of the fastest-growing economies.

2.13 Key Stakeholders

A stakeholder is a party who has an interest in a company and can affect or be affected by the business. The main players in a typical company are investors, employees, customers, and suppliers. However, with increasing attention to corporate social responsibility, the concept has expanded to include local communities, governments, and industry associations. Stakeholders can be both internal and external to the organisation. Internal stakeholders are people who have an interest in the company through a direct relationship, such as employment, ownership, or investment. External stakeholders are people who do not work directly with the company, but who are affected in some way by the company's actions or results. Suppliers, creditors and public bodies are all considered external stakeholders.

2.13.1 Government Agencies and Regulatory Bodies

Malaysia has a highly centralised government; however, there are many different departments with responsibilities in the industries. These are the Government Agencies and regulatory bodies

that are empowered by the legislation according to the scope and powers given in the related acts that directly regulate the Manufacture of Paper and Paper Products Division in Malaysia. Table 2-11 is the list of key stakeholders for this division.

Table 2-11 Government Agencies and Regulatory Bodies

NO	GOVERNMENT AGENCIES & REGULATORY BODIES	ROLES AND FUNCTION
1	Ministry of International Trade and Industry (MITI)	The Ministry of International Trade and Industry (MITI) is responsible for international trade, industry, investment, productivity, small and medium enterprises, development finance institutions, halal industry, automotive, steel, and strategic trade. Its functions include: • To develop and implement policies on industrial development, international trade and investment. • To attract quality foreign and domestic investments • To promote and increase Malaysia's exports of high. value-added goods and services by strengthening bilateral, regional and multilateral trade relations and cooperation. • To enhance national productivity and competitiveness, particularly in the manufacturing and services sectors. • To ensure a conducive business ecosystem to facilitate trade and investment. • To provide credible standardisation, accreditation and conformity assessment services to enhance societal and environmental well-being as well as facilitate trade and economic growth. • To promote and accelerate the adoption of digitalization and innovative technologies, including data-driven policies, towards growing globally competitive industries. • To facilitate the development of small and medium enterprises, including homegrown industries, and the Bumiputera community to become globally competitive and integrate into the global value chain.
2	Malaysian Investment Development Authority (MIDA)	Incorporated as a statutory body under the Malaysian Industrial Development Authority (MIDA) Act, the establishment of MIDA in 1967 was hailed by the World Bank as “the necessary impetus for

		purposeful, positive, and coordinated promotional action" for Malaysia's industrial development. Today, MIDA is Malaysia's cutting-edge, dynamic, and pioneering force in opening pathways to new frontiers around the globe. MIDA is also strongly supported by the Department of Environment, *Tenaga Nasional Berhad*, and *Telekom Malaysia Berhad*. MIDA evaluates the following applications for projects in the manufacturing sector and selected services sub-sectors: • Manufacturing licences • Tax incentives • Expatriate posts • Duty exemption on raw materials and components • Duty exemption on machinery and equipment for the agricultural sector and any selected service sector • Regional establishments
3	Malaysia External Development Corporation (MARTRADE)	MATRADE's mission to promote Malaysia's exports has enabled many local companies to carve new frontiers in global markets. Today as we continue to put the spotlight on capable Malaysian companies on the international stage, we are helping make the phrase 'Made-In-Malaysia' synonymous with excellence, reliability and trustworthiness.
4	Ministry of Human Resource (MoHR) a. Department of Skills Development (DSD) b. Department of Occupational Safety and Health (DOSH)	The Ministry of Human Resources, abbreviated MoHR, is a ministry of the Government of Malaysia that is responsible for skills development, labour, occupational safety and health, trade unions, industrial relations, industrial court, labour market information and analysis, and social security. To coordinate and regulate the implementation of skills training to produce K-Workers for employment and recognition at national and international levels. To research and develop job competency standards and expertise to continuously improve the quality of skilled human resources who can contribute to the economic growth of the country. A department under the Ministry of Human Resources. This department is responsible for ensuring the safety, health and welfare of people at work as well as protecting other people from the safety and health

		hazards arising from the activities in various sectors. As a government agency, the department is responsible for the administration and enforcement of legislation related to occupational safety and health of the country, with a vision of becoming an organisation which leads the nation in creating a safe and healthy work culture that contributes towards enhancing the quality of working life.
5	Ministry of Natural Resources, Environment and Climate Change a. Department of Environment (DOE)	Ministry of Natural Resources, Environment and Climate Change is a ministry of the Government of Malaysia that is responsible for energy, natural resources, environment, climate change, land, mines, minerals, geoscience, biodiversity, wildlife, national parks, forestry, surveying, mapping and geospatial data. DOE is under The Ministry of Natural Resources, Environment and Climate Change. The main function of the DOE is to prevent, eliminate, control pollution and improve the environment, consistent with the purposes of the Environmental Quality Act 1974 and the regulations there under DOE is also responsible for the implementation of the resolutions decided by the conventions of the international environment, such as Vienna Convention for the protection of the Ozone Layer 1985, Montreal Protocol on Substances That Deplete the Ozone Layer 1987, the Basel Convention on the Transboundary Movement of Hazardous Waste and Their Disposal Act 1989 and other areas while the success of programmes of bilateral cooperation and multilateral cooperation between Indonesia, Singapore and other ASEAN countries on environmental management.

2.13.2 Industry Association & Professional Bodies

This section describes the activities of various industries and professional associations involved in the production of paper and paper products. The scope of the review includes professional services provided to the industry. Regulating these professional services will create value for the industry and ultimately the economy as a whole. Relevant industry and professional associations are listed in Table 2.12.

Table 2-12 List of Related Industry Associations and Professional Bodies for The Manufacture of Paper and Paper Products.

NO	ORGANISATION	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
1.	Board of Engineers Malaysia (BEM)	**Overview:** The Board of Engineers Malaysia (BEM) is a statutory body constituted under the Registration of Engineers Act 1967 with perpetual succession and a common seal, which may sue and be sued. It was formed on 23 August 1972.
		Roles and Functions: BEM's primary role is to facilitate the registration of engineers, engineering technologists, inspectors of works, sole proprietorships, partnerships and bodies corporate provide professional engineering services and regulate the professional conduct and practice of registered persons to safeguard the safety and interest of the public.
2	The Institution of Engineers Malaysia (IEM)	**Overview:** The Institution of Engineers, Malaysia (IEM) was established in 1959.
		Roles and Functions: Its primary function is to promote and advance the science and profession of engineering in any or all of its disciplines and to facilitate the exchange of information and ideas related to engineering.

3	Malaysia Board of Technologists (MBOT)	**Overview:** Malaysia Board of Technologists (MBOT) is a professional body that gives professional recognition to technologists and technicians in related technology and technical fields.
		Roles and Functions: Based on Act 768, MBOT expands its function vertically and horizontally whereby MBOT looks at technology-based professions that cut across disciplines based on conceptual design to a realized technology and covers from technicians (with MQF Level 3 to Advanced Diploma Level 5) up to technologists (bachelor's degree and above). These professionals (technologists and technicians) have integrated roles from concept to.
4	SIRIM Berhad – SIRIM Industrial Research	**Overview:** SIRIM is a premier industrial research and technology organisation in Malaysia, wholly owned by the Minister of Finance Incorporated. With over forty years of experience and expertise, SIRIM is mandated as the machinery for research and technology development, and the national champion of quality.
		Roles and Functions: SIRIM has always played a major role in the development of the country's private sector. By tapping into our expertise and knowledge base, we focus on developing new technologies and improvements in the manufacturing, technology and services sectors. SIRIM nurtures Small and Medium Enterprises (SME) growth with solutions for technology penetration and upgrading, making it an ideal technology partner for SMEs.

2.13.3 Research & Training Institutions

Manufacturers invest in research and development to improve internal operations and relationships with suppliers, stakeholders, and customers. Through investment in research and development, technological progress, employee satisfaction, and enterprise capability are significantly increased. Training centres are places where people receive vocational training. Table 2.13 shows research and training institutions related to the Manufacture of Paper and Paper Products.

Table 2-13 List of Research Institute for The Manufacture of Paper and Paper Products

NO	RESEARCH & TRAINING INSTITUTIONS	OVERVIEW, ROLES, FUNCTIONS AND RESPONSIBILITIES
1	Public Institutions	Public institutions are government-funded higher education institutions under the purview of the Ministry of Education Malaysia. They can generally be divided into three major categories as follows: • Public universities offer undergraduate and postgraduate programmes, and sometimes pre-university foundation year and diploma courses. They can be divided into 3 major groups: Research Universities, Focused Universities and Comprehensive Universities. • There is one programme related to paper processing and manufacturing being offered by *Universiti Sains Malaysia*. The degree program namely Bachelor of Technology (Honours) (Bioresource) (USM, 2021) offers the fundamentals of paper processing and manufacturing. programmes. • Another programme that offers career prospects in paper manufacturing is the University Tunku Abdul Razak (UTAR) which offers a Bachelor of Engineering (Honours) in Petrochemical Engineering (UTAR, 2023). This program listed paper manufacturing as one of the

		career prospects for their students.
2	*Institut Latihan Jabatan Tenaga Manusia* (ILJTM)	*Institut Latihan Jabatan Tenaga Manusia* (ILJTM) consists of *Institut Latihan Perindustrian* (ILP), *Pusat Latihan Teknologi Tinggi* (ADTEC) and *Institut Teknikal Jepun-Malaysia* (JMTI). The *Institut Latihan Perindustrian* (ILP) is a training institute for the production of skilled labour to meet the demands of the industrial sector in Malaysia. ILP is managed by the Department of Human Resources and has been producing national talent from the training certificate level to the Advanced Diploma in various skill courses. The only ILP that offers programme in paper manufacturing although not all related to paper manufacturing is ILP Nibong Tebal. There are three programs offered at the certificate and diploma level which are *Sijil dan Diploma Teknologi Percetakan Institut Latihan Perindustrian* (ILP). These programmes are more into printing technology.

2.14 Educational Programmes

By the year 2023, there are public institutions that offer educational programmes related to paper and paper product manufacturing. These public institutions include universities and institutes from ILJTM. The programmes offered are:

1. Bachelor of Technology (Honours) (Bioresource) (USM, 2021),
2. Bachelor of Engineering (Honours) in Petrochemical Engineering (UTAR, 2023)
3. *Sijil dan Diploma Teknologi Percetakan Institut Latihan Perindustrian* (ILP)

2.15 Policies & Initiatives

2.15.1 Government Legislation

Malaysia's manufacturing industry is regulated by the Industrial Adjustment Act 1975. The Industrial Adjustment Act 1975 imposes various requirements on companies operating or planning to operate in the manufacturing industry. Compliance requirements are introduced to

facilitate the proper regulation of manufacturing industries by relevant authorities. It also ensures that companies produce products that are consistent with the economic and social goals of the nation. Additionally, it promotes the orderly development of the manufacturing industry and minimises manufacturing activities and practices that are potentially harmful to society, such as hazardous waste disposal, pollution, and other environmental problems. This article investigates the regulatory compliance aspects of the Malaysian manufacturing industry. The term 'manufacturing activity' is defined in the Industrial Adjustment Act of 1975 as ``use, sale, transportation, delivery or disposal. It includes assembly of parts and repair of ships but does not include activities typically associated with retail or wholesale trade."

2.15.2 Employment Act 1955 for Peninsular Malaysia, Sabah Labour Ordinance 1950 for Sabah and Sarawak Labour Ordinance 1952 for Sarawak

The Labor Law in Malaysia is regulated mainly by the Employment Act 1955. The law governs the terms and conditions of employment such as working hours, holidays and rest periods, wages, overtime, and other employment conditions (*ACT 265: EMPLOYMENT ACT 1955*, 2012).

C17 division is also under this act as it includes the employment and other employment issues that had been governed by the Act.

The Employment Act 1955 for Peninsular Malaysia, Sabah Labour Ordinance 1950 for Sabah and Sarawak Labour Ordinance 1952 for Sarawak. Workers covered under the Employment Act 1955 are all workers whose earnings do not exceed RM2000.00 a month and all manual workers irrespective of their earnings. While for Sabah & Sarawak, Labour Ordinance covered workers who earned below RM2500.00 a month and also manual workers irrespective of their earnings. The purpose of these legislations is to provide a number of minimum benefits for those workers covered by the Act and the Ordinances and to establish certain rights for both employers and employees. Labour legislation in Malaysia does not differentiate between part-time workers, temporary workers, local or foreign workers. All such workers are protected equally by the law (Eartworms Foundation, 1955).

2.15.3 Environmental Act 1974

An Act relating to the prevention, abatement, control of pollution and enhancement of the environment, and for purposes connected therewith (*ACT 127: ENVIRONMENTAL QUALITY ACT 1974*, 2001).

Because paper manufacturing industries are closely related to the Environment, Pollution and Waste Act 127 helps Malaysia to control activities that require monitoring to safeguard the environmental issues in the country.

2.16 Government Policies & Initiatives

2.16.1 National 4IR Policy (Industry4WRD)

Industry4WRD is Malaysia's national policy framework to transform the country's industrial sector through the adoption of Industry 4.0 technologies and practices, including the integration of advanced technologies, such as the Internet of Things (IoT), artificial intelligence (AI), and robotics. The purpose is big data analytics in manufacturing and other industrial processes. The Industry4WRD policy framework was launched in 2018 and is led by the Ministry of International Trade and Industry (MITI). The main goals of politics are:

a) To increase the adoption of Industry 4.0 technologies and practices among Malaysian manufacturers.
b) To improve the competitiveness of Malaysian industries through greater efficiency, productivity, and innovation.
c) To develop a highly skilled workforce capable of working with advanced technologies.
d) To attract more foreign direct investment (FDI) into Malaysia's industrial sector.

To achieve these goals, the Industry4WRD policy framework provides a range of support and incentives to help Malaysian companies adopt Industry 4.0 technologies and practices. These include grants and funding for research and development, tax incentives for investments in Industry-4.0-related projects, and workforce training and skills development programs (MITI, 2018a). The target audience for this initiative is the manufacturing industry, including the paper and paper products industries. Through benefits, such as grants and funding for research

and development, tax incentives, and employee training and skills development programs, this initiative aims to advance the industry's technological progress while increasing its efficiency, productivity, and innovation (MITI, 2018).

2.16.2 Sustainable Development Goals (SDG)

Figure 2-8 Sustainable development goals

C17 division activities are significantly related to the Sustainable Development Goals. Among the 17 SDGs, C17 Manufacture of Paper and Paper Products contribute to SDG 8 Decent work and Economic growth, SDG 9 Industry, Innovation, and Infrastructure, SDG12 responsible consumption and production and the most important is SDG 13 the climate action goals.

To support SDG 8 Decent work and Economic growth, C17 sectors in the context of GDP contributions in Malaysia, the sector had contributed toward 0.4% of the overall GDP which is similar to RM 5.6 billion. Having an efficient system for the work in the sectors will contribute to better achievement for our country.

C17 Manufacture of Paper and Paper Products has been the industry's player for a long time; therefore, it is needed to support SDG 9 to build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation. SDG 12 is about ensuring sustainable consumption and production patterns, which is key to sustaining the livelihoods of current and future generations. Unsustainable patterns of consumption and production are the root causes of the triple planetary crises of climate change, biodiversity loss and pollution. Hence, C17 sectors play an important role towards the SDG 12.

As C17 took responsibility for producing from pulp and wood, the action to combat climate change and its impacts is vital. Although the industry is facing a decreasing market due to digitalization, the moral of sustaining the environment cannot be neglected.

2.17 CONCLUSION

The paper and paper products manufacturing industry is an important part of economic growth and development. In Malaysia, he said, as the implementation of the 4IR progresses, the manufacturing sector will continue to focus on moving towards higher value, more diverse and more complex products. In line with Industry 4.0 national policy (Industry4WRD), efforts are also being made to utilise digital technology and improve systems to increase productivity. 4IR preparations also focus on leveraging disruptive technologies. The sector is expected to grow by 5.7% annually, led by export-oriented subsectors, with Malaysia's Index of Industrial Production (IIP) expected to grow by 13.6% in August 2022, led by manufacturing. Year-on-year, manufacturing output increased by 15.2 per cent in August 2022, following a 14.9 per cent increase in July 2022. One of the key sub-sectors that contributed to manufacturing growth in August 2022 was paper and paper products (RM5.6 billion) (DOSM, 2022).

CHAPTER III

METHODOLOGY

3.1 Introduction

This chapter clarifies the process of researching this topic adopted in this study. It identifies its analytical framework beginning with its methodology and nature, location of the sample, population and sampling, instruments used, and data collection and procedures. The methodology is applied to produce deliverables that consist of Occupational Structure (OS), Occupational Responsibilities (OR), Occupation Description (OD), jobs in demand, critical jobs, competency in demand, jobs relevant to the industry and technology revolution as well as the emerging skills.

3.2 Research Approach and Design

The researcher has chosen to use a Design Development Research (DDR) methodology that is uniquely tailored for addressing complex challenges, such as those encountered in the C17 Paper and paper products division transformation within the Fourth Industrial Revolution. This approach links the consistency of traditional research with a creative and iterative design process. It helps to create, refine, and optimise solutions that not only address identified problems but also improve the overall industry landscape. In this study, design development research will permit active engagement with stakeholders, including industry experts, practitioners, and policymakers, to collaboratively design and refine strategies, technologies, and best practices that encourage sustainable growth, innovation, and competitiveness within the paper manufacturing industry. The approach is described through three separate phases, which include Phase 1, Phase 2 and Phase 3.

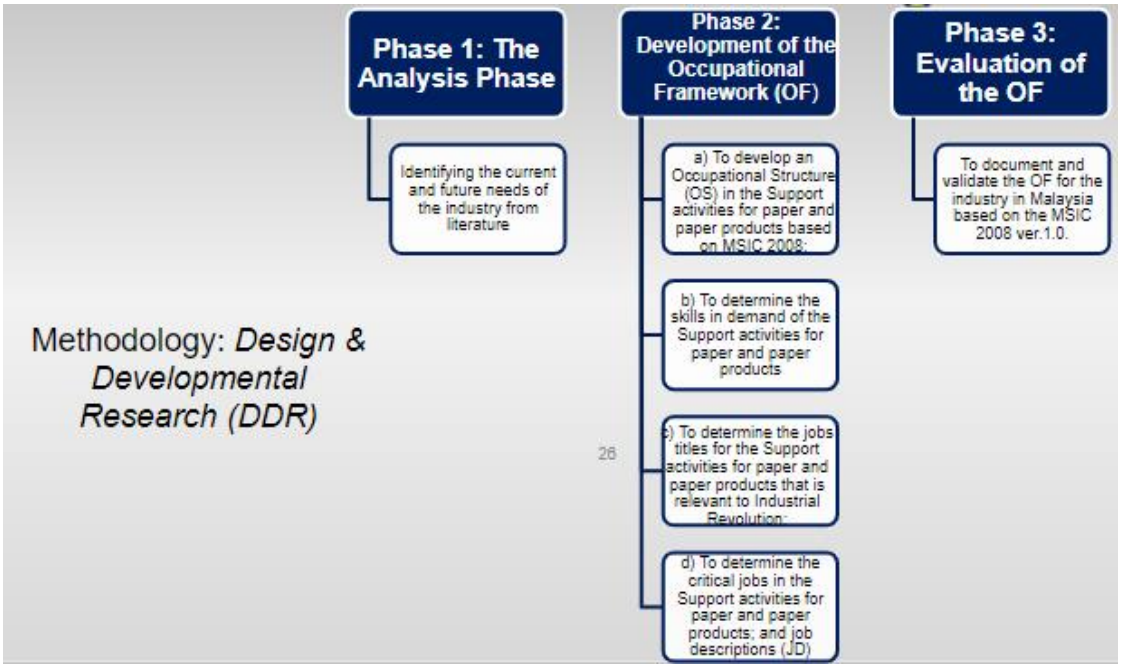

Figure 3-1 Phases of Research Methodology for Manufacturing of Paper and Paper Products.

3.3 Phase 1: Analysis Phase

Phase 1 involves the analysis phase, which includes identifying the current and future needs of the industry literature. The task is to conduct a document review to gather relevant information that will be used to develop Chapters 1, 2, and 3 of this research. This includes reviewing academic literature, reports, and other sources of information related to the research topic. Document review is a systematic approach to studying literature and documents on a research topic, where researchers extract and assess relevant information for accuracy and reliability. This step helps identify gaps in existing research, providing a foundation for the study. Identifying the research problem in this phase requires a review of the literature and defining the research question to ensure that it is focused and relevant. It is critical to articulate the research problem clearly for a well-designed and executed study.

In the second step of this initial phase, a rigorous analysis of the compiled documents takes place, aiming to precisely identify the existing and potential future needs of the industry. This methodical analysis draws upon the insights garnered from the conducted literature review. By delving into the literature, the study gains valuable insights into the shifting requirements and expectations within the industry. This strategic approach ensures that the study remains closely aligned with the ever-evolving dynamics of the industry landscape, allowing it to effectively

respond to both present demands and future imperatives. In essence, this step serves as a mechanism to ensure that the research maintains its relevance and applicability within the dynamic context of the industry.

Overall, Phase 1 is a crucial step in the research process as it lays the foundation for the rest of this study. By conducting a thorough document review, developing a well-constructed survey questionnaire, and ensuring its quality through validation, the researcher can ensure that the study is built on a solid base of relevant and accurate information.

Table 3-1 Phase 1 methodology

Objective	Data collection methods	Sources of data / Respondents	Data analysis method
a. To identify the current and future needs of the industry from literature.	Literature Review and Document analysis	Documents such as. 1. National Skills Development Act 2006 (ACT 652) 2. Malaysian Qualifications Framework (MQF) 3. Malaysia Standard Industrial Classification 2008 (MSIC 2008) 4. Economic Database Reports from the Department of Statistics Malaysia, census, other reports in the Occupation following MASCO, 12th Malaysia Plan, National Budget and Talent Corporation. 5. MOSQF 6. Other related documents to the paper and paper products sector.	Document analysis and comparative analysis

3.4 Phase 2: Development of the Occupational Framework (OF)

The main task in Phase Two is to develop the OF systematically according to the objectives. During the industry visit phase, the researcher seeks feedback from industry representatives on the proposed framework, including its relevance, comprehensiveness, and applicability to their respective sectors. The researcher gathered insights on the strengths and weaknesses of the

framework and identified areas for improvement.

The feedback from industry representatives were used to refine and finalise the occupational framework, ensuring that it accurately reflects the skills and competencies required for C17 Manufacture of Paper and Paper Products. Ultimately, our goal is to create a framework that is practical, useful, and relevant to industry stakeholders, and we believe that the insights gained from industry engagement are critical to achieving this objective.

A research approach is the procedure selected by the researcher to collect, analyse, and interpret data. There are three approaches to research: quantitative, qualitative, and mixed methods. Document Review, Focus Group Discussion and Fuzzy Delphi method were used to collect the required quantitative data. The research approach for this study is shown in Table 3.2.

Table 3-2 Phase 2 Methodology

Objective	**Data collection methods**	**Sources of data / Respondents**	**Data analysis method**
(a) To establish Occupational Structure (OS) for the C17 Manufacture of paper and paper products sector based on MSIC 2008 by examining job areas, job titles and relevant competency levels. (b) To determine the skills in demand of the	There were 2 + 1 Workshops for developing the OF. 1. Focus Group Discussion (FGD) involving experts from industry in a workshop. The need analysis from the first phase would be presented first as a point of discussion for the issues within the industry and to obtain the industry workforce position. The FGD would involve discussion on the occupational structure (OS), job description (JD), demand for the skills, jobs' title and critical jobs, assessment of curriculum and training programmes,	There are at least seven experts from the paper and paper products industry. The criteria of the experts are as follows: • Employed with registered companies under SSM (Criteria: SME companies, multinational companies) • A minimum of 5 years' experience in the Paper and Paper Products industry • Two experts from	FGD and Fuzzy Delphi

Objective	Data collection methods	Sources of data / Respondents	Data analysis method
support activities for paper and paper products. (c) To determine the job titles for the Support activities for paper and paper products that are relevant to the Industrial Revolution. (d) To determine the critical jobs in the support activities for paper and paper products; and (e) To determine Job Descriptions (JD) for critical jobs	accreditation and qualification based on industry needs suitable to MOSQ framework, potential workforce challenges, future outlook and strategic recommendations to be proposed. Structured interview protocol for the FDG would involve the future needs of the industry such as: i. What is the occupational structure (OS) required? ii. What are the job descriptions (JD) for each job title? iii. How can the needs for the skills and competencies in the industry be determined? iv. How can the job descriptions for jobs relevant to Industry 4.0 and sustainability be determined? v. What are the critical jobs for the industry? In the second Workshop, the finalised OF would be developed.	professional body related to the C17 division. • One expert from the government	

Discussion on a specific topic aims to draw from the complex personal experiences, beliefs, perceptions and attitudes of the participants through a moderated interaction. The following analyses were carried out during both FGD sessions.

a) Examine the potential workforce challenges faced by the overall industry and any important sub-sectors.

b) Establish the available job title and career path for each of the job areas as determined in the MSIC 2008 and new job areas as required by the industry.
c) Determine the demand and supply of talent in the Manufacture of Paper and Paper Products industry and its related activities based on NOSS and MQA standards.
d) Determined the generic job description and responsibility for each of the job titles.
e) Analysis of future trends of the occupational demand by various skill categories including TVET-related occupations.
f) Establishment of critical jobs and competencies in demand by using the Fuzzy Delphi Method.

In FGD2, the mention of "Fuzzy Delphi" indicates the incorporation of a specialised method to boost the precision and reliability of the OF. Fuzzy Delphi is an extension of the traditional Delphi method, which is a structured communication method used to grab a consensus among experts. Fuzzy Delphi presents this approach by admitting to a degree of uncertainty or vagueness in expert responses, making it appropriate for complex and multifaceted industries like paper manufacturing (Muhammad et al., 2022).

This instrument used a five-point Likert scale, with 1 representing 'strongly disagree' and 5 representing 'strongly agree.' This scale was chosen because it is comprehensive and reliable in collecting data (Chua, 2012). This means that if the response to an item is "strongly agree," the fuzzy scale is (0.60, 0.80, 1.00). Mustapha and Darusalam (2018) cautioned that the d value (for each item based on the expert's response) must be equal to or smaller than 0.2, and the group consensus must be above 75% (Mustapha, Ramlan and Ghazali, 2018). The calculation of group consensus was grounded on the average of the threshold value (d) for each element in the instrument that was accepted (d <= 0.2).

The choice of experts followed a well-defined criterion, warranting that they fulfilled the following conditions:

1. Employment with companies registered under the Companies Commission of Malaysia (SSM), incorporating both Small and Medium-sized Enterprises (SMEs) and multinational corporations.
2. Tenure of a minimum of 5 years' experience within the C17 division, ensuring an extensive knowledge base.
3. Inclusion of at least two experts associated with professional bodies related to the C17 groups, enriching the discussion with varied perspectives.
4. Incorporation of one expert from a pertinent government agency actively engaged in the industry, contributing regulatory insights.

The utilisation of these carefully chosen experts in the FGDs endeavours to extract an authentic and multi-dimensional understanding of the C17 division, its occupational framework, challenges, and potential trajectories. The expert panel list's details are tabulated below in Table 3-3.

Table 3-3 List of experts for C17 Manufacture of Paper and Paper Products

No	Name	Position	Organisation	Classifications
1	Lai Jie Yee	Project Manager	Wilson Papermaking Solutions Sdn Bhd	Industry
2	Donald S Wilson	Pengarah	Wilson Papermaking Solutions Sdn Bhd	Industry
3	Mr Teoh WK	HR Manager	NTPM Holdings Bhd	Industry
4	Lim Joo Tiong	Automation Manager	NTPM Holdings Bhd	Industry
5	Zeenat Nisa Ahmad Shah	HR Manager	PERCETAKAN MUN SUN SDN BHD	Industry
6	Tan Wei Thye	Executive Committee	Malaysia Paper Association MAPA	Association
7	Fazli Mhd Saad	AJK Tertinggi	PPPMEU	Association
8	Azhar Ahmad	AJK Tertinggi	PPPMEU	Association
9	Assoc. Prof. Dr Leh Cheu Peng	Pensyarah Universiti	Bioresource Tech., School of Industrial TechnologyUSM Pusat Pengajian Teknologi Industri	Academic
10	Assoc. Prof. Dr Mohamad Haafiz Mohamad Kassim	Pengarah/Prof Madya Dr	Bioresource Tech., School of Industrial TechnologyUSM Pusat Rancangan Kokurikulum	Academic

No	Name	Position	Organisation	Classifications
11	Dr. Nurul Fazita Mohammad Rawi	Pensyarah	Bioresource Tech., School of Industrial TechnologyUSM Pusat Pengajian Teknologi Industri	Academic
12	Mazlan Ibrahim	Pensyarah Kanan	Universiti Sains Malaysia	Academic

The competencies in demand under the C17 division were discussed and identified during the FGD and are detailed in Table 3-4.

Table 3-4: Competency in demand and description under the C17 divisions.

COMPETENCY IN DEMAND	DESCRIPTION
KNOWLEDGE	
Project Management	Understand and practice the process of organising, planning, executing and controlling resources, procedures and protocols to achieve specific goals and objectives within a specified time frame.
Engineering Design & Development	Understand and practice the process of conceptualising, planning, and developing a solution to a technical problem.
Production, Fabrication, Installation and Assembly.	Understand and practice the process of making a product from creating individual parts, putting or assembling all the individual parts and combining with the whole process until the final product is produced.
Machining & Special Tooling	Understand and practice the process of handling machines and tools including the high technology machineries as well as the special tooling that is required in manufacturing industries, especially in the production of high-precision and complex products.
Quality & Safety Management	Understand and practice the process of ensuring the products and procedures of making the products are safe, high quality and meet customer expectations.
Industrial Automation Engineering	Understand and able to use various technologies, such as programmable logic controllers (PLCs), robotic systems, and computer-integrated manufacturing (CIM) systems in a wide range of activities, including process analysis and optimisation, control system design, software development, and commissioning and testing of automated systems.
SKILLS	
Interpersonal Communication	Able to communicate well, express oneself clearly and understand the meaning behind the words and actions of others. For example, being an active listener, effective speaker, nonverbal communicator, and empathy.

COMPETENCY IN DEMAND	DESCRIPTION
Written Communication	Able to communicate and understand the process of exchanging information, ideas, and feelings through written text such as emails, letters, reports, memos, and instructional materials.
Critical Thinking	Able to practice critical thinking through careful and systematic evaluation of information, arguments, and evidence to make informed decisions and solve problems.
Equipment Maintenance	The abilities and knowledge required to effectively inspect, repair, and maintain various types of equipment. These skills are crucial in ensuring the smooth functioning and longevity of equipment in the industry.
Installation	The abilities and competencies required to properly and effectively install various systems, equipment, software, or components. These skills involve following specific instructions, using appropriate tools and techniques, and ensuring that installations are completed accurately and safely.
Problem Solving	The capacity to identify a problem, collect data, come up with possible solutions, assess those solutions, and put the selected answer into action.
Agile Mindset	The ability to apply a way of thinking that combines comprehension, teamwork, learning, and adaptability to produce high-quality outcomes.
Leadership	The ability to establish a direction, encourage and push others to follow, and foster an environment that supports and fosters achievement, one can influence and drive others to attain shared goals.
Operation Monitoring	The skills refer to the abilities and competencies required to oversee and track the execution and performance of various operational processes and systems. It involves actively observing, assessing, and analysing operational activities to ensure they are running smoothly and efficiently.
Operation and Control	The abilities and competencies required to effectively manage and regulate operational processes, activities, and systems. These skills involve overseeing the execution of tasks, ensuring adherence to plans and procedures, maintaining quality standards, and adjusting operations as needed to achieve desired outcomes.
Time management	Able to plan and organise the time allocation efficiently and effectively towards the accomplishment of specific tasks, goals and objectives.
Quality Control Analysis	Abilities and competencies required to assess and evaluate the quality of products, processes, or services through systematic analysis and inspection.
Aptitude for Technology and Equipment	Able to understand how technologies and equipment operate, while easily learning and adapting to new or future technology and equipment.
Intrapreneurship	Creative, innovative and able to create new opportunities for innovation, new products or services and bringing them to market.
Troubleshooting	The ability to identify, analyse, and resolve problems or issues that arise in technical systems, processes, or equipment.

COMPETENCY IN DEMAND	DESCRIPTION
ATTRIBUTE / ATTITUTE	
Attention to detail	Able to focus on the smaller, finer points of a task or project, and to ensure that every aspect has been considered and executed correctly to a high standard.
Teamwork	Able and willing to collaborate and cooperate between individuals in working together towards completing a goal.
Multi-tasking / Flexibility	Able to handle multiple tasks, responsibilities, or projects simultaneously.
Dependability	Dependable, reliable and consistent in completing the task and responsibilities.
Work Ethic	Able to commit to working hard, being productive, and striving for excellence in completing a goal.
Professionalism	A competent, knowledgeable, and skilled in their work in completing a task.
Self-management / Independent	Able to manage emotions, thoughts, behaviours, and time to achieve their personal and professional goals.
Self-learning	Ability to acquire knowledge, skills, and abilities through their efforts, without relying on formal education or training.
Agility	Flexible, adaptable, and responsive in the face of changing circumstances, requirements, or conditions.
Ego-management	Able to regulate one's ego or self-esteem to achieve personal and professional success.
Career management	Able to set career goals, explore and identify opportunities for growth and advancement, and continuously work to improve skills, knowledge, and abilities.

In FD instrument, types of emerging skills that are essential and could have a significant impact on the future of the Manufacturing of Paper and Paper Products division were asked of the respondents and the result is explained in Table 3.5.

Table 3.5 Future emerging skills that were suggested by the respondents.

EMERGING SKILLS	REASONS ON THE REQUIRED SKILLS
Drawing and design 3D model drawing by using modern tools	The future application requires technological advancement as mentioned in the industrial revolution. It is essential for future graduates and talent to be exposed to these advanced technologies since future manufacturing is looking to practice more digitalisation.
Designing virtual environments	Creating immersive experiences: Designing virtual environments allows for the creation of immersive and engaging experiences for users. By designing visually appealing and interactive virtual spaces, designers can provide

EMERGING SKILLS	REASONS ON THE REQUIRED SKILLS
	users with a more captivating and realistic experience, whether for entertainment, education, training, or other purposes.
Design artificial intelligent	Designing AI involves creating and developing algorithms, models, and systems that can mimic or simulate human intelligence to perform tasks, make decisions, and solve problems. By acquiring design AI skills, individuals can contribute to the development of AI solutions that can automate processes, improve efficiency, and provide intelligent insights.
Design and applying green technology	Technological advancement in the future is looking more at green and renewable energy. Thus, future graduates and new talent are recommended to be exposed to any green technology and system.
Digitalisation	These emerging skills are essential to improve the ability to find, evaluate, use, share, and create content using digital devices, such as computers and smartphones.
Autonomous technology including machine learning	Autonomous technology, powered by machine learning algorithms, can automate various tasks and processes, leading to increased efficiency and productivity. It can perform complex computations and analyse massive amounts of data much faster than humans, enabling organisations to streamline operations and achieve higher levels of efficiency.
Data automation and internet of things (IoT)	Data automation in combination with IoT technologies enables the collection, processing, and analysis of vast amounts of data in real-time. This automation eliminates manual data entry and reduces human error, resulting in higher accuracy and efficiency in data management.
Environmental, social and governance	ESG focuses on environmental factors, such as climate change, resource conservation, and pollution reduction. It also considers social factors, including labour practices, human rights, and community impact, along with governance factors, such as transparency, accountability, and ethical decision-making. By addressing these aspects, organisations can contribute to sustainable practices and long-term environmental protection.

Nine (9) crucial pillars of technological advancement were discussed in Chapter 2 of this research, with all of them directly relevant to the Manufacture of Paper and Paper Products industries. Table 3.6 elaborates further on the relevant technologies under the Industrial Revolution and the systems or programs that were used in the industries according to the result from the FGD 1.

Table 3.6 Technology pillars under the IR 4.0 that are relevant to Manufacture of Paper and Paper Products industries.

TECHNOLOGY PILLARS	DESCRIPTION OF THE PILLARS	SYSTEMS OR PROGRAMS USED IN THE INDUSTRIES
Autonomous Robots	Coordinated and automated actions of robots to complete tasks intelligently, with minimal human input	Autonomous robot machines in assembly factories, autonomous or self-driving vehicles such as safety technologies in recent vehicles.
Big Data Analytics	The analysis of ever larger volumes of data. Circulation, collection, and analysis of information is a necessity because it supports productivity growth based on a real-time decision-making process	Machine learning, data collecting and analysing sensors, equipment, robotics and some others for maintenance purposes in factories and industries.
Cloud Computing	Storing and accessing data and programmes over the Internet instead of your computer's hard drive	Cloud-based storage, storing data for maintenance purposes, data sharing, remote monitoring and reporting of a process.
Internet of Things (IoT)	All machines and systems connected to the production plant (as well as other systems) must be able to collect, exchange and save these massive volumes of information, in a completely autonomous way and without the need for human intervention	Real-time data, storing and sending through the cloud for maintenance purposes, quality control, remote monitoring and efficiency reporting.
Additive Manufacturing	Use in prototyping, design iteration and small-scale production and often described as "rapid prototyping" - produce the desired components faster, more flexibly and more precisely than ever before.	3D printing, Prototyping, 1 to 1 prototyping, details printing.
System Integration	The process of linking together different computing systems and software applications physically or functionally to act as a coordinated whole via the Internet of Things-IoT	Factory automation system, Machine-to-machine communication, quality management, maintenance system
Cybersecurity	With the increased connectivity and use of standard communications protocols, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats is increasing.	Automation system security, network security, access control, encryption, software security, physical security

TECHNOLOGY PILLARS	DESCRIPTION OF THE PILLARS	SYSTEMS OR PROGRAMS USED IN THE INDUSTRIES
Augmented Reality	Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices - provide workers with real-time information to improve decision-making and work procedures	Real-time data for training, maintenance, quality management, product design, product assembly and production
Simulation	Simulations will leverage real-time data to mirror the physical world in a virtual model, which can include machines, products, and humans. This allows operators to test and optimize the machine settings for the next product in line in the virtual world before the physical changeover, thereby driving down machine setup times and increasing quality	Pre-process/production analysis such as parts produce per time, lead time for a product, machines and robots work rate, design and balancing, and programming robot.

During discussions and surveys, common issues identified include a shortage of skilled workers, low wages, talent gaps, adapting to technological changes, and inadequate facilities. Interestingly, foreign labour dependency is also considered a major problem across all areas of expertise. These issues were later included in the FD instrument and given to SME to be answered during the FGD2. Then the results of the FD in shown in Table 3.7.

Table 3.7 Other issues related to Manufacture of Paper and Paper Products industries.

ISSUES	DETAILS
Career advance opportunities	No clear direction on career advancement.
Competency development	Employee development in terms of competency or specific skills are lacking.
Poor leadership	Poor or improper leadership from superiors and management.
Employee benefits	Lack of employee benefits in terms of medical, protection and salary benefits.
Attitude management	Employees have poor or improper attitudes.
Unqualified employee	Superior or management positions are filled with unqualified personnel.
Management support	Lack of management support in some critical activities.
High turnover	Post-pandemic issues and offers from industries' competitors are better.

3.5 Phase 3: Evaluation of the OF

The third phase of this research project focuses on the OF evaluation. This phase aims to verify and test the usability of the proposed occupational framework for the C17 Manufacture of Paper and Paper Products. Representatives from the industry will be invited to participate in this phase of the research.

Table 3-8 Method for validation

Objective	Data collection methods	Sources of data / Respondents	Data analysis
To document and validate the OF for the industry in Malaysia based on the MSIC 2008 ver. 1.0.	a. International Conferences b. Workshop c. Site Visit	• OS and OR established from the previous phase will be presented in International Conferences or Seminars/workshops for the industry.	Presentation

In this research, two FGD sessions will be conducted to understand the context of various industries from the experience of the experts involved in the manufacturing of paper and paper products. FGD 1 was conducted on 19 and 20 August 2023 (FGD1), see Figure 3-2 and FGD2 was planned to be conducted on 7 October 2023 (FGD2). The objectives of FGD 1 are to understand the occupational structure for C17 groups and to establish the critical jobs and competencies in demand for each job title in the C17 division. Apart from that, these FGD also provide a platform to understand the issues and challenges of the C17 division. An OS had been developed during FGD1 which consists of 44 job titles. To confirm the developed OS, visits to selected industries was done. The details result and explanation of the OS are discussed in Chapter 4.

3.6 Conclusion

The justification of the chosen research methodology and data collection method (document review, focus group discussions) is covered in this section. Document review is chosen because it can provide details about the setting in which research participants operate and can be used to support or contradict evidence from other sources. Focus group discussions are used in this

research since they are a quick and effective technique to learn information while also generating new ideas through free discussion among the respondents. The findings on the Occupational Structure, Occupational Responsibilities and Description and competency in demand as identified by the FGD and industry surveys are presented in the next chapter, Chapter 4 Findings.

CHAPTER IV

FINDINGS

4.1 Introduction

This chapter presents the research findings based on the data collected from document review, focus group discussions (FGD) with subject matter experts, Fuzzy Delphi instrument and site visits. The findings are presented according to the objectives of this study, as described in Chapter 1. The first objective is to identify the relationship between previous research with current and future industrial needs. The second objective is to establish an Occupational Structure (OS) for the Manufacture of Paper and Paper Products sector based on MSIC 2008 by examining job areas, job titles, and relevant competency levels. The third and fourth objectives are to determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job title and to determine Occupational Descriptions (OD) for each job title in demand based on the proposed OS. This research will also present the jobs in demand and the critical job titles in the industry, as well as investigate the competencies in demand and job titles relevant to the technology and industrial revolution as the last objective. In this chapter, we also show how the OS relates to the National Occupational Skills Standards (NOSS) that are already in place.

4.2 Finding Analysis

This section provides the findings from the analysis of the document review, the focus group discussions (FGD) with the industry subject matter expert (SME) representatives including the Fuzzy Delphi instrument discussing the Manufacture of Paper and Paper Products division to develop the Occupational Framework (OF) for the industry. The discussion in this section will cover the main group under Division C17 of MSIC 2008, which is Group 170: Manufacture of paper and paper products. The structure in this section will be based on the objectives of the study as below:

a) To identify the relationship between previous research with current and

future industrial needs.

b) To establish Occupational Structure (OS) for the C17 Manufacture of paper and paper products sector based on MSIC 2008 by examining job areas, job titles and relevant competency levels.

c) To determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job title.

d) To determine Occupational Descriptions (OD) for each job title in demand based on the proposed OS.

e) To identify the critical job titles and jobs in demand in the Manufacture of paper and paper products section.

4.2.1 Objective 1: a) To identify the relationship between previous research with current and future industrial needs.

As per the findings of the document analysis in Chapter 2, it has been concluded that there is an urgent need to update the Occupational Framework (OF) for the manufacturing of paper and paper products.

Comparison with the listed group of the C17 division in MSIC2008 shows that there are 1 group (C1701 group) 3 classes (1701, 1702 and 1709). The details of the group and classes are shown in Table 4.1.

Table 4-1 C17 Manufacture of paper and paper products Category listed in MSIC2008.

Category	Code	Description
Section	C	Manufacturing
Division	17	Manufacture of Paper and Paper Products
Group	170	Manufacture of Paper and Paper Products
Class	1701	Manufacture of pulp, paper, and paperboard
	1702	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
	1709	Manufacture of other articles of paper and paperboard

Another document to be looked at established by the government is Malaysia's Classification of Product by Activity (MCPA2009). This document established products and services involved in specific divisions that are the same as listed in MSIC2008. It was founded that in MCPA2009 for C17 Manufacture of Paper and Paper Products matched the group and classes in MSIC2008. A total number of products listed in MCPA2009 is 236 products including pulp, paper and paperboard, corrugated paper and paperboard of containers and other articles of paper and paperboard.

4.2.2 Future industrial needs.

Chapter 2 provides an overview of the existing literature on the subject. The analysis suggests that there is a pressing requirement to create and revise the Occupational Framework (OF) for the C17 division industry. The industry has been significantly influenced by developments in technologies, digitalisation, and sustainability practices, which necessitate the provision of new skills to workers, government intervention and the matching of skills provided by training and educational institutes with the industry. Table 4.2 summarise the Current and future needs of the paper manufacturing industry.

In addition, due to the high cost of capital investment required, many players in the industry are still lagging in adopting Industry 4.0 technology, and workers need to be empowered with new technology and IR tools to improve production processes and overall competitiveness.

In Chapter 2, several stakeholders have been identified as relevant to the C17 division. These stakeholders include industry players, government agencies, training and educational institutions, and related associations.

Table 4-2 Description of Current and future needs of Paper manufacturing Industry.

Description	**Current situation**	**Future Needs**
Industry Revolution Technology	1. Many players in the industry are still lagging in adopting Industry 4.0 technology. 2. Workers need to be empowered with new technology and IR	Digital Transformation: The paper industry is adapting to digital transformation by integrating advanced technologies and digital solutions. This includes implementing

Description	Current situation	Future Needs
	tools to improve production processes and overall competitiveness	automation and digitisation in production processes, utilising data analytics and artificial intelligence for optimisation and predictive maintenance, adopting e-commerce and online platforms for sales and logistics, and utilising digital innovations for quality control and supply chain management (ABB, 2020).
Governing and Legislation	1. Many policy and regulatory frameworks that affect the C17 industry, such as environmental regulations and safety standards. 2. Compliance with these regulations can be costly and time-consuming, and there is a necessity for streamlined regulatory frameworks that are helpful for the industry's growth.	The government has a critical role to act in the development and growth of the C17 division. It can provide regulations, policies, and financial incentives to support the industry's growth and development. For example, the government can offer tax breaks or subsidies to companies that invest in Industry 4.0 technology or grant training to workers.
Training and educational	1. Present skills mismatch linked in the document analysis means that the skills being taught may not bring into line with the needs of the industry	The link between educational institutions and industry players to ensure that the training being offered is significant and up to date

The government has a critical role to act in the development and growth of the C17 division. It can provide regulations, policies, and financial incentives to support the industry's growth and development. For example, the government can offer tax breaks or subsidies to companies that invest in Industry 4.0 technology or grant training to workers.

Furthermore, many policy and regulatory frameworks that affect the C17 industry, such as environmental regulations and safety standards. Compliance with these regulations can be costly and time-consuming, and there is a necessity for streamlined regulatory frameworks that are helpful for the industry's growth.

Training and educational institutions are also important stakeholders in the C17 division. They are accountable for permitting the necessary skills and knowledge to workers in the industry. However, the present skills mismatch linked in the document analysis means that the skills being taught may not be in line with the needs of the industry. Therefore, there is a need to boost the link between educational institutions and industry players to ensure that the training being offered is significant and up to date.

Certification bodies also play a vital role in the C17 division, as they offer recognition and assurance of quality to industry players and customers. However, the absence of standardisation across the value chain, as identified in the document analysis, means that there is a need for more coordination and standardisation of certification obligations.

The paper industry is evolving to meet future industrial needs by incorporating several key trends and requirements. Some of the future industrial needs for the paper industry include:

1. Sustainability and Circular Economy: With growing environmental concerns, the paper industry is expected to continue its focus on sustainability and implementing circular economy principles. This includes using renewable, responsibly sourced raw materials, minimising water and energy usage, reducing waste through recycling and efficient production processes, and adopting environmentally friendly practices throughout the supply chain (RVJ, 2020).

2. Digital Transformation: The paper industry is adapting to digital transformation by integrating advanced technologies and digital solutions. This includes implementing automation and digitisation in production processes, utilising data analytics and artificial intelligence for optimisation and predictive maintenance, adopting e-commerce and online platforms for sales and logistics, and utilizing digital innovations for quality control and supply chain management (ABB, 2020).

3. Advanced Materials and Packaging Solutions: The future industrial needs for the paper industry include developing advanced paper-based materials and innovative packaging solutions. This may involve creating high-performance packaging materials with improved strength, durability, and eco-friendliness. Additionally, developing or integrating functional coatings, barrier films, and smart features in paper-based products can expand their applications and meet changing consumer demands.

4. Customisation and Personalisation: As consumer preferences continue to evolve, the paper industry is moving towards providing more personalized and customized products and services. This includes offering tailored packaging options, printing solutions, and speciality papers to cater to individual needs and unique branding requirements.

5. Collaboration and Partnerships: Future industrial needs for the paper industry involve fostering collaboration and partnerships with other sectors, such as technology companies, researchers, and sustainability organisations. By joining forces and promoting knowledge exchange, the paper industry can stay abreast of the latest innovations, learn from best practices, and drive collective efforts towards sustainable and efficient industrial practices.

It is worth noting that specific industrial needs for the paper industry may vary based on regional regulations, market demands, and evolving societal expectations.

In conclusion, the C17 division is impacted by various stakeholders, policies, and regulations, and there is a need for cooperation among all stakeholders to ensure the industry's sustainable growth and development.

4.2.3 Objective 2: To establish Occupational Structure (OS) for the Manufacture of Paper and Paper Products division based on MSIC 2008 by examining job areas, job titles and relevant competency level.

In establishing the OS for the C17 division, several steps had been taken. These as mentioned in Chapter 3 Methodology include Focus Group Discussion, site visits and verification. This section will describe the findings during the action taken.

4.2.3.1 Focus Group Discussion (FGD) 1

FGD 1 was conducted on 19 and 20 August 2023 at The Sunway Hotel and seven invited experts from industries related to C17 division attended these two days sessions. The objectives of FGD 1 are to discuss and develop the occupational structure and occupational responsibilities.

The first draft of C17 OS was successfully developed. This drafted OS was then verified by site visits and expert verifications. The details results and explanation of the OS are discussed in this chapter. The remaining data collected during this stage is to feed the purpose of developing the Fuzzy Delphi instrument for the next stage of the study.

(a) (b) (c)

Figure 4-1 Focus Group Discussion being held on 19 and 20 August 2023

4.2.3.2 Occupational Structure (OS)

Occupational Structure (OS) refers to the aggregate distribution of occupations in society, defined by skill level, economic function, or social rank.

Based on the Focus Group Discussion (FGD) with the experts' representatives from every industry related to the C17 division, the OS for Group C170 has been successfully developed. Table 4.3 summarises the overall number of job titles in the C170 group. Six job areas managed to be listed during the FGD, with 44 overall job titles identified, 35 critical job titles and 15 job titles relevant to the Industrial Revolution within the Manufacturing of Paper and Paper Products.

Table 4-3 Summary of Job Areas and Titles in C17: Manufacture of Paper and Paper Products

Occupational Structure (OS)	Total Identified Job Areas	Total Identified Job Titles	Total Job Titles Relevant to Industrial Revolution	Total Critical Job & Relevant to Industrial Revolution
C170: Manufacture of paper and paper products	6	44	15	7

Manufacture of paper and paper products (C170) contains 6 major job areas that are essential and important to the paper production process. The explanation of the job areas is as follows:

1. Raw Material – The area involves the process of receiving raw materials including virgin fibre (logs or chips) and/or baled or loose recycled fibre of various types. The raw material is sorted and graded by quality and stored for future use. When required the material is delivered in prescribed amounts to a transport system to the pulp mill for processing.
2. Pulp Mill or Stock Preparation (Production) – The area involves the process of preparing stock from the Raw Material department for delivery to the paper machine. The process involves many stages including but not limited to converting chips into pulp (virgin fibre), washing, bleaching, refining, screening, cleaning, thickening, and storing for delivery to the paper machine.
3. Pulp Mill or Stock Preparation (Quality) – The area involves quality assurance of each stage in the pulp mill process to meet the requirements of the paper machine production schedule. This involves taking samples at predefined locations in the process for laboratory testing or the use of automation to monitor quality parameters if installed to meet quality specifications.
4. Paper Mill (Production) – The area involves mechanized equipment to convert the pulp slurry into the final paper grade. This includes but is not limited to the following steps in the process. Receiving the pulp from the pulp mill, further cleaning for lightweight contaminants, dilution, dying, chemical addition (as required by paper type), forming, pressing, drying, and surface conditioning (sizing, calendaring). The paper is wound onto a spool creating a large parent roll ready for converting to final product.

5. Paper Mill (Quality) – The area involves quality assurance at specific stages in the paper mill process to meet the requirements of the paper specification to meet the customers' expectations. This involves taking physical samples at predefined locations in the process for laboratory testing or the use of automation to ensure quality specifications are met. The laboratory testing is also used to ensure paper machine automation is calibrated.
6. Converting Plant – The area involves the transformation of the parent roll into the desired size and product. This may include but not limited to embossing, slitting, perforating, printing, die cutting, and others as required by the customers.

The OS of the C170 group is tabulated, presented, and summarised in Table 4.5, which presents the overall job areas and job title. The table also shows critical job titles, job titles relevant to the Industrial Revolution, and the combination of both.

A series of site visits had been done to different C17 division companies. Figure 4.2 shows the pictures of site visits to Nibong Tebal Paper Mills Sdn Bhd, Muda Paper Mills Sdn Bhd and Percetakan Mun Sun Sdn Bhd. During the site visits, feedback from industry representatives was used to refine and finalize the occupational framework, ensuring that it accurately reflects the skills and competencies required to develop the OF.

(a)

(b)

(c)

Figure 4-2 Site Visits to Paper manufacturers (a) NTPM Sdn Bhd on 7th Sept 2023, (b) Muda Papermills Sdn Bhd on 11th July 2023 and (c) Percetakan Mun Sun Sdn Bhd on 1st Dec 2023

Furthermore, the findings were also presented at an International Conference on Sustainability Education Development 2023 held in University Malaya on 25th October 2023. Figure 4.3 shows the presentation of the findings.

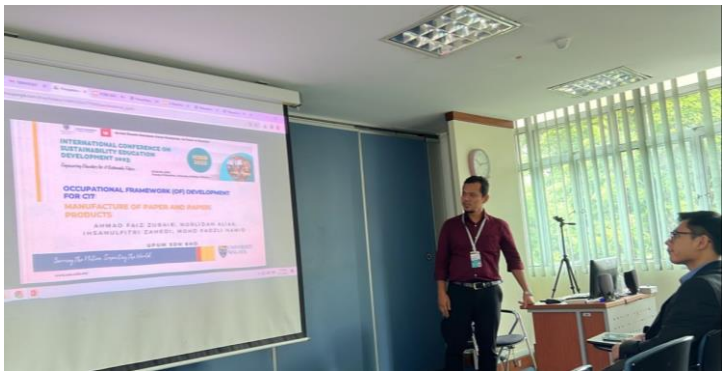

Figure 4.3 Presentation of C17 findings at ICSED on 25th Oct 2023

Apart from the presentation at the International Conference, another presentation was done online to industrial and academic practitioners of the C17 division. The practitioners were among the people who were not from the existing list of SME listed in both FGD's being organised. The presentation was done on 8 of December 2023. Figure 4.4 shows the screen shot of the meeting. This presentation was done to validate the findings to make sure it is significant to industrial practice.

Figure 4.4 Presentation of the finding to C17 practitioners on 8th December 2023

Table 4-4 Occupational Structure – C170

SECTION	C	MANUFACTURING				
DIVISION	17	MANUFACTURE OF PAPER AND PAPER PRODUCTS				
GROUP	C170	MANUFACTURE OF PAPER AND PAPER PRODUCTS				
AREA	RAW MATERIAL	PULP MILL / STOCK PREPARATION (PRODUCTION)	PULP MILL / STOCK PREPARATION (QUALITY)	PAPER MILL (PRODUCTION)	PAPER MILL (QUALITY)	CONVERTING PROCESS
Level 8	NJT	NJT	NJT	NJT	NJT	NJT
Level 7	NJT	NJT	NJT	NJT	NJT	NJT
Level 6	NJT	Superintendent**/ Pulp Mill Manager**	Technical Manager**	Superintendent**/ Paper Machine Manager **	Technical Manager**	Superintendent**/ Section manager**
Level 5	NJT	Production Executive***/ Production Engineer***	Process Engineer***/ Quality Engineer***	Production Executive***/ Production Engineer***	Process Engineer***/ Quality Engineer***	Process Engineer***
Level 4	Senior Technician*	Senior Technician*	Senior Technician*	Senior Technician*	Senior Technician*	Production Planner *
Level 3	Line Leader*	-DCS Operator*	Field Technician*	Machine Tender*/ Back Tender*/ Winder Man*	Field Technician*	Line Leader*
Level 2	Storekeeper/ QC Operator*	Bale Feeder*/ Pulper man*/ Ragger Man*	QC Technician*/ Reject handler*	QC Technician*	QC Technician*	Handler*/ QC Technician*
Level 1	NJT	NJT	NJT	NJT	NJT	Printing Operator*/ Packaging Operator*

NJT – No Job Title
** Critical Job Title*
*** Jobs relevant to technology and industrial revolution*
**** Critical Jobs and jobs relevant to technology and industrial revolution*

Table 4-5 Summary of Job Titles in C170

JOB AREA	JOB LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
RAW MATERIALS	NJT	2	1	1	NJT	NJT	NJT	NJT
PULP MILL / STOCK PREPARATION (PRODUCTION)	NJT	3	1	1	2	2	NJT	NJT
PULP MILL / STOCK PREPARATION (QUALITY)	NJT	2	1	1	2	1	NJT	NJT
PAPER MILL (PRODUCTION)	NJT	1	3	1	2	2	NJT	NJT
PAPER MILL (QUALITY)	NJT	1	1	1	2	1	NJT	NJT
CONVERTING PROCESS	2	2	1	1	1	2	NJT	NJT

DETAILS	LEVEL							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
IDENTIFIED JOB TITLES (PER LEVEL)	2	11	8	6	9	8	0	0
TOTAL IDENTIFIED JOB TITLE	44							
CRITICAL JOB TITLES (PER LEVEL)	2	10	8	6	9	0	0	0
TOTAL CRITICAL JOB TITLES	35							
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION (PER LEVEL)	0	0	0	0	9	8	0	0
JOB TITLES RELEVANT TO TECHNOLOGY & INDUSTRIAL REVOLUTION	17							

The list of jobs in demand and critical jobs for respective group under the Manufacture of Paper and Paper Products are described in Table 4-6.

Table 4-6 Critical jobs and Jobs relevant to industrial technology under the C170 group

JOB AREA	CRITICAL JOBS	JOBS RELEVANT TO INDUSTRIAL TECHNOLOGY
Raw Materials	1. QC Operator 2. Line Leader 3. Senior Technician	NJT
Pulp Mill / Stock Preparation (Production)	1. Bale Feeder 2. Pulper Man 3. Ragger Man 4. DCS Operator 5. Senior Technician 6. Production Executive 7. Production Engineer	1. Superintendent 2. Pulp Mill Manager 3. Production Engineer 4. Production Executive
Pulp Mill / Stock Preparation (Quality)	1. Reject handler. 2. QC Technician 3. Field Technician 4. Senior Technician 5. Process Engineer 6. Quality Engineer	1. Technical Manager 2. Process Engineer 3. Quality Engineer
Paper Mill/ Paper Machine (Production)	1. QC Technician 2. Machine Tender 3. Back Tender 4. Winder Man 5. Senior Technician 6. Production Executive 7. Production Engineer	1. Production Engineer 2. Production Executive 3. Superintendent 4. Paper Machine Manager
Paper Mill/ Paper Machine (Quality)	1. QC Technician 2. Field Technician 3. Senior Technician 4. Process Engineer 5. Quality Engineer	1. Technical Manager 2. Process Engineer 3. Quality Engineer
Converting Process	1. Printing Operator 2. Packaging Operator 3. Handler 4. QC Technician 5. Line Leader 6. Production Planner 7. Process Engineer	1. Process Engineer 2. Superintendent 3. Section Manager

4.2.4 Objective 3: To determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job title.

Occupational Responsibility (OR) refers to the duty or obligation to effectively carry out a task, either assigned by someone else or self-imposed due to promises or circumstances. It encompasses the core aspects of work delineated by the job titles outlined in the Occupational Structure (OS), establishing an employee's accountability. Employee accountability involves fulfilling assigned duties, performing job-required tasks, and being present at work to contribute to the organisation's objectives. This section focuses on explaining and discussing the operational responsibilities (OR) associated with job titles within the C17 division, categorising them based on their respective job areas and levels. Specific attention will be given to describing the job titles that hold primary responsibility for the key functions within these industries.

The OR will serve as the future reference for the development of the National Occupational Skills Standard (NOSS) for the Manufacture of Paper and Paper Products occupation under the MSIC 2008, Division C17. The OR for the job titles in this study are tabulated in Table 4-7 until Table 4-9

Table 4-7 Occupational Responsibility (OR) C170 first and second area (1/ 4).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	RAW MATERIAL HANDLING	PULP MILLING / STOCK PREPARATION (PRODUCTION)
LEVEL 8	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title
LEVEL 6	No Job Title	**Superintendent/ Pulp Mill Manager** 1. Managing the data analysis (R&D) for current machine issues/troubleshooting, optimising cost, development of new products and customer complaint. 2. Preparing department budgeting (including safety equipment, personnel, equipment and etc.). 3. Providing training framework for the department technicians and engineers on the plant process, new process approach and ISO protocols. 4. Possessing high level of competency and experience in pulp and papermaking industry. 5. Setting goals for the department. 6. Managing employee hiring for the respective department.

Table 4-7: Occupational Responsibility (OR) C170 first and second area (2/ 4).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	RAW MATERIAL HANDLING	PULP MILLING / STOCK PREPARATION (PRODUCTION)
LEVEL 5	No Job Title	**Production Executive /** 7. Training operators. 8. Managing shift operators. 9. Managing shift schedules. 10. Developing new SOP. 11. Providing guidance/ training for operating team of plant production and plant safety. 12. Reviewing, updating, maintaining department SOP for safety, LOTO, and processes. 13. Working with production planner to schedule production run. 14. Conducting regularly scheduled safety meetings with operators. **Production Engineer** 1. Troubleshooting and technical support of department equipment if there is an interruption in production. 2. Analyzing production data and preparing report. 3. Managing 5S and ISO documentation for respective department. 4. Assisting LOTO during production shutdowns. 5. Scheduling operation schedule downtime/ fabric change requirements. 6. Optimising production efficiency.

Table 4-7: Occupational Responsibility (OR) C170 first and second area (3/ 4).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	RAW MATERIAL HANDLING	PULP MILLING / STOCK PREPARATION (PRODUCTION)
LEVEL 4	**Senior Technician** 1. Supervising & fulfilling production requirements. 2. Providing guidance for operators & forklift drivers. 3. Monitoring operators work performance / Complying with work instructions SOP. 4. Assigning work tasks to operators. 5. Ensuring safety in place & enforced. 6. Preparing shift report / production report. 7. Providing regular safety briefing to operators to fulfill requirements from Fire Department.	**Senior Technician** 1. Supervising & fulfilling production requirements. 2. Providing guidance for operators & forklift drivers. 3. Monitoring operators work performance / Complying with work instructions SOP. 4. Assigning work tasks to operators. 5. Ensuring safety in place & enforced. 6. Preparing shift report / production report. 7. Providing regular safety briefing to operators to fulfill requirements from Fire Department.
LEVEL 3	**Line Leader** 1. Supervising & fulfilling production requirements. 2. Providing guidance to (operator & forklift driver) 3. Ensuring safety in place & enforced. 4. Preparing shift report / production report	**DCS Operator** 1. Daily/routine field checking with checklist (daily/weekly/monthly). 2. Able to recognize together with team leader on troubleshooting on plant operational related issues. 3. Assisting plant safety procedure and following the LOTO system when required. 4. Daily/routine field checking with checklist (daily/weekly/monthly).

Table 4-7: Occupational Responsibility (OR) C170 first and second area (4/ 4).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	RAW MATERIAL HANDLING	PULP MILLING / STOCK PREPARATION (PRODUCTION
LEVEL 2	**Storekeeper** 1. Daily field checking. 2. Able to identify DCS operator/team leader on troubleshooting on plant operational related issues. 3. Able to identify plant safety procedures and follow the LOTO system when required. 4. Conducting 5S/housekeeping in the plant. 5. Handling material with forklift.	**Bale Feeder / Pulper / Ragger** 1. Daily field checking in Bale feeding, pulp machine and raggering. 2. Able to recognize together with team leader on troubleshooting on plant operational related issues. 3. Assisting plant safety procedure and following the LOTO system when required. 4. Conducting 5S/housekeeping in the plant. 5. Handling material with forklift.
LEVEL 1	**No Job Title**	**No Job Title**

Table 4-8 Occupational Responsibility (OR) C170 third and Fourth area (1/ 4).

	(C) MANUFACTURING	
DIVISION	**(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS**	
GROUP	**(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS**	
AREA	**PULP MILLING / STOCK PREPARATION (QUALITY)**	**PAPER MIL (PRODUCTION)**
LEVEL 8	**No Job Title**	**No Job Title**
LEVEL 7	**No Job Title**	**No Job Title**
LEVEL 6	**Technical Manager** 1. Managing QC/QA, developing continuous improvement projects in the mill in coordination with the head of department. 2. Managing the data analysis (R&D) for current machine issues/troubleshooting, optimising cost, development of new products and customer complaints. 3. Preparing department budgeting (including safety equipment, personnel, equipment and etcetera). 4. Providing training framework for the department technicians and engineers on the plant process, new process approach and ISO protocols. 5. Setting goals for the department. 6. Leading ISO Audit requirements 7. Managing employee hiring for the respective department.	**Superintendent / Paper Machine Manager** 1. Managing the data analysis (R&D) for current machine issues/troubleshooting, optimising cost, development of new products and customer complaints. 2. Preparing department budgeting (including safety equipment, personnel, equipment and etc.). 3. Providing training framework for the department technicians and engineers on the plant process, new process approach and ISO protocols. 4. Possessing a high level of competency and experience in pulp and papermaking industry. 5. Setting goals for the department. 6. Managing employee hiring for the respective department.

Table 4-8.: Occupational Responsibility (OR) C170 third and Fourth area (2/ 4).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	PULP MILLING / STOCK PREPARATION (QUALITY)	PAPER MIL (PRODUCTION)
LEVEL 5	**Process Engineer:** 1. Troubleshooting and technical support for the equipment of the department if any interruption of production process occurs. 2. Developing new process SOP. 3. Providing guidance/training for operating team of plant production and plant safety. 4. Analysing production data and preparing report. 5. Implementing Continuous Improvement programs (new equipment installation, chemical trials and etc). 6. Managing chemical use optimisation and inventory levels. 7. Reviewing/ updating/ maintaining SOP/ work instructions for safety and process. 8. Working with safety department and conduct Chemical emergency drill periodically. **Quality Engineer** 1. Maintaining lab equipment (calibration up to date) 2. Preparing & analysing testing lab report to external stakeholder. 3. Providing training to lab technicians. 4. Developing lab SOP and testing procedure. 5. Involved with the development of quality specifications for new products. 6. Providing lab safety training & briefing to lab technician. 7. Coordinating the production team on product quality. 8. Preparing, maintaining, and updating ISO documentation.	**Production Executive /** 1. Training operators. 2. Managing shift operators. 3. Managing shift schedules. 4. Developing new SOP. 5. Providing guidance/ training for operating team of plant production and plant safety. 6. Reviewing, updating, maintaining department SOP for safety, LOTO, and processes. 7. Working with production planner to schedule production run. 8. Conducting regularly scheduled safety meetings with operators. **Production Engineer** 1. Troubleshooting and technical support of department equipment if there is an interruption in production. 2. Analyzing production data and preparing report. 3. Managing 5S and ISO documentation for respective department. 4. Assisting LOTO during production shutdowns. 5. Scheduling operation schedule downtime/ fabric change requirements. 6. Optimising production efficiency.

Table 4-8.: Occupational Responsibility (OR) C170 third and Fourth area (3/ 4).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	PULP MILLING / STOCK PREPARATION (QUALITY)	PAPER MIL (PRODUCTION)
LEVEL 4	**Senior Technician** 1. Supervising & fulfilling production requirements. 2. Providing guidance for operators & forklift drivers. 3. Monitoring operators work performance / Complying with work instructions SOP. 4. Assigning work tasks to operators. 5. Ensuring safety in place & enforced. 6. Preparing shift report / production report. 7. Providing regular safety briefing to operators to fulfill requirements from Fire Department.	**Senior Technician** 1. Supervising & fulfilling production requirements. 2. Providing guidance for operators & forklift drivers. 3. Monitoring operators work performance / Complying with work instructions SOP. 4. Assigning work tasks to operators. 5. Ensuring safety in place & enforced. 6. Preparing shift report / production report. 7. Providing regular safety briefing to operators to fulfill requirements from Fire Department.
LEVEL 3	**Field Technician** 1. Daily/routine field check with checklist (daily/weekly/ monthly) 2. Assisting DCS operator/team leader on troubleshooting on plant operational related issues. 3. Ensuring all safety procedures and LOTO system are strictly followed. 4. Conducting Level 1 maintenance in the plant such as adjusting seal water, greasing, etc. 5. Conducting 5S/ housekeeping in the plant. 6. Report any abnormalities in the process immediately to the supervisor if there will be a negative effect on production. 7. Ensuring all quality parameters are met. 8. Monitoring DCS for potential issues and taking preemptive steps to mitigate impacts on production and/or quality. 9. Conducting inspection on final product quality in area of responsibility (wet end, reel, winder)	**Machine Tender/Back Tender/Winder** 1. Daily/routine field check with checklist (daily/weekly/ monthly) 2. Assisting DCS operator/team leader on troubleshooting on plant operational related issues. 3. Ensuring all safety procedures and LOTO system are strictly followed. 4. Conducting Level 1 maintenance in the plant such as adjusting seal water, greasing, etc. 5. Conducting 5S/ housekeeping in the plant. 6. Report any abnormalities in the process immediately to the supervisor if there will be a negative effect on production. 7. Ensuring all quality parameters are met. 8. Monitoring DCS for potential issues and taking preemptive steps to mitigate impacts on production and/or quality. 9. Conducting inspection on final product quality in area of responsibility (wet end, reel, winder)

Table 4-8: Occupational Responsibility (OR) C170 first and second area (4/ 4).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	PULP MILLING / STOCK PREPARATION (QUALITY)	PAPER MIL (PRODUCTION)
LEVEL 2	**QC Technician / Reject Handler** 1. Daily field checking. 2. Able to recognize together with DCS operator/team leader on troubleshooting on plant operational related issues. 3. Assisting plant safety procedure and following the LOTO system when required. 4. Conducting 5S/housekeeping in the plant.	**QC Technician** 1. Daily field checking. 2. Able to recognize together with DCS operator/team leader on troubleshooting on plant operational related issues. 3. Assisting plant safety procedure and following the LOTO system when required. 4. Conducting 5S/housekeeping in the plant.
LEVEL 1	No Job Title	No Job Title

Table 4-9 Occupational Responsibility (OR) C170 third and Fourth area (1/ 5).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	PAPER MILL (QUALITY)	CONVERTING PROCESS
LEVEL 8	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title
LEVEL 6	**Technical Manager** 1. Manage QC/QA, developing continuous improvement projects in the mill in coordination with the head of department. 2. Manage the data analysis (R&D) for current machine issues/troubleshooting, optimising cost, development of new products and customer complaint. 3. Preparing department budgeting (including safety equipment, personnel, equipment etc.). 4. Providing training framework for the department technicians and engineers on the plant process, new process approach and ISO protocols. 5. Possessing a high level of competency and experience in pulp and papermaking industry. 6. Setting of goals for the department. 7. Lead ISO Audit requirements 8. Managing employee hiring for the respective department.	**Section Manager** 1. Responsible for preparing annual departmental budget. 2. Managing employee hiring for the respective department. 3. Managing/ executing company/ department goals & direction/ KPI. 4. Providing department management report for the general manager. 5. Collaborating with other heads of departments. 6. Responsible for ensuring the KPI of the department including OEE, safety and environmental concerns are met. 7. Approving & monitoring continuous improvement projects. 8. Collaborating with maintenance department to minimise equipment downtime including preventative maintenance. 9. Responsible as the decision maker for any department activities

Table 4-9.: Occupational Responsibility (OR) C170 third and Fourth area (2/ 5).

SECTION	**(C) MANUFACTURING**	
DIVISION	**(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS**	
GROUP	**(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS**	
AREA	**PAPER MILL (QUALITY)**	**CONVERTING PROCESS**
LEVEL 5	**Process Engineer:** 1. Troubleshooting and technical support of department equipment if any interruption of production process occurs. 2. Developing new process SOP. 3. Providing guidance and training to operator team for plant process and plant safety. 4. Analysis of production data and report preparation. 5. Implementing Continuous Improvement programs (New equipment installation, chemical trials and etc). 6. Manage chemical use optimisation and inventory levels. 7. To review/ update/ maintain SOP/ work instructions for safety and process. 8. Work with the safety department and conduct Chemical emergency drill periodically.	**Process Engineer:** 1. Troubleshooting and Technical support department equipment if there is any interruption of production process. 2. Develop new process SOP's. 3. Provide guidance and training to operator team for plant process and plant safety. 4. Analysis of production data and report preparation. 5. Implementing Continuous Improvement programs (New equipment installation, chemical trials and etcetera). 6. Manage chemical use optimisation and inventory levels. 7. To review/ update/ maintain SOP/ work instructions for safety and process. 8. Work with safety department and conduct Chemical emergency drill periodically.

Table 4-9.: Occupational Responsibility (OR) C170 third and Fourth area (3/ 5).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	PAPER MILL (QUALITY)	CONVERTING PROCESS
LEVEL 5 (continued)	**Quality Engineer** 1. Maintaining lab equipment (calibration up to date) 2. Preparing & analysing testing lab report to external stakeholder. 3. Providing training to lab technician 4. Developing lab SOP and testing procedure. 5. Involved with the development of quality specifications for new products. 6. Providing lab safety training & briefing to lab Technician. 7. Coordinating the production team on product quality 8. Prepare, maintain, and update ISO documentation.	
LEVEL 4	**Senior Technician** 1. Supervising & fulfilling production requirements. 2. Providing guidance for operators & forklift drivers. 3. Monitoring operators work performance / Complying with work instructions SOP. 4. Assigning work tasks to operators. 5. Ensuring safety in place & enforced. 6. Preparing shift report / production report. 7. Providing regular safety briefing to operators to fulfill requirements from Fire Department.	**Production Planner** 1. Providing production planning to the production team 2. Obtaining updated sales forecast from the sales team. 3. Coordinating materials with front & back end 4. Preparing production capacity forecast. 5. Developing contingency plans to address production challenges. 6. Proficiency in ERP software system to manage production schedule.

Table 4-9: Occupational Responsibility (OR) C170 third and Fourth area (4/ 5).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	PAPER MILL (QUALITY)	CONVERTING PROCESS
LEVEL 3	**Field Technician** 1. Daily/routine field check with checklist (daily/weekly/ monthly) 2. Assisting DCS operator/team leader on troubleshooting on plant operational related issues. 3. Ensuring all safety procedures and LOTO system are strictly followed. 4. Conducting Level 1 maintenance in the plant such as adjusting seal water, greasing, etc. 5. Conducting 5S/ housekeeping in the plant. 6. Report any abnormalities in the process immediately to the supervisor if there will be a negative effect on production. 7. Ensuring all quality parameters are met. 8. Monitoring DCS for potential issues and taking preemptive steps to mitigate impacts on production and/or quality. 9. Conducting inspection on final product quality in area of responsibility (wet end, reel, winder)	**Line Leader** 1. Supervising & fulfilling production requirements. 2. Providing guidance for operators & forklift drivers 3. Ensuring safety in place & enforced. 4. Preparing shift report / production report.

Table 4-9: Occupational Responsibility (OR) C170 third and Fourth area (5/ 5).

SECTION	(C) MANUFACTURING	
DIVISION	(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
GROUP	(170) MANUFACTURE OF PAPER AND PAPER PRODUCTS	
AREA	PAPER MILL (QUALITY)	CONVERTING PROCESS
LEVEL 2	**QC Technician** 1. Daily field checking. 2. Assisting DCS operator/team leader on troubleshooting on plant operational related issues. 3. Assisting plant safety procedure and following the LOTO system when required. 4. Conducting 5S/housekeeping in the plant.	**Handler** 1. Daily field checking. 2. Assisting DCS operator/team leader on troubleshooting on plant operational related issues. 3. Assisting plant safety procedure and following the LOTO system when required. 4. Conducting 5S/housekeeping in the plant. 5. Handling material with forklift.
LEVEL 1	**No Job Title**	**Operator** 1. Ensuring the adhere and compliance of safety rules and procedures by adopting established safety code and practices and regulatory requirements to all employees working in Safe & Sound environment is in place. 2. Attending safety briefing and daily work assignment. 3. Pre-operation checking. 4. Trouble shooting packing equipment (Minor & Major). 5. Monitoring the equipment while operation in progress. 6. Recording in relevant forms for packaging machine operating parameters. 7. Checking relevant packaging material inventory. 8. Handling and taking over shifts. 9. Verifying finished goods quantity against the inventory sheet 10. Ensuring production schedule is met. 11. Issuing all rework materials due to weighing or printing problems efficiently.

4.2.5 To determine Occupational Description (OD) for each job title in demand based on the proposed OS.

Occupational Description (OD) is a comprehensive written statement that provides a general overview of a specific job, derived from the results of a job analysis. In this context, the OD pertains to job titles that are considered essential for the operations of the sector and are currently in high demand. The OD summarises the responsibilities, job level, and required competencies, encompassing knowledge, skills, and attributes relevant to the job. The detailed Occupational Description for this organisational field can be found in Annex 4.

4.2.6 To identify the critical jobs titles in the Manufacture of paper and paper products section.

This section will describe the findings of identifying the critical jobs titles, job in demand and propose job titles related to the industrial revolution technology for the Manufacture of Paper and Paper Products division. The method in setting the objective of the study is by Focus group discussion, Fuzzy Delphi (FD) method and site visit for verifications.

4.2.7 Fuzzy Delphi Instrument Result

The Fuzzy Delphi (FD) instruments were discussed during FGD2 that was held on 7 October 2023 at Bertam Resort Hotel attended by 10 SMEs of C17 division. FD instruments consist of 6 sections which are:

Section 1: Respondents Details
Section 2: Competencies in Demand
Section 3: Emerging Skills
Section 4: Occupations Related to Technology
Section 5: Jobs in Demand
Section 6: Related Issues

Fuzzy Delphi instrument is a valuable research tool that offers several advantages in decision-making processes. This instrument combines the advantages of the Delphi technique, which

involves obtaining expert opinions through multiple rounds of questionnaires, with the principles of fuzzy logic, which allow for the modeling and analysis of imprecise and uncertain information.

The demographic profile shown in Table 4-10 indicates that most of the respondents are over 40 years old and have at least 11 years of experience in their respective industries. Additionally, most of the respondents hold management-level positions and are based in Pulau Pinang area.

Table 4-10 Respondents' Details from Section 1 FD

Profile	Item	Quantity	Percentage (%)
Age	Below 20 years old	0	0
	20 – 29 years old	0	0
	30 – 39 years old	2	20
	40 – 49 years old	6	60
	Above 50 years old	2	20
Gender	Male	6	60
	Female	4	40
Year of Experience	Below 5 years	3	30
	6 – 10 years	1	10
	11 – 20 years	3	30
	21 – 30 years	3	30
	Above 30 years	0	0
Position in Organisation	Chief Executive Director	0	0
	Specialist / Director / General Manager / Senior Manager	2	20
	Manager / Engineer / Executive	0	0
	Assistant Engineer / Assistant Manager / Supervisor	3	30
	Others (Line Leader / Team Leader)	5	50
Organisational Location	Pahang	2	20
	Selangor	1	10
	Pulau Pinang	7	70

This section only discussed the demographic profile of the survey. The remaining results including jobs in demand, competencies in demand, jobs relevant to IR, emerging skills, and issues related to C17 industries are discussed later in this chapter.

4.2.8 Focus Group Discussion (FGD) 2

FGD 2 was conducted on 7 October 2023 at Bertam Resort Hotel and was attended by 10 experts from all industry groups for C17. The objectives of the FGD 2 are to finalise the developed OS, discuss FD instrument, establishing jobs in demand and critical jobs as well as jobs related to relevant technology in the C17 division. All the objectives in FGD 2 are managed to be completed during the session. Detailed explanation and result of the outcome of FGD 2 are discussed later in this chapter.

Figure 4.5 Focus Group Discussion 2 on 7 October 2023

4.2.9 Competencies in Demand

"Competencies in demand" refers to the skills, knowledge, and abilities that are increasingly required in the job market. These are the qualities that employers are eyeing for in candidates and are required to perform the tasks expected in a particular job. The competencies in demand contrast depending on the industry, location and existing state of the job market. The job skills in demand are ever-changing to exhibit the rapid shifts in the way the world operates. As new skills become more important, others become outdated.

This section discussed the competency that is currently on demand in the Manufacture of Paper and Paper Products division. Competency in demand is the essential or additional ability of a person to perform their job requirements and responsibilities accordingly with the industry obligation. This includes the knowledge, skills and attributes required to do the job.

Knowledge is described as the understanding of information that acquired through education or capability that could be benefited to perform a task. The competency to perform specific tasks or activities in an efficient and competent manner is defined as skills. Whereas attributes are related to the quality or characteristic of that is significant to the task.

The listed competencies in Chapter 3, Table 3-4 are very important to all job titles under the Manufacture of Paper and Paper Products and are essential for a graduate or candidate to have in order to be able to perform the job requirements and responsibilities under these industries. However, the level of importance may be differ depending on the job level and requirements.

The list of competencies was then asked in the Fuzzy Delphi instrument to determine which competencies are important to respective industries under the Manufacture of Paper and Paper Products and the result is shown in Table 4-11 until Table 4-14.

Table 4-11 Competencies in Demand (Knowledge) as Consensus by Fuzzy Delphi Instrument

Competencies in Demand (Knowledge)	**Total Acceptance (d<0.2)**	**Consensus Value**	**Defuzzification Value**	**Rank**
Quality & Safety Management	8	80	0.76	1
Industrial Automation Engineering	3	30	0.64	Rejected
Production, Fabrication, Installation and Assembly	4	40	0.60	Rejected
Project Management	4	40	0.59	Rejected

Competencies in Demand (Knowledge)	Total Acceptance (d<0.2)	Consensus Value	Defuzzification Value	Rank
Machining & Special Tooling	4	40	0.58	Rejected
Engineering Design & Development	3	30	0.55	Rejected

From the FD results, only one competency in demand can be agreed by all the panel members. The competency that only been agreed on was Quality and Safety Management. All panel members agreed on the knowledge that occupational member should have in the paper and paper product manufacturing industry. Other competencies in knowledge were not being agreed in the collective manner of all panels.

Table 4-12 Competencies in Demand (Skills) as Consensus by Fuzzy Delphi Instrument

Competency in Demand (Skills)	Total Acceptance (d<0.2)	Consensus Value	Defuzzification Value	Rank
Time Management	8	80%	0.760	1
Interpersonal Communication	9	90%	0.720	2
Problem Solving	9	90%	0.720	2
Quality Control Analysis	9	90%	0.720	2
Agile Mindset	9	90%	0.700	3
Aptitude for Technology and Equipment	9	90%	0.700	3
Troubleshooting	9	90%	0.700	3
Leadership	9	90%	0.694	4
Critical Thinking	9	90%	0.683	5
Operation and Control	9	90%	0.680	6
Written Communication	2	20%	0.663	Rejected

Competency in Demand (Skills)	Total Acceptance (d<0.2)	Consensus Value	Defuzzification Value	Rank
Operation Monitoring	5	50%	0.660	Rejected
Intrapreneurship	5	50%	0.620	Rejected
Equipment Maintenance	4	40%	0.583	Rejected
Installation	5	50%	0.547	Rejected

Among 15 skills listed in the FD instrument, 10 were agreed by SME to be important in C17 division. These skills were later being ranked by the FD. Time management is the most important skill required in the occupation, while three skills were ranked as the second important skills.

Table 4-13 Competencies in Demand (Attributes) as Consensus by Fuzzy Delphi Instrument

Competency in Demand (Attributes)	Total Acceptance (d<0.2)	Consensus Value	Defuzzification Value	Rank
Professionalism	9	90%	1	1
Multi-tasking / Flexibility	8	80%	0.98	2
Career Management	4	40%	0.96	3
Work Ethic	10	100%	0.8	4
Teamwork	10	100%	0.78	5
Ego Management	9	90%	0.76	6
Self-Learning	10	100%	0.7	7
Dependability	9	90%	0.6	8
Attention to Details	9	90%	0.58	9
Agility	10	100%	0.56	10
Independent	7	70%	0.5	11
Self-Management	9	90%	0.31	Rejected

For competencies in demand of Attributes, only one attribute was being rejected which is self-management. Other attributes were agreed as important in the occupation in C17 division. Professionalism and multi-tasking were agreed to be the most and second most important attributes. Although self-management was high in consensus value (90%), the defuzzification valued low (<0.5) therefore it must be rejected.

4.2.10 Jobs in Demand and Critical Jobs

Occupation is considered critical if they are skilled, sought-after, and strategic (TalentCorp, 2022). According to TalentCorp (2022), sought-after means demand for an occupation or job title which exceeds the supply of appropriately qualified workers despite efforts on the part of employers to gratify their demands and for aims not easily addressed through changes in employer hiring practices. Strategic intends that an occupation is focal to Malaysia's economic development objectives. A strategic occupation is one that is intimately linked to Malaysia's economic growth and the development of its knowledge-based economy. A job in demand refers to job positions or occupations that are currently high in demand within the labor market. These jobs typically have a high number of job openings and a relatively low supply of qualified candidates, leading to increasing competition for hiring and potentially higher wages. The demand for these jobs may be driven by various factors such as industrial growth, technological improvements, demographic changes and evolving skill requirements.

Critical jobs, on the other hand, are job positions that are considered crucial or essential for the function of organisations or the economy. These jobs are often characterised by their significance in providing essential services, maintaining critical infrastructure, ensuring public safety, or supporting key economic sectors. Critical jobs are typically identified based on their importance to society and the potential consequences of their absence or disruption. Despite an overlap between jobs in demand and critical jobs which may occur, they are not synonymous. Jobs in demand primarily reflect the current market dynamics and employer needs, whereas critical jobs reflect the broader societal or economic importance of specific

occupations. Critical jobs may not always be in high demand, and jobs in demand may not always be considered critical. The categorisation of jobs as in demand or critical may vary across industries, regions, and time periods according to specific circumstances and priorities.

The critical jobs and jobs in demand were characterised through the second FGD session and brainstorming session where the experts listed out the critical job and job in demand for their corresponding industries.

On the other hand, one of the sections in the FD is to identify the jobs in demand and critical jobs in the respondents' respective industry. The jobs in demand in the tabulated tables are listed based on the job titles and areas derived in the developed OS from the industries' experts. There is a total of 10 overall jobs in demand under the Manufacture of Paper and Paper Products division. The keys of the selected job in demand were based on consensus value of 70% obtained from FD. Results of the FD are shown in Table 4.14 below. In addition, data from the experts from FGD and data FD have identified the contributing factors to the shortage of jobs in demand in the industries. The explanations are as follow:

a) Lack of experience to execute the job requirement and responsibility.
b) High salary expectation or salary offered did not compensate well to the job requirement especially among graduates.
c) Lack of knowledge, skills, and competency among candidates.
d) High turnover due to more attractive salaries and benefits offered by competitors.
e) Contract-based jobs have appeared to be less attractive to the graduates who look for a more stable career.
f) Post-pandemic effect whereby manpower was reduced to a bare minimum during pandemic as well as their salary which have led to high turnover or resignation.

Table 4-14 Fuzzy Delphi result for job in demand for C17 division

Area	Job Titles	Consensus Value	Accepted/ Rejected
Raw Materials	Shift Supervisor	80%	Accepted
	Leader	80%	Accepted
	Storekeeper	90%	Accepted
	Qc Operator	10%	Rejected
Pulp Mill / Stock Preparation	Superintendent	40%	Rejected
	Pulp Manager	50%	Rejected
	Technical Manager	80%	Accepted
	Process Engineer	30%	Rejected
	Quality Engineer	30%	Rejected
	Production Executive	70%	Accepted
	Shift Supervisor	70%	Accepted
	Field Technician	50%	Rejected
	DCS Operator	30%	Rejected
	Reject Handler	80%	Accepted
	Bale Feeder	20%	Rejected
	Pulperman	20%	Rejected
	Raggerman	40%	Rejected
	QC Technician	70%	Accepted
Paper Mill/ Paper Machine	Superintendent	30%	Rejected
	Paper Machine Manager	30%	Rejected
	Technical Manager	20%	Rejected
	Process Engineer	10%	Rejected
	Quality Engineer	30%	Rejected
	Production Executive	60%	Rejected
	Shift Supervisor	90%	Accepted
	Machine Tender	20%	Rejected
	Back Tender	20%	Rejected
	Winder	30%	Rejected
	QC Technician	30%	Rejected
Converting Process	Superintendent	30%	Rejected
	Section Manager	30%	Rejected
	Process Engineer	90%	Accepted
	Production Planner	40%	Rejected
	Leader	20%	Rejected
	Handler	40%	Rejected
	QC Technician	50%	Rejected

4.2.11 Emerging Skills

In today's rapidly adjusting job market, it is crucial to keep pace with emerging skills and trends in order to stay competitive and relevant. This section exhibits the research findings on emerging skills, providing a comprehensive analysis of the most in-demand skills for various job titles. The findings will help to shed light on the skills that are becoming increasingly crucial in the job market and provide helpful insights for job seekers, employers, and policy makers. This section will also contribute to the ongoing discourse on the future of work and skill development and help advise training and professional development programs aimed at promoting the growth and competitiveness of the workforce. Emerging skills relate to the new and rapidly developing abilities and knowledge areas that are becoming increasingly important in various fields and industries. In the manufacturing of paper and paper products industries, workers may need to develop and adapt to emerging skills.

Emerging skills refer to new or rapidly evolving abilities and competencies that are in high demand in the job market due to technological improvements, global economy changes, and other factors. These skills are typically concerned with new technologies or digital transformation, data analysis, design thinking, and cross-cultural collaboration among others. Emerging skills are seen as key drivers of innovation and competitiveness, and individuals and organisations who have them are better equipped to adapt to the changing demands of the workplace.

Data from Table 4.15 showed that there are two (2) important emerging skills for C17 that are agreed by the SME. Digitalisation and Design and applying green technology rank the highest and second highest among other skills. Meanwhile other skills were rejected as the consensus value is less than 70%.

Table 4.15 Fuzzy Delphi results on Emerging Skills for C17 division.

Emerging Skills	Total Acceptance (d<0.2)	Consensus Value	Defuzzification Value	Rank
Digitalisation	8	80%	0.56	1
Designing and applying green technology	8	80%	0.54	2
Data automation and Internet of Things (IoT)	1	10%	0.61	Rejected
Environment, social and governance	5	50%	0.58	Rejected
Autonomous technology including machine learning	4	40%	0.55	Rejected
Drawing and designing 3D model drawing with the use of modern tools	6	60%	0.473333	Rejected
Designing artificial intelligent	2	20%	0.433333	Rejected
Designing virtual environments	6	60%	0.383333	Rejected

4.2.12 Jobs Relevant to Industrial Revolution

The integration of technology in industrial relations is driving significant changes in the job market and creating new job opportunities. The research findings showed there are job titles relevant to the Industrial Revolution within the Manufacturing of Paper and Paper Products division.

As technology grows rapidly, it is likely to be foreseen that the future occupation will be more automated especially with the introduction of artificial intelligence, robotics and etc. The Industrial revolution has significantly improved manufacturing industries especially on production volume, lead time, accuracy and efficiencies. However, it does affect towards reducing manpower and high maintenance.

It is discussed in the FGD and was agreed among the experts that the technologies and

industrial revolution impact directly towards the Manufacturing of Paper and Paper Products division, however, not all job level are affected by it. Following the FGD discussion, the issue was brought to the FD instrument and the result is discussed as in Table 4.15

Nevertheless, the response by experts from FGD explained that not all industries under the Manufacture of Paper and Paper Products are capable and ready to optimise their technologies and manufacturing machinery due to its high cost and maintenance. Thus, physical labour remains relevant and reliable in manufacturing industries.

Table 4.16 shows the result from FD instrument for occupation related to technology for C17 division. Of the nine tasks that were listed, six were agreed as the task that related to Industrial Revolution. Additive manufacturing and System Integrated ranked the top and second top of the listed tasks. From the result we can see that C17 division is not really occupied on Augmented Realty, autonomous robots and simulation as these the tasks had been rejected by SME.

Table 4.16 Result from Fuzzy Delphi for Jobs related to Industrial Revolution in C17 division.

Occupation Related to Technology	Total Acceptance (d<0.2)	Consensus Value	Defuzzification Value	Rank
Additive Manufacturing	10	100%	0.68	1
System Integration	10	100%	0.68	2
Cloud Computing	7	70%	0.66	3
Internet of Things (IoT)	7	70%	0.66	4
Big Data Analytics	8	80%	0.64	5
Cybersecurity	9	90%	0.50	6
Augmented Reality	3	30%	0.62	rejected
Autonomous Robots	5	50%	0.66	rejected
Simulation	1	10%	0.66	rejected

4.2.13 Issues related to Manufacture of Paper and Paper Products Industries

The Manufacture of Paper and Paper Products sector plays a significant role in the economy, contributing to the growth of various industries. However, it faces several challenges that must be addressed for sustainability and competitiveness. This section aims to highlight these challenges and propose potential solutions. The analysis provides valuable insights into the sector's difficulties, informing policy decisions to promote its development and enhance the country's economic performance.

Table 4.17 shows the results of FD instrument that was answered by the SME. Of the eight issues, five were agreed as the major issues in the industry. As mentioned before Insufficient skilled labor and certified workers are ranked the highest and second highest. On the other hand, SME had denied the issue of technology adaptation and underpayment as issues in C17 division.

Table 4.17 Fuzzy Delphi results for other issues related to the industry.

Issues related	Total Acceptance (d<0.2)	Consensus value	Defuzzification value	Rank
Insufficient number of skilled workers	9	90%	0.66	1
Insufficient number of certified workers	9	90%	0.66	2
Insufficient number of competence workers	9	90%	0.66	3
High dependence on foreign labor	7	70%	0.64	4
Talent gap among graduates	8	80%	0.54	5
Adaptation to technological changes	5	50%	0.62	Rejected
Underpayment wages lead to high turnover	4	40%	0.526667	Rejected
Poor facilities and amenities for workers	7	70%	0.466667	Rejected

To summarise, Table 4.17 reveals various obstacles encountered by the Manufacture of Paper and Paper Products industry in Division C17. These obstacles consist of a lack of proficient and skilled workers, concerns regarding wages and turnover rates, and inadequate amenities and facilities for employees. By addressing these challenges, it is possible to enhance both the industry's overall sustainability and productivity.

4.3 Mapping of available NOSS to the Occupational Structure

Although some National Occupational Skills Standards (NOSS) have been developed for certain groups in C17, the OF for C17 has not been circulated by the Department of Skills Division. The mapping of the published NOSS is shown in Table 4-18.

Currently, there are 3 NOSS that have been developed that are categorised under C17 group, according to the industry experts, these 3 developed NOSS are best categorised under the converting process area. Therefore, there is a need to develop the NOSS document for the critical job titles listed in the OS.

Table 4-18 Mapping of available NOSS with C17 OS

SECTION	**(C) MANUFACTURING**					
DIVISION	**(17) MANUFACTURE OF PAPER AND PAPER PRODUCTS**					
GROUP	**(C170) MANUFACTURE OF PAPER AND PAPER PRODUCTS**					
AREA	**RAW MATERIAL**	**PULP MILL / STOCK PREPARATION (PRODUCTION)**	**PULP MILL / STOCK PREPARATION (QUALITY)**	**PAPER MILL (PRODUCTION)**	**PAPER MILL (QUALITY)**	**CONVERTING PROCESS**
Level 8	NJT	NJT	NJT	NJT	NJT	NJT
Level 7	NJT	NJT	NJT	NJT	NJT	NJT
Level 6	NJT	Superintendent**/ Pulp Mill Manager**	Technical Manager**	Superintendent**/ Paper Machine Manager**	Technical Manager**	Superintendent/ Section Manager
Level 5	NJT	Production Executive*/ Production Engineer***	Process Engineer***/ Quality Engineer***	Production Executive*/ Production Engineer***	Process Engineer***/ Quality Engineer***	Process Engineer
Level 4	Senior Technician*	Senior Technician*	Senior Technician*	Senior Technician*	Senior Technician*	Production Planner
Level 3	Line Leader*	DCS Operator*	Field Technician*	Machine Tender*/ Back Tender*/ Winder Man*	Field Technician*	Line Leader **L3 PG-100-3:2012 Pembuatan Pembungkusan Kotak Kertas / Paperboard Packaging Manufacturing (18-12-2012)**
Level 2	Storekeeper/ QC Operator*	Bale Feeder*/ Pulper Man*/ Ragger Man*	QC Technician*/ Reject handler*	QC Technician*	QC Technician*	Handler/ QC Technician **L2 PG-100-2:2012 Pembuatan Pembungkusan Kotak Kertas / Paperboard Packaging Manufacturing (18-12-2012)**
Level 1	NJT	NJT	NJT	NJT	NJT	Printing Operator/ Packaging Operator **L1 PG-100-1:2012 Pembuatan Pembungkusan Kotak Kertas / Paperboard Packaging Manufacturing (18-12-2012)**

4.4 CONCLUSION

Chapter 4 presents a thorough examination of job titles, responsibilities, and the occupational structure. Insights from focus group discussions and the FD instrument offer a deep understanding of the job market and in-demand skills. The study identifies crucial competencies and skills, emphasising the significance of digital literacy in the current job market. The discussion of emerging skills underscores the importance of ongoing professional development to remain competitive. Ultimately, the research findings in Chapter 4 provide valuable insights for job seekers, employers, and policy makers, contributing to the dialogue on skill development and the future of work.

CHAPTER V

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The purpose of this chapter is to provide a comprehensive discussion, recommendations, and conclusion based on the findings of a study focused on the Occupational Structure (OS) within the Manufacture of Paper and Paper Products industry. The study aimed to establish the OS by examining job areas, titles, and competency levels, outlining the main work activities and tasks for each position, and identifying critical job titles within the industry. Additionally, it proposed job titles aligned with the current national technology and industrial revolution.

To achieve these objectives, a design and development research (DDR) approach was employed, using multiple data collection techniques, including document review, focus group discussion, brainstorming, and Fuzzy Delphi instrument methods. The findings of this study will provide insights into the occupational structure, responsibilities, and descriptions for the Manufacture of Paper and Paper Products division, which can be used to guide workforce planning, training and development, recruitment and retention, and other human resource management practices.

In this chapter, an in-depth examination of the study's significant findings pertaining to the Manufacture of Paper and Paper Products division will be presented. These findings encompass the establishment of the division's occupational structure, accompanied by a thorough delineation of the respective roles and responsibilities for each group within the division. Alongside this comprehensive analysis, the chapter will also delve into recommendations derived from the study's findings. These recommendations include the identification of critical job titles that are pivotal to the current national technology and industrial revolution, as well as proposed job titles that correlate with this era of advancement.

Furthermore, this chapter aims to provide insightful conclusions drawn from the study,

alongside highlighting the contributions it makes to the field of workforce development within the Manufacture of Paper and Paper Products division. By shedding light on the occupational structure, responsibilities, and emerging skills, this study offers valuable insights that pave the way for enhanced efficacy and future growth in the division's workforce.

5.2 Discussion

The discussion in this section will be organised according to the research questions, with each question being addressed separately.

5.2.1 Objective 1: To identify the relationship between previous research with current and future industrial needs.

This study had examined related documents established by the government specifically from Department of Skills Development (DSD) including MSIC 2008, MACPA 2009, NOSS, MOSQF, National Skills Development Act 1965, Economic Database Reports from the Department of Statistics Malaysia, census, other reports in the Occupation following MASCO, 12th Malaysia Plan, National Budget and Talent Corporation in order to identify the previous frameworks that had been developed. From the review, it can be concluded that for C17 division.

i. Only three NOSS had been established that only cater level 1 to level 3 occupation. These NOSS only cover paperboard packaging occupations and skills that the workers required. The mapping of the related NOSS is shown in Table 4.15.
ii. Groups in MSIC2008 are shown in Table 4.1. Total 1 group (C1701 group) 3 classes (1701, 1702 and 1709). From these Classes, there are 5 items listed for C17 division that are 17010, 17020, 17091, 17092,17093,17094 and 17099.
iii. To map MSIC2008 and MCPA 2009, the number of groups, classes and items are matched. In MCPA2009 more details number of products were listed. It can be concluded that a total of 236 numbers of products in Manufacture of Paper and Paper Products were listed in MCPA 2009.

5.2.2 Objective 2: To establish Occupational Structure (OS) for the Manufacture of Paper and Paper Products division based on MSIC 2008 by examining job areas, job titles and relevant competency level.

The occupation structure of an industry is a critical aspect that determines the efficiency and competitiveness of the industry. Understanding the various job areas, titles, and levels within an industry provides valuable insight into the skills and competencies required to perform these jobs, and the level of expertise required for different roles. Occupational Structure (OS) for group C170 has been successfully developed through Focus Group Discussions (FGD) with industry expert's representative from industry related to C17 division. The study has identified a total of 6 total job areas and 44 job titles in the Manufacture of Paper and Paper Products division across the group.

The number of job areas and titles identified for the group reflects the unique nature of the Manufacturing of Paper and paper products division and the specific skill sets required for each job area. The primary job areas within this division include raw material, stock preparation / pulp mill, paper mill and converting process. In summary, there is a wide range of job opportunities in the manufacturing of paper and paper products, with various job levels and areas of expertise to explore.

The understanding of occupational structure is important for policy makers as it provides insights and helps to understand the composition of the workforce and for formulating future plans (Godora, 2021). This information is also valuable for industry players and decision makers who are looking to improve their competitiveness and meet the changing demands of the market.

5.2.3 Objective 3: To determine Occupational Responsibilities (OR) that outline the main work activities and tasks for each job title.

The responsibilities of a job within an industry play a crucial role in determining the efficiency and competitiveness of the industry. Understanding the tasks, duties, and responsibilities associated with different jobs provides valuable insights into the skills and competencies required for these jobs.

The OR developed for 44 job titles described in Table 4.5 until Table 4.7 will serve as the future reference for the development of the National Occupational Skills Standard (NOSS) for C17 Manufacture of Paper and Paper Products occupation under the MSIC 2008, The results of this analysis provide a comprehensive overview of the occupational responsibilities of the industry and provide insights into the skills and competencies required for different roles. This information is valuable for industry players and decision makers who are looking to improve their competitiveness and meet the changing demands of the market, as well as for job seekers who want to understand the requirements for different positions within the industry (Talent Corp, 2022).

5.2.4 Objective 4: To determine Occupational Descriptions (OD) for each job title in demand based on the proposed OS.

The occupational description section provides a detailed overview of the responsibilities, knowledge, skills, and attributes required for a job in demand in the manufacturing of paper and paper products. The aim of OD is to give individuals and organisations a clear understanding of the role and its requirements, which will aid in evaluating the suitability of potential candidates. It is also helpful for individuals who are seeking opportunities to enter this field, as it highlights the necessary knowledge, experience, and competencies for success. With a comprehensive understanding of the job, the occupational description will ensure that the right person is matched with the right position, leading to improved job satisfaction, performance, and success for both the individual and the organisation.

There is a total of 7 overall jobs in demand under the Manufacture of Paper and Paper Products industries managed to be listed based on the Fuzzy Delphi instrument result. Jobs in demand data showed that there is a relatively high demand for skilled workers in the manufacturing of paper and paper products industry. This finding indicates that there may be a shortage of qualified candidates to fill these roles, which could lead to increased competition among employers for top talent. Additionally, it may suggest that there are opportunities for individuals interested in pursuing a career in this field, as there are a significant number of jobs currently available. Overall, this information could be useful for both employers and job seekers to understand the current state of the job market in this

industry and make informed decisions based on the demand for specific job roles.

The shortage of jobs in demand in the industries is due to several factors, including the lack of experience among candidates, high salary expectations, lack of knowledge, skills, and competency, high turnover, lack of local resources, a mismatch of qualification and education, rapid technological improvements, poor career growth, and the post-pandemic effect (Talent Corp, 2022; Ibrahim and Nashir, 2022). To address these challenges, companies and academic institutions need to work together to provide practical experience, competitive compensation, relevant skills training, employee retention strategies, and career growth opportunities (Valiente, Sancajo, and Jacokis, 2020). The competencies in demand for knowledge, such as project management, engineering design, production, fabrication, assembly, repair, machining, quality and safety management and industrial automation engineering, highlight the skills required for candidates seeking to enter the industry.

Knowing what competencies are important in an industry can help with planning and improving the industry. Understanding the skills, knowledge and abilities that are in high demand within the industry provides valuable insights into the talent needs of the industry.

5.2.5 Objective 5: To identify the critical jobs titles and job in demand in the Manufacture of paper and paper products section.

Identifying critical job titles within an industry is important as these positions play a crucial role in determining the success and competitiveness of the industry. Understanding the skills and competencies required for critical jobs can provide valuable insights into the industry's talent needs and help to inform workforce development initiatives. Out of the 44 jobs titles identified, 35 are identified as critical jobs that are currently experiencing a shortage of supply. Some of these critical jobs require completion in foreign countries.

From the map of NOSS vs OS in Table 4.17, it can be concluded that only four out of 35 critical jobs in the OS that match the NOSS develop for C17 division. Therefore, required skills and competencies that can be established in NOSS for the remaining critical jobs is needed in future.

To address the talent shortage in the C17 division, companies need to focus on providing practical experience, competitive compensation, relevant skills training, and career growth opportunities for their employees. This will help to improve employee retention and attract new talent. In terms of specific competencies, project management skills are essential for production managers, while engineering design skills are critical for engineers. Skilled workers such as machinists and technicians require specialised skills in machining and special tooling, as well as knowledge of quality and safety management.

The rapid advancement of new technologies in the C17 division requires a focus on developing knowledge in Project Management, Engineering, Design & Development, Production, Fabrication, Installation and Assembly, Machining & Special Tooling, Quality & Safety Management and Industrial Automation Engineering.

Overall, to address the talent shortage in the C17 division, companies need to focus on providing competitive compensation, relevant skills training, and career growth opportunities for employees, while also developing specific competencies in areas such as project management, engineering design, industrial automation engineering, and quality and safety management.

The research findings list nine important skills that are in demand for individuals working in the manufacturing of paper and paper products industries. These skills include interpersonal communication, written communication, critical thinking, equipment maintenance, installation, problem solving, agile mindset, leadership, operation monitoring, operation and control, time management, quality control analysis, aptitude for technology and equipment, intrapreneurship, and troubleshooting. These skills are essential for success in the manufacturing of paper and paper products industries and are highly valued by employers. Individuals who possess these skills are more likely to excel in their roles and contribute to the success of their organisations.

The attributes or attitudes that are important in the industry of paper and paper products manufacturing include Attention to Detail, Teamwork, Multi-tasking and Flexibility, Dependability, Work Ethic, Professionalism, Self-Management and Independent, Self-Learning, Agility, Ego Management and Career Management.

The above information will give us a better understanding of the talent the industry needs. This is useful for people who work in the industry and want to be more competitive, and for people looking for jobs in the industry to know what knowledge, skills and attributes they should have. This information is valuable for industry players and decision makers who are looking to improve their competitiveness (UNIDO, 2022) and meet the changing demands of the market, as well as for job seekers who want to understand the requirements for critical positions within the industry.

5.2.6 To propose job titles related to the industrial revolution technology for the Manufacture of Paper and Paper Products division.

The manufacturing of paper and paper products is an important division of the economy that is undergoing significant changes due to advancements in industrial revolution technology. From the research findings, 7 job titles are identified related to industrial revolution technology. The industrial revolution will impact directly on the industries as they are very related to manufacturing. Industrial revolution provides better lead time with lower cost, while improve efficiencies, less manpower needed, less human error, improve product quality, simulation made easier, prototype more accurate, and improve productivity.

This may be due to several reasons such as replacing or reducing manpower with robotics, cost savings, difficulties to find a skilled and competent worker, and difficulties in coping with new technologies.

Based on FGD and survey findings analysis it could be clearly noted that digitalisation, and the impact on production processes, is acknowledged as a key issue for manufacturing companies. However, the actual progress in this area seems to vary a lot between companies. Whilst some respondents explained significant progress related to digitalisation in their companies, such as automation of activities and digital monitoring of production, other companies have not yet been able to upgrade their production environments.

These findings shed light on the importance of digital literacy and the impact of technology on industrial revolutions, and provide valuable insights for job seekers, employers, and

policy makers. This section also contributes to the ongoing discourse on the future of work and the role of technology in industrial relations and help inform training and professional development programs aimed at promoting the growth and competitiveness of the workforce, exploring the implications of these findings for the job market and the workforce.

The discussion on emerging skills is critical in understanding the rapidly evolving landscape of the manufacturing of paper and paper products. With technology playing an increasingly larger role in manufacturing (UNIDO, 2022), it is important for individuals and organisations to stay ahead of the curve by continuously acquiring and refining these emerging skills. The findings related to emerging skills will be valuable for individuals seeking to enter the manufacturing of paper and paper products as well as for organisations looking to upskill their workforce and remain competitive in the market. By highlighting the key skills in demand, this section will help to ensure that individuals and organisations have the necessary knowledge and competencies to succeed in this rapidly changing industry. Staying up to date with these emerging skills will help individuals and organisations remain competitive in the rapidly evolving landscape of the manufacturing of paper and paper products.

5.3 Recommendations

The Occupational Framework (OF) serves as a comprehensive report aimed at providing the industry with valuable insights regarding the human capital development requirements for a specific sector. With the primary objective of informing the industry's strategic plans for cultivating skilled workers and certifying Malaysians in C17 division, the ultimate aspiration is to bolster the quality of the local sector and enhance Malaysia's global competitiveness.

To construct the Occupational Structure (OS), extensive feedback from focus group discussions was taken into account. This enabled the identification and highlighting of various job areas, job titles, and career paths based on competency levels. During the process of developing the OS, numerous challenges were identified within C17 industries in Malaysia. It is based on these findings that recommendations have been proposed for the corresponding industries in C17.

a) Develop National Occupational Skills Standards (NOSS): Based on the research findings, it is recommended that the existing 3 NOSS match for the 3 job titles in the C17 division be reviewed and updated, and that new NOSS be developed for the remaining job titles that currently have no NOSS. To establish a consistent framework of skills, knowledge, and competencies necessary for each occupation within the sector, it is imperative to undertake measures that would not only benefit universities and TVET training institutions, but also enhance their ability to evaluate and adapt their existing curricula in accordance with industry demands.

b) Furthermore, it is recommended to incorporate qualification requirements into job descriptions within the context of the distinctive C17 manufacturing of paper and paper products division. This strategic action will facilitate employers in obtaining a comprehensive understanding of the necessary qualifications for each position. By doing so, employers can better align their recruitment efforts with the specific skillset required, ensuring a more coherent workforce within the industry.

c) In order to maintain the relevance and accuracy of the Occupational Framework (OF) for the C17 division, it is necessary to extend the timeframes for future research. By doing so, we can ensure that the framework effectively captures the current data, aligning the skills and competencies required for each occupation within the sector with the ever-evolving industry demands. It is recommended that a time frame of approximately one year be allotted for this future research, as this duration allows for adequate gathering and analysis of pertinent literature and data sources. Furthermore, conducting surveys or interviews with industry experts will provide valuable insights that can enrich the findings. Ultimately, this comprehensive approach will enable us to validate the outcomes of the research, ensuring that the resulting OF remains current and reflective of the industry's needs.

5.4 Limitation

One of the primary limitations inherent in this research lies in the constrained time frame

allocated for conducting a comprehensive literature review and collecting data on the C17 Occupational Framework. Additionally, the acquisition of up-to-date information on industry growth, employment trends, and other pertinent factors can pose a significant challenge, particularly due to the constantly evolving nature of the industry. Consequently, it is imperative for the data in this study to be updated at multiple junctures to ensure a comprehensive and precise depiction of the current state of each group within the C17 division.

To summarise, while this research presents valuable insights into the potential advantages of the C17 Occupational Framework, it is important to acknowledge the limitations associated with the abbreviated time frame for literature review and data collection, as well as the rapidly changing landscape of the industry. Consequently, future research employing a more extensive time frame and involving an augmented data collection process may be indispensable in providing a thorough and precise understanding of the competencies and skills imperative for success each group within the C17 division.

5.5 Conclusion

The research findings indicate that the objectives of this study have been accomplished. The OS for C17 Manufacture of Paper and Paper Products has identified 6 job areas and 44 job titles that possess distinct occupational structures, duties, and descriptions. The significance of job titles cannot be undermined in the context of industry transformation and crucial job sectors. A comprehensive study has been conducted to identify the emerging skills and competencies that will play a vital role in supporting the industry's growth. These findings will serve as a fundamental basis for the development of the National Occupational Skills Standard (NOSS) document. In addition, it is imperative to review the existing NOSS and develop NOSS for critical roles and those in high demand within the industry.

Furthermore, the C17 Occupational Framework offers valuable insights for stakeholders regarding present and future trends in the C17 division. This encompasses information on emerging technologies, novel business models, and evolving customer needs. The acquisition of such information equips stakeholders to remain ahead of the curve and effectively anticipate and respond to industry changes.

Moreover, the C17 Occupational Framework serves as an indispensable tool for stakeholders in identifying and addressing gaps and inefficiencies prevalent in the industry. For instance, it facilitates the recognition of areas with shortages of skilled workers or barriers hindering the entry of new talents. Such information proves valuable in developing targeted initiatives and policies to rectify these issues and optimise industry performance.

Additionally, the C17 Occupational Framework aids in supporting workforce planning and development. It provides insights into the supply and demand dynamics of various occupations within the C17 division, thus enabling informed decision-making pertaining to recruitment, training, and succession planning.

Lastly, the C17 Occupational Framework fosters a common language and understanding among stakeholders, which in turn promotes collaboration and innovation within the industry. Furthermore, the framework offers valuable insights into industry trends and serves as an essential tool for identifying and addressing gaps and inefficiencies. By supporting workforce planning and development, it facilitates effective collaboration and innovation among stakeholders. Overall, the potential benefits brought forth by the C17 Occupational Framework extend to the industry as a whole and its diverse stakeholders.

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ANNEX 1: LIST OF CONTRIBUTORS

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C17 MANUFACTURE OF PAPER AND PAPER PRODUCTS

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3	Mr Teoh WK	HR Manager	NTPM Holdings Bhd
4	Lim Joo Tiong	Automation Manager	NTPM Holdings Bhd
5	Zeenat Nisa Ahmad Shah	HR Manager	Percetakan Mun Sun Sdn Bhd
6	Tan Wei Thye	Executive Committee	Malaysia Paper Association MAPA
7	Fazli Mhd Saad	AJK Tertinggi	Paper and Paper Products Manufacturing Employees' Union (PPPMEU)
8	Azhar Ahmad	AJK Tertinggi	Paper and Paper Products Manufacturing Employees' Union (PPPMEU)
9	Assoc. Prof. Dr Leh Cheu Peng	Pensyarah Universiti	Bioresource Tech., School of Industrial TechnologyUSM Pusat Pengajian Teknologi Industri
10	Assoc. Prof. Dr Mohamad Haafiz Mohamad Kassim	Pengarah/Prof Madya Dr	Bioresource Tech., School of Industrial TechnologyUSM Pusat Rancangan Kokurikulum
11	Dr. Nurul Fazita Mohammad Rawi	Pensyarah	Bioresource Tech., School of Industrial TechnologyUSM Pusat Pengajian Teknologi Industri
12	Mazlan Ibrahim	Pensyarah Kanan	Universiti Sains Malaysia

OCCUPATIONAL FRAMEWORK ASSESSMENT TECHNICAL COMMITTEE (JTPOF 1)
12th September 2023

No	Name	Position	Organisation
1	Dr. Khuzainey binti Ismail	Senior Assistant Director (Policy Planning 2)	Planning, Development, and International Division (BPPA) Chairman
2.	Ahmad Azran Ranaai	Senior Assistant Director	Occupational Standards and TVET Curriculum Division (BSPKTVET)
3.	Dr Tan Kea Chang	Vocational Training Executive	Competencies Certification Division (BPK)
4.	Mohd Ibnul Qaiyim Amrullah	Human Resources Manager	Pascorp Paper Industry Berhad
5.	Prof Datuk Abdul Khalil Shawkataly	Dean	School of Industrial Technology, Universiti Sains Malaysia (USM)
6.	Ahmad Uwais Ab Razak	Assistant Director	Malaysian Investment Development Authority (MIDA)
7	Nurmadihah Binti Mat Daud	MYSTEP Officer	Ministry of Human Resource, Malaysia
8.	Abdul Rahman Mohd Tahir	Secretary	Paper and Paper Products Manufacturing Employees' Union (PPPMEU)

OCCUPATIONAL FRAMEWORK ASSESSMENT TECHNICAL COMMITTEE (JTPOF 2)
9th January 2024

No	Name	Position	Organisation
1	Dr. Khuzainey binti Ismail	Senior Assistant Director (Policy Planning 2)	Planning, Development, and International Division (BPPA) Chairman
2.	Ahmad Azran Ranaai	Senior Assistant Director	Occupational Standards and TVET Curriculum Division (BSPKTVET)
3.	Ts Dr. Sulaiha binti Ali	Assistant Director	Occupational Standards and TVET Curriculum Division (BSPKTVET)
4.	Ts Nor Aini Binti Abdullah	Pegawai Kanan Pembangunan Kemahiran	Occupational Standards and TVET Curriculum Division (BSPKTVET) - Secretariat
5.	Mohd Ibnul Qaiyim Amrullah	Human Resources Manager	Pascorp Paper Industry Berhad
6.	Dr. Fairus Atida Binti Said	Senior Assistant Director	Competencies Certification Division (BPK)
7.	Kodsiah Binti Mohd	Pegawai Perhubungan	Ministry of Human Resource,

No	Name	Position	Organisation
	Juzad	Perusahaan	Malaysia
8.	Aziawati Ismail	Deputy Director	Malaysian Investment Development Authority (MIDA)
9.	Nurin Nasuha	Statistician	Department of Stastician Malaysia (DOSM)

OCCUPATIONAL FRAMEWORK INTERNAL TECHNICAL COMMITTEE DEVELOPMENT OF SKILLS DEVELOPMENT

No	Name	Position	Organisation
1.	Khadijah binti Isaak	Principal Assistant Director	Occupational Standards and TVET Curriculum Division (BSPKTVET) - Secretariat
3.	Ts Dr. Sulaiha binti Ali	Assistant Director	Occupational Standards and TVET Curriculum Division (BSPKTVET)
4.	Dr Tan Kea Chang	Vocational Training Executive	Competencies Certification Division (BPK)
5.	Dr. Khuzainey binti Ismail	Senior Assistant Director (Policy Planning 2)	Planning, Development, and International Division (BPPA)
6.	Ts Dr Wan Nasarudin Wan Jalal	Head Assistant Director	Accreditation Division (BPT)
7.	En Norazmi Mokni	Head Assistant Director	Unit Pengurusan ILB Bahagian Hubungan Industri & Kerjasama Strategik
8.	Dr Muhamad Azuddin Hassan	Ketua Penyelaras Program (Penyelidikan)	Centre of Instructors and Advanced Skills Training (CIAST)
9.	Dr. Saidi bin Zain	Innovation Coordinator Research and Innovation Unit	Centre of Instructors and Advanced Skills Training (CIAST)
10	Ts Nor Aini Binti Abdullah	Pegawai Kanan Pembangunan Kemahiran	Occupational Standards and TVET Curriculum Division (BSPKTVET) - Secretariat
11	Wan Suriani Binti Wan Yusoff	Pegawai Pembangunan Kemahiran	Occupational Standards and TVET Curriculum Division (BSPKTVET) - Secretariat
12	Dr. Fairus Atida Binti Said	Senior Assistant Director	Competencies Certification Division (BPK)

OCCUPATIONAL FRAMEWORK MANAGEMENT UNIT OCCUPATIONAL STANDARDS AND TVET CURRICULUM DIVISION (BSPKTVET) DEVELOPMENT OF SKILLS DEVELOPMENT

No	**Name**	**Position**
1.	Khadijah binti Isaak	Principal Assistant Director
2.	Ahmad Azran bin Ranaai	Senior Assistant Director
3.	Nazrul Hilmi bin Mohammad	Senior Assistant Director
4.	Ts. Nor Aini binti Abdullah	Senior Assistant Director
5.	Wan Suraini binti Wan Yusoff	Skills Development Officer

ANNEX 2: FUZZY DELPHI INSTRUMENT

Department of Skills Development
Malaysia

DEPARTMENT OF SKILLS DEVELOPMENT (DSD)
MINISTRY OF HUMAN RESOURCE

FUZZY DELPHI INSTRUMENT

for

THE DEVELOPMENT OF OCCUPATIONAL FRAMEWORK

Organised by
DSD
Through
UPUM. Sdn. Bhd.

UPUM
UNIT PERUNDINGAN UNIVERSITI MALAYA
UNIVERSITY OF MALAYA CONSULTANCY UNIT

UPUM Sdn. Bhd. has been tasked to develop Occupational Frameworks in six (6) divisions of economic areas according to the Malaysia Standard Industrial Classification (MSIC) 2008, by the Department of Skills Development (DSD), Ministry of Human Resources. The six divisions are:

B09 – Mining Support Service Activities
C15 - Manufacturing of Leather and Related Product
C16 - Manufacture of Wood and Products of Wood and Cork, except furniture; Manufacture of articles of straw and plating materials.
C17 – Manufacture of paper And paper products
N80 – Security and investigation activities
N81 – Service to buildings and landscape activities

The research aims to establish the occupational structure for these divisions by examining job areas, job titles, and levels; determine the occupational description and responsibilities for each job; examine the jobs and competencies in demand; identify critical job titles; and competency needed to address the demand and supply of the industry in Malaysia.

The Fuzzy Delphi Instrument is used to achieve the following objectives:

a. To identify the critical job and the Job Description for the six identified divisions related to current developments in the industry.
b. To analyse the competency needed to address the demand and supply of the industry in Malaysia.

Hence, we welcome your feedback and responses as expert panel members.

The Fuzzy Delphi Instrument consists of six (6) sections. Please attempt all sections and fill in where applicable.

Section 1	:	Respondents Details.
Section 2	:	Competency in Demand
Section 3	:	Emerging Skills
Section 4	:	Occupation Related to Technology
Section 5	:	n Demand
Section 6	:	d Issues

Section 1: SURVEY RESPONDENT DETAIL
Please select only one item.

1. Age:
o Below 20 years old
o 20 – 29 years old
o 30 – 39 years old
o 40 – 49 years old
o Above 50 years old

2. Gender:
- o Male
- o Female

3. Overall number of years in the industry:
- o Below 5 years
- o 5 – 10 years
- o 11 – 20 years
- o 21 – 30 years
- o Above 30 years

4. Position in the organization:
- o Chief Executive Officer
- o Specialist/Managing Director/General Manager
- o Production Engineer/Engineer
- o Manager/ Human Resource Manager
- o Others (please specify): _____

5. Location of your organization in Malaysia (Please specify the state only):
- o Perlis
- o Kedah
- o Penang
- o Perak
- o Selangor
- o Negeri Sembilan
- o Melaka
- o Johor
- o Pahang
- o Terengganu
- o Kelantan
- o Sabah
- o Sarawak
- o Federal Territory of Kuala Lumpur
- o Federal Territory of Putrajaya
- o Federal Territiry of Labuan

6. Expertise according to the Division in the Malaysia Standard Industrial Classification (MSIC) 2008
- o B09 – Mining Support Service Activities
- o C15 - Manufacturing of Leather and Related Product

- C16 - Manufacture of Wood and Products of Wood and Cork, except furniture; Manufacture of articles of straw and plating materials.
- C17 – Manufacture of paper And paper products
- N80 – Security and investigation activities
- N81 – Service to buildings and landscape activities

7. Expertise according to Group in the Malaysia Standard Industrial Classification (MSIC) 2008

- B091 – Support activities for Petroleum and Natural Gas Extraction
- B099 – Support activities for other mining and quarrying
- C151 – Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur
- C152 – Manufacture of footware
- C161 – Sawmilling and planing of wood
- C162 – Manufacture of products of wood, cork, straw, and plaiting materials
- C170 – Manufacture of paper and paper products
- N801 – Private security activities
- N802 – Security systems service activities
- N803 – Investigation activities
- N811 – Combined facilities support activities
- N812 – Cleaning activities
- N813 – Landscape care and maintainence service activities

INSTRUCTIONS: For each of the statements please indicate your level of agreement by selecting only one of the choices based on the Fuzzy scale below:

Linguistic Scale	Fuzzy Scale
Strongly Disagree	1
Disagree	2
Moderately Agree	3
Agree	4
Strongly Agree	5

Section 2: Competency in Demand

According to your expert opinion, rate your agreement that the following area of expertise is **high in demand.**

No.	Area of Expertise	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Project Management						
2.	Engineering Design & Development						
3.	Production, Fabrication, Installation & Assembly						
4.	Quality & Safety Management						
5.	Testing & Commissioning						
6.	People Management						
7.	Information Technology						
8.	Others (please specify):						

2. According to your expert opinion, rank your agreement that the following competency is important to perform these jobs.

i. Knowledge

No.	Knowledge	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Project Management						
2.	Engineering Design & Development						
3.	Production, Fabrication, Installation & Assembly						
4.	Machining and Special Tooling						
5.	Quality & Safety Management						
6.	Industrial Automation						

	Engineering						
7.	Others (please specify):						

ii. Skills

No.	Job Area	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Interpersonal Communication						
2.	Written Communication						
3.	Critical Thinking						
4.	Equipment Maintenance						
5.	Installation						
6.	Problem Solving						
7.	Agile Mindset *(A thought process that involves understanding, collaborating, learning, and staying flexible to achieves high performing results)*						
8.	Leadership						
9.	Operation and Control						
10.	Time management						
11.	Quality Control Analysis						
12.	Attitude for Technology and Equipment						
13.	Intrapreneurship *(Refers to employee initiatives in organisations to take something new, without being asked to do so)*						
14.	Troubleshooting						
15.	Others (please specify)						

iii. Attribute/Attitude

No.	Attribute/ Attitude	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Attention to details						
2.	Teamwork						
3.	Multi-tasking/ Flexibility						
4.	Dependability *(Trustworthy & Reliable)*						
5.	Work Ethics						
6.	Professionalism						
7.	Self-management/ independent						

8.	Self-learning						
9.	Agility *(Ability to think and understand quickly)*						
10.	Ego-management *(An exaggerated sense of self-worth based on one's extrinsic achievement)*						
11.	Career-management *(career path and individual development, succession planning)*						
12.	Others (please specify)						

According to your expert opinion, rank your agreement on the following.

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	The current graduates, trainees, apprentices, and current workers possess the skills required by the industry.						

According to your expert opinion, rank your agreement on the reason(s) for the skills gap.

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Education or training mismatch						
2.	Major changes in traditional training and new skills requirements						
3.	Attitude (for example, lack of desire to work)						
4.	Misalignment between how job seekers are communicating their skills in their CV						
5.	Employers do not clarify the skills they require in the job specifications in the job advertisement.						
6.	Other *(please specify)*:						

SECTION 3: EMERGING SKILLS

Emerging skills are skills that are expected to be important to the industry in the near future based on recent events, trends, government policies, or research. For example, the technology revolution, issues of sustainability, and many other things are examples of emerging skills.

According to your expert opinion, rank your agreement on the future emerging skills that affect the productivity of your current job.

Bil	Emerging skills	Scale					Please provide reasons for the requirement of emerging skills
		1	2	3	4	5	
1.	Drawing / designing 3D, - Skills in developing and designing 2D / 3D model drawing using modern tools.						
2.	Designing virtual environments - Design and developing Virtual Reality (VR) and Augmented Reality (AR) for the use of procedures, machining, cataloque and others related system.						
3.	Designing artificial intelligent - The use of AI and algorithms to solve problem related to the production.						
4.	Design/Apply Green technology principles. - the use of technology and science to reduce human impacts on the natural environment including energy, atmospheric science, agriculture, material science, and hydrology.						
5.	Digital skills - the ability to find, evaluate, use, share, and create content using digital devices, such as computers and smartphones.						

6.	Design/ Utilize software for autonomous technology, machine learning, data automation, and Internet of things (IoT). - The use of specific technology related to IR4.0 towards solving problem in the production.						
7.	Environmental, social and governance (ESG). - The use of modern tools incorporates to reduce environmental footprint or to accomplish other objectives that can benefit society.						
8.	Design / Apply Robotics and Electronics. - The use of robotics and electronics technology to ease and solve the enterprise problem.						
9.	Other *(please specify)*:						

SECTION 4: OCCUPATION RELATED TO TECHNOLOGY

According to your expert opinion, rank your agreement on the technology.

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	The Industrial Revolution would have an impact on this industry						
2.	Technology advancement directly affects the jobs in the industry.						

According to your expert opinion, rank your agreement on the technology that is influencing your industry/ job area.

No.	Attribute/ Attitude	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Autonomous Robots (Coordinated and automated actions of robots to complete tasks intelligently, with minimal human input)						
2.	Big Data Analytics (The analysis of ever larger volumes of data. Circulation, collection, and analysis of information is a necessity because it supports productivity growth based on a real-time decision-making process)						
3.	Cloud Computing (Storing and accessing data and programs over the Internet instead of your computer's hard drive)						
4.	Internet of Things (IoT) (All machines and systems connected to the production plant (as well as other systems) must be able to collect, exchange and save these massive volumes of information, in a completely autonomous way and						

	without the need of human intervention)						
5.	Additive Manufacturing (3D Printing) (Use in prototyping, design iteration and small-scale production and often described as “rapid prototyping” - produce the desired components faster, more flexibly and more precisely than ever before)						
6.	System Integration (The process of linking together different computing systems and software applications physically or functionally to act as a coordinated whole via Internet of Things-IoT)						
7.	Cybersecurity (With the increased connectivity and use of standard communications protocols, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats is increasing)						
8.	Augmented Reality (Augmented-reality-based systems support a variety of services, such as selecting parts in a warehouse and sending repair instructions over mobile devices - provide workers with real-time information to improve decision making and work procedures)						
9.	Simulation (Simulations will leverage real-time data to mirror the physical world in a virtual model, which can include machines, products, and humans. This allows operators to test and						

	optimize the machine settings for the next product in line in the virtual world before the physical changeover, thereby driving down machine setup times and increasing quality)						

SECTION 5: JOBS IN DEMAND

According to your expert opinion, rank your agreement on the high manpower shortage for these jobs.

a. Raw Materials

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Shift Supervisor						
2.	Leader						
3.	Storekeeper						
4.	QC Operator						

b. Pulp Mill / Stock preparation

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Superintendent						
2.	Pulp Mill Manager						
3.	Technical Manager						
4.	Process Engineer						
5.	Quality Engineer						
6.	Production Executive						
7.	Shift Supervisor						
8.	Field Technician						
9.	DCS Operator						
10.	Reject handler						
11.	Bale Feeder						
12.	PulperMan						
13.	Ragger Man						
14.	QC Technician						

c. Paper Mill / Paper machine

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Superintendent						

2.	Paper Machine Manager						
3.	Technical Manager						
4.	Process Engineer						
5.	Quality Engineer						
6.	Production Executive						
7.	Shift Supervisor						
8.	Machine Tender						
9.	Back Tender						
10.	Winder Man						
11.	QC Technician						

d. Converting

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Superintendent						
2.	Section manager						
3.	Process Engineer						
4.	Production Planner						
5.	Leader						
6.	Handler						
7.	Forklift Driver						
8.	QC Technician						

1. State the reason for the high shortage of the Jobs-in demand.

SECTION 6: RELATED ISSUES

According to your expert opinion, rank your agreement on the key issues affecting the workforce of the industry.

Bil	Aspect	Scale					If the item is not relevant, please state why.
		1	2	3	4	5	
1.	Insufficient number of skilled workers						
2.	Insufficient number of certified workers						
3.	Insufficient number of competence workers						
4.	High dependence on foreign labor						
5.	Underpayment of wages leads to high turnover						
6.	Talent Gap among graduates						
7.	Adaptation to technological changes						
8.	Poor facilities and amenities for workers						
9.	Others (please specify)						

End of instrument. Thank you.

ANNEX 3: OCCUPATIONAL DESCRIPTIONS

ANNEX 3: OCCUPATIONAL DESCRIPTION (OD)

SECTION : (C) MANUFACTURING
MSIC DIVISION : (17) - MANUFACTURE OF PAPER AND PAPER PRODUCT
MSIC GROUP : (170) - MANUFACTURE F PAPER AND PAPER PRODUCT

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Raw Material**
JOB TITLE	**:**	**Shift Supervisor**
LEVEL	**:**	**4**

Job Responsibilities:

- Shift Supervisors coordinate and supervise the activities of process control technicians, machine operators, assemblers and other manufacturing labourers.

Knowledge:

- Regulations and standards.
- Maintenance procedures and processes.
- Inspection techniques.
- Maintenance records and documentation.
- Safety management systems.
- Technical knowledge and industry developments.
- Compliance with regulations and standards.

Skills:

- Leadership.
- Interpersonal Communication.
- Problem-solving.
- Planning and organisation.
- Time management.
- Auditing.
- Documentation.
- Root cause analysis.

Attributes (Attitude):

- Safety-oriented.
- Professionalism.
- Team-oriented.
- Flexibility.
- Positive attitude.
- Open-minded.
- Strong work ethic.
- Continuous improvement.
- Sense of responsibility.
- Attention to details.

MSIC DIVISION : C17 - Manufacture of Paper and Paper Product
MSIC GROUP : C170 - Manufacture of Paper and Paper Product
AREA : Raw Material
JOB TITLE : Shift Supervisor
LEVEL : 4

Job Responsibilities:

- Shift Supervisors coordinate and supervise the activities of process control technicians, machine operators, assemblers and other manufacturing labourers.

Knowledge:

- Regulations and standards.
- Maintenance procedures and processes.
- Inspection techniques.
- Maintenance records and documentation.
- Safety management systems.
- Technical knowledge and industry developments.
- Compliance with regulations and standards.

Skills:

- Leadership.
- Interpersonal Communication.
- Problem-solving.
- Planning and organisation.
- Time management.
- Auditing.
- Documentation.
- Root cause analysis.

Attributes (Attitude):

- Safety-oriented.
- Professionalism.
- Team-oriented.
- Flexibility.
- Positive attitude.
- Open-minded.
- Strong work ethic.
- Continuous improvement.
- Sense of responsibility.
- Attention to details.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Raw Material**
JOB TITLE	**:**	**Leader**
LEVEL	**:**	**3**

Job Responsibilities:

- Leading a team of production workers, including setting goals, evaluating performance, and providing feedback and coaching.
- Managing production schedules to ensure that deadlines are met and that production runs smoothly.
- Managing inventory levels to ensure that production runs smoothly and that there are no delays due to lack of materials.
- Troubleshooting production problems and implementing solutions to resolve them.
- Implementing quality control procedures to ensure that products are of the highest quality.

Knowledge:

- Engineering and Technology.
- Design.
- Production and Processing.
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical expertise.
- Leadership.
- Communication.
- Problem-solving.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION : C17 - Manufacture of Paper and Paper Product
MSIC GROUP : C170 - Manufacture of Paper and Paper Product
AREA : Raw Material
JOB TITLE : Leader
LEVEL : 3

Job Responsibilities:

- Leading a team of production workers, including setting goals, evaluating performance, and providing feedback and coaching.
- Managing production schedules to ensure that deadlines are met and that production runs smoothly.
- Managing inventory levels to ensure that production runs smoothly and that there are no delays due to lack of materials.
- Troubleshooting production problems and implementing solutions to resolve them.
- Implementing quality control procedures to ensure that products are of the highest quality.

Knowledge:

- Engineering and Technology.
- Design.
- Production and Processing.
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical expertise.
- Leadership.
- Communication.
- Problem-solving.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Raw Material**
JOB TITLE	**:**	**Forklift Driver**
LEVEL	**:**	**2**

Job Responsibilities:

- Forklift Driver drive, operate and monitor lifting trucks or similar vehicles to transport, lift and stack pallets with goods.

Knowledge:

- Public Safety - Knowledge involves protecting the public, safeguarding people from crimes, disaster, and other potential dangers and threats.
- Customer and Personal Service - Knowledge of principles and processes for providing customer and personal services.
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods

Skills:

- Coordination - proficiency in adjusting actions in relation to other's actions
- Time Management - proficiency in managing time effectively to meet deadline.Commercial Driving - proficiency in operating large, heavy, or placarded hasardous material vehicles in commerce
- Equipment Maintenance - proficiency of routine maintenance on equipment and determining when and what kind of maintenance is needed.

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Raw Material**
JOB TITLE	**:**	**Storekeeper**
LEVEL	**:**	**2**

Job Responsibilities:

- Storekeeper maintain records of goods produced and production materials received, weighed, issued, dispatched or kept in stock.

Knowledge:

- Clerical - Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology
- Computer and Electronics - Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods
- Mathematics - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications

Skills:

- Warehouse Management - proficiency in using software application, designed to support warehouse or distribution center management and staff.
- Data Entry - proficiency in entering information into a computer or data-recording system using an electronic or mechanical device.
- Microsoft Office - proficiency in using office suite applications, servers and services developed by Microsoft.
- Inventory Management - Proficiency in the process of ordering, storing, using, and selling a company's inventory.
- record keeping - proficiency in keeping records, or units of preserved information in some permanent form such as written documents, photographs, recordings and others.

Attributes (Attitude):

- Conventional -Likes to involve in managing data, information, and processes.
- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Enterprising -Likes to involve in starting up and carrying out projects and often deal with business

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Raw Material**
JOB TITLE	**:**	**QC Operator**
LEVEL	**:**	**2**

Job Responsibilities:

- Daily field checklist
- Assist DCS operator /team leader on troubleshooting if plant encounter operational issues
- Assist in the plan safety procedure and following the LOTO system when required.
- Conduct 5s/housekeeping in the plant

Knowledge:

- Equipment and machinery.
- Manufacturing processes.
- Quality control.
- Safety.
- Industry regulations.
- Basic mechanical and electrical skills.
- Inventory management.
- Technical documentation.
- Productivity improvement techniques.
- Troubleshooting techniques.

Skills:

- Technical skills.
- Problem-solving skills.
- Communication skills.
- Time management skills.
- Analytical skills.
- Interpersonal skills.
- Decision-making skills.

Attributes (Attitude):

- Attention to detail.
- Work ethic.
- Flexibility.
- Willingness to learn and improve.
- Team player.
- Positive attitude.
- Good Physical stamina.
- Good hand-eye coordination.
- Safety-minded.
- Self-motivated.
- Good time management.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Production)**
JOB TITLE	**:**	**Superintendant**
LEVEL	**:**	**6**

Job Responsibilities:

- Developing and maintaining detailed project schedules, including resource allocation, critical path analysis, and progress reporting.
- Managing and mentoring a team of planners and schedulers.
- Providing technical guidance and support to the shipbuilding team.

Knowledge:

- Engineering and Technology - Knowledge of the practical application of engineering science and technology that applies principles, techniques, procedures, and equipment to the design of goods and services
- Design - Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models
- Mechanical - Knowledge of machines and tools, including their designs, uses, repair and maintenance
- Physics - Knowledge and prediction of physics principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics.
- Mathematics - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications

Skills:

- Critical Thinking - proficiency in using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
- Reading Comprehension - proficiency in understanding written sentences and paragraphs in work related documents
- Active Listening Skills - proficiency in giving full attention to what other people are saying, taking time to understand the points being made and asking questions as appropriate.
- Mathematics - proficiency in using mathematics to solve problems

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Investigative -Likes to involve in theory, research, and intellectual inquiry.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Production)**
JOB TITLE	**:**	**Pulp Mill Manager**
LEVEL	**:**	**6**

Job Responsibilities:

- Responsible for overseeing the production process of the
- manufacturing , ensuring that products are produced efficiently, on time, and
- within budget.

Knowledge:

- Manufacturing processes (assembly, fabrication, and machining for pulp mill)
- Environmental regulations and guideline.
- Project management principles and techniques.
- Sourcing, procurement, inventory management, and logistics.
- Lean manufacturing principles, such as 5S and Kanban.

Skills:

- Project management
- Leadership and team management
- plan and organise production schedules
- Interdepartmental coordination
- resolve production issues and decision making
- Interdepartmental communication
- Team time management

Attributes (Attitude):

- Be mindful
- Openness and able to adapt new situations
- positive attitude, face challenges
- inspire and motivate team to achieve their goals.
- Being proactive and making effective decisions

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Quality)**
JOB TITLE	**:**	**Technical Manager**
LEVEL	**:**	**6**

Job Responsibilities:

- Leading QC/QA, development of continues improvement projects in the mill in coordination with department head.
- Lead data analysis (R&D) for current machine issues/troubleshooting, optimising cost, development of new products and customer complaint.
- Preparing department budgeting (including safety equipment, personnel, equipment and etcetera).
- Provide training framework for the department technicians and engineers on the plant process, new process approach and ISO protocols.
- High level of competency and experience in pulp and papermaking industry.
- Setting of goals for the department.
- Lead ISO Audit requirements
- Manage employee hiring's for respective department.

Knowledge:

- Production design
- Project management principles.
- Diagnose and troubleshoot technical issues
- Aligning vendor's technology
- Budget management and control

Skills:

- Technical problem solving
- Leadership skills.
- Project management skills.
- verbal and written communication
- The ability to think strategically
- Budget management
- Decision-making

Attributes (Attitude):

- Work ethic
- attention to detail.
- Flexibility.
- Results-oriented.
- Collaboration

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Production)**
JOB TITLE	**:**	**Production Executive**
LEVEL	**:**	**5**

Job Responsibilities:

- A Production Engineer is a professional responsible for designing, developing, and
- implementing the processes, systems, and equipment used in the production of pulp mill. They work closely with the production team and other
- departments such as design, quality, and procurement to ensure that the production
- process is efficient, effective, and meets quality standards and regulatory requirements.

Knowledge:

- Industry standards and regulations
- Complex production processes
- Data analysis data and identify areas for improvement
- Ability to effectively.
- Technical
- Manufacturing and production process

Skills:

- Technical drawing and design
- Project management
- Problem-solving
- Interpersonal Communication
- Leadership and team management
- Quality control and inspection
- Technical writing
- Time management

Attributes (Attitude):

- Attention to detail.
- Flexibility.
- Creativity.
- Positive attitude.
- Strong work ethic.
- Willingness to learn.
- Self-motivation.
- Sense of responsibility.
- Continuous improvement mindset.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Quality)**
JOB TITLE	**:**	**Process Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Designing and improving production processes.
- Planning and scheduling production.
- Production equipment and machinery.
- Production problem and solutions.
- Quality control procedures.

Knowledge:

- Mechanical.
- Engineering and Technology.
- Production and Processing.
- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical skills.
- Problem-solving.
- Analytical thinking
- Interpersonal Communication
- Critical thinking.

Attributes (Attitude):

- Attention to detail.
- Creativity.
- Adaptability.
- business acumen.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Quality)**
JOB TITLE	**:**	**Quality Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Responsible for ensuring that an organisation's products and services meet the highest standards of quality.
- Enhance existing knowledge and method of testing and systems that meet specific needs and requirements.
- Responsible for defining the quality standards, implementing and maintaining the quality systems, and conducting audits to ensure adherence to the set standards.

Knowledge:

- Quality management systems.
- Statistical process control (SPC).
- Root cause analysis.
- Quality tools and techniques.
- Quality standards and regulations.
- Auditing.

Skills:

- Analytical skills.
- Problem-solving skills
- Leadership skills.
- Communication skills.
- Technical expertise.
- Project management skills.

Attributes (Attitude):

- Strong ethics and integrity.
- Continuous improvement mindset.
- Proactivity.
- Open-mindedness and flexibility.
- Attention to detail.
- Creativity.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation**
JOB TITLE	**:**	**Senior Technician**
LEVEL	**:**	**4**

Job Responsibilities:

- Shiff Supervisors coordinate and supervise the activities of process control technicians, machine operators, assemblers and other manufacturing labourers.

Knowledge:

- Regulations and standards.
- Maintenance procedures and processes.
- Inspection techniques.
- Maintenance records and documentation.
- Safety management systems.
- Technical knowledge and industry developments.
- Compliance with regulations and standards.

Skills:

- Leadership.
- Interpersonal Communication.
- Problem-solving.
- Planning and organisation.
- Time management.
- Auditing.
- Documentation.
- Root cause analysis.

Attributes (Attitude):

- Safety-oriented.
- Professionalism.
- Team-oriented.
- Flexibility.
- Positive attitude.
- Open-minded.
- Strong work ethic.
- Continuous improvement.
- Sense of responsibility.
- Attention to details.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Production)**
JOB TITLE	**:**	**Field Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Daily field checking /routine field check with checklist (daily/weekly/monthly)
- Assist DCS operator /team leader on troubleshooting if plant encounter operational issues
- Assist in the plan safety procedure and following the LOTO system when required.
- Conduct 5s/housekeeping in the plant

Knowledge:

- Manufacturing processes.
- Machine operation.
- Quality control.
- Safety regulations.
- Engineering drawings and schematics.
- Troubleshooting.
- Lean manufacturing.
- Technical documentation.

Skills:

- troubleshooting, repair, and maintenance
- Interpersonal communication
- technical documentation
- work progress report.
- Interpersonal Communicate
- Creative problems solving
- Interdepartmental Team work
- Adhere to Occupational Safety and Health

Attributes (Attitude):

- Adhere to Occupational Safety and Health
- information sharing
- assist others to adapt changing environment.
- Workers learning opportunities
- Effective task delegation
- Prepare documents clearly and report concisely.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Quality)**
JOB TITLE	**:**	**Field Technician**
LEVEL	**:**	**3**

Job Responsibilities:

- Daily field checking /routine field check with checklist (daily/weekly/monthly)
- Assist DCS operator /team leader on troubleshooting if plant encounter operational issues
- Assist in the plan safety procedure and following the LOTO system when required.
- Conduct 5s/housekeeping in the plant

Knowledge:

- Manufacturing processes.
- Machine operation.
- Quality control.
- Safety regulations.
- Engineering drawings and schematics.
- Troubleshooting.
- Lean manufacturing.
- Technical documentation.

Skills:

- troubleshooting, repair, and maintenance
- Interpersonal communication
- technical documentation
- work progress report.
- Interpersonal Communicate
- Creative problems solving
- Interdepartmental Team work
- Adhere to Occupational Safety and Health

Attributes (Attitude):

- Adhere to Occupational Safety and Health
- information sharing
- assist others to adapt changing environment.
- Workers learning opportunities
- Effective task delegation
- Prepare documents clearly and report concisely.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Production)**
JOB TITLE	**:**	**Bale Feeder/ PulperMan/ Ragger Man**
LEVEL	**:**	**2**

Job Responsibilities:

- Daily field checklist
- Assist DCS operator /team leader on troubleshooting if plant encounter operational issues
- Assist in the plan safety procedure and following the LOTO system when required.
- Conduct 5s/housekeeping in the plan

Knowledge:

- Public Safety - Knowledge involves protecting the public, safeguarding people from crimes, disaster, and other potential dangers and threats.
- Customer and Personal Service - Knowledge of principles and processes for providing customer and personal services.
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods

Skills:

- Coordination - proficiency in adjusting actions in relation to other's actions
- Time Management - proficiency in managing time effectively to meet deadline.Commercial Driving - proficiency in operating large, heavy, or placarded hasardous material vehicles in commerce
- Equipment Maintenance - proficiency of routine maintenance on equipment and determining when and what kind of maintenance is needed.

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Pulp Mill / Stock Preparation (Quality)**
JOB TITLE	**:**	**Reject handler/ QC Technician**
LEVEL	**:**	**2**

Job Responsibilities:

- Daily field checklist
- Assist DCS operator /team leader on troubleshooting if plant encounter operational issues
- Assist in the plan safety procedure and following the LOTO system when required.
- Conduct 5s/housekeeping in the plan

Knowledge:

- Public Safety - Knowledge involves protecting the public, safeguarding people from crimes, disaster, and other potential dangers and threats.
- Customer and Personal Service - Knowledge of principles and processes for providing customer and personal services.
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods

Skills:

- Coordination - proficiency in adjusting actions in relation to other's actions
- Time Management - proficiency in managing time effectively to meet deadline.Commercial Driving - proficiency in operating large, heavy, or placarded hasardous material vehicles in commerce
- Equipment Maintenance - proficiency of routine maintenance on equipment and determining when and what kind of maintenance is needed.

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine (Production)**
JOB TITLE	**:**	**Superintendant**
LEVEL	**:**	**6**

Job Responsibilities:

- Developing and maintaining detailed project schedules, including resource allocation, critical path analysis, and progress reporting.
- Managing and mentoring a team of planners and schedulers.
- Providing technical guidance and support to the shipbuilding team.

Knowledge:

- Engineering and Technology - Knowledge of the practical application of engineering science and technology that applies principles, techniques, procedures, and equipment to the design of goods and services
- Design - Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models
- Mechanical - Knowledge of machines and tools, including their designs, uses, repair and maintenance
- Physics - Knowledge and prediction of physics principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics.
- Mathematics - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications

Skills:

- Critical Thinking - proficiency in using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
- Reading Comprehension - proficiency in understanding written sentences and paragraphs in work related documents
- Active Listening Skills - proficiency in giving full attention to what other people are saying, taking time to understand the points being made and asking questions as appropriate.
- Mathematics - proficiency in using mathematics to solve problems

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Investigative -Likes to involve in theory, research, and intellectual inquiry.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine (Production)**
JOB TITLE	**:**	**Paper Machine Manager**
LEVEL	**:**	**6**

Job Responsibilities:

- Responsible for overseeing the production process of the
- manufacturing , ensuring that products are produced efficiently, on time, and
- within budget.

Knowledge:

- Manufacturing processes (assembly, fabrication, and machining for pulp mill)
- Environmental regulations and guideline.
- project management principles and techniques.
- sourcing, procurement, inventory management, and logistics.
- lean manufacturing principles, such as 5S and Kanban.

Skills:

- Project management
- Leadership and team management
- plan and organise production schedules
- Interdepartmental coordination
- resolve production issues and decision making
- Interdepartmental communication
- Team time management

Attributes (Attitude):

- Be mindful
- Openness and able to adapt new situations
- positive attitude, face challenges
- inspire and motivate team to achieve their goals.
- Being proactive and making effective decisions

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product AREA**
	:	**Paper Mill / Paper Machine (Quality)**
JOB TITLE	**:**	**Technical Manager**
LEVEL	**:**	**6**

Job Responsibilities:

- Leading QC/QA, development of continues improvement projects in the mill in coordination with department head.
- Lead data analysis (R&D) for current machine issues/troubleshooting, optimising cost, development of new products and customer complaint.
- Preparing department budgeting (including safety equipment, personnel, equipment and etcetera).
- Provide training framework for the department technicians and engineers on the plant process, new process approach and ISO protocols.
- High level of competency and experience in pulp and papermaking industry.
- Setting of goals for the department.
- Lead ISO Audit requirements
- Manage employee hiring's for respective department.

Knowledge:

- Production design
- project management principles.
- diagnose and troubleshoot technical issues
- aligning vendor's technology
- Budget management and control

Skills:

- technical problem solving
- leadership skills.
- project management skills.
- verbal and written communication
- The ability to think strategically
- Budget management
- decision-making

Attributes (Attitude):

- Work ethic
- attention to detail.
- Flexibility.
- Results-oriented.
- collaboration

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine (Production)**
JOB TITLE	**:**	**Production Executive / Production Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- A Production Engineer is a professional responsible for designing, developing, and implementing the processes, systems, and equipment used in the production of pulp mill. They work closely with the production team and other departments such as design, quality, and procurement to ensure that the production process is efficient, effective, and meets quality standards and regulatory requirements.

Knowledge:

- Industry standards and regulations
- Complex production processes
- Data analysis data and identify areas for improvement
- Ability to effectively.
- Technical
- Manufacturing and production process

Skills:

- Technical drawing and design
- Project management
- Problem-solving
- Interpersonal Communication
- Leadership and team management
- Quality control and inspection
- Technical writing
- Time management

Attributes (Attitude):

- Attention to detail.
- Flexibility.
- Creativity.
- Positive attitude.
- Strong work ethic.
- Willingness to learn.
- Self-motivation.
- Sense of responsibility.
- Continuous improvement mindset.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine (Quality)**
JOB TITLE	**:**	**Process Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Designing and improving production processes.
- Planning and scheduling production.
- Production equipment and machinery.
- Production problem and solutions.
- Quality control procedures.

Knowledge:

- Mechanical.
- Engineering and Technology.
- Production and Processing.
- Lean Manufacturing
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical skills.
- Problem-solving.
- Analytical thinking
- Interpersonal Communication
- Critical thinking.

Attributes (Attitude):

- Attention to detail.
- Creativity.
- Adaptability.
- business acumen.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine (Quality)**
JOB TITLE	**:**	**Quality Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Responsible for ensuring that an organisation's products and services meet the highest standards of quality.
- Enhance existing knowledge and method of testing and systems that meet specific needs and requirements.
- Responsible for defining the quality standards, implementing and maintaining the quality systems, and conducting audits to ensure adherence to the set standards.

Knowledge:

- Quality management systems.
- Statistical process control (SPC).
- Root cause analysis.
- Quality tools and techniques.
- Quality standards and regulations.
- Auditing.

Skills:

- Analytical skills.
- Problem-solving skills
- Leadership skills.
- Communication skills.
- Technical expertise.
- Project management skills.

Attributes (Attitude):

- Strong ethics and integrity.
- Continuous improvement mindset.
- Proactivity.
- Open-mindedness and flexibility.
- Attention to detail.
- Creativity.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine**
JOB TITLE	**:**	**Senior Technician**
LEVEL	**:**	**4**

Job Responsibilities:

- Shiff Supervisors coordinate and supervise the activities of process control technicians, machine operators, assemblers and other manufacturing labourers.

Knowledge:

- Regulations and standards.
- Maintenance procedures and processes.
- Inspection techniques.
- Maintenance records and documentation.
- Safety management systems.
- Technical knowledge and industry developments.
- Compliance with regulations and standards.

Skills:

- Leadership.
- Interpersonal Communication.
- Problem-solving.
- Planning and organisation.
- Time management.
- Auditing.
- Documentation.
- Root cause analysis.

Attributes (Attitude):

- Safety-oriented.
- Professionalism.
- Team-oriented.
- Flexibility.
- Positive attitude.
- Open-minded.
- Strong work ethic.
- Continuous improvement.
- Sense of responsibility.
- Attention to details.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine (Production)**
JOB TITLE	**:**	**Machine Tender/Back Tender/Winderman**
LEVEL	**:**	**3**

Job Responsibilities:

- Daily field checking/ routine field check with checklist (daily/weekly/ monthly)
- Assist DCS operator/ team leader on troubleshooting if plant encounter operational issues
- Ensure all safety procedures are followed. LOTO system must be strictly followed.
- Conduct level 1 maintenance in the plant. E.g. (adjusting seal water, greasing, etc.)
- Conduct 5S/ housekeeping in the plant.
- Report any abnormalities in the process immediately to the supervisor if there will be a negative effect on production.
- Ensure all quality parameters are met.
- Monitor DCS for potential issues and take preemptive steps to mitigate impact on production and/or quality.
- Inspection of final product quality in area of responsibility (Wet end, reel, winder)

Knowledge:

- Manufacturing processes.
- Machine operation.
- Quality control.
- Safety regulations.
- Troubleshooting.
- echnical documentation.

Skills:

- troubleshooting, repair, and maintenance
- Interpersonal communication
- technical documentation
- Interpersonal Communicate
- Interdepartmental Team work
- Adhere to Occupational Safety and Health

Attributes (Attitude):

- Adhere to Occupational Safety and Health
- information sharing
- assist others to adapt changing environment.
- Workers learning opportunities
- Effective task delegation
- Prepare documents clearly and report concisely.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Paper Mill / Paper Machine**
JOB TITLE	**:**	**QC Technician**
LEVEL	**:**	**2**

Job Responsibilities:

- Daily field checklist
- Assist DCS operator /team leader on troubleshooting if plant encounter operational issues
- Assist in the plan safety procedure and following the LOTO system when required.
- Conduct 5s/housekeeping in the plant

Knowledge:

- Public Safety - Knowledge involves protecting the public, safeguarding people from crimes, disaster, and other potential dangers and threats.
- Customer and Personal Service - Knowledge of principles and processes for providing customer and personal services.
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods

Skills:

- Coordination - proficiency in adjusting actions in relation to other's actions
- Time Management - proficiency in managing time effectively to meet deadline.Commercial Driving - proficiency in operating large, heavy, or placarded hasardous material vehicles in commerce
- Equipment Maintenance - proficiency of routine maintenance on equipment and determining when and what kind of maintenance is needed.

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Converting Process**
JOB TITLE	**:**	**Superintendant**
LEVEL	**:**	**6**

Job Responsibilities:

- Developing and maintaining detailed project schedules, including resource
- allocation, critical path analysis, and progress reporting.
- Managing and mentoring a team of planners and schedulers.
- • Providing technical guidance and support to the shipbuilding team.

Knowledge:

- Engineering and Technology - Knowledge of the practical application of engineering science and technology that applies principles, techniques, procedures, and equipment to the design of goods and services
- Design - Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models
- Mechanical - Knowledge of machines and tools, including their designs, uses, repair and maintenance
- Physics - Knowledge and prediction of physics principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics.
- Mathematics - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications

Skills:

- Critical Thinking - proficiency in using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
- Reading Comprehension - proficiency in understanding written sentences and paragraphs in work related documents
- Active Listening Skills - proficiency in giving full attention to what other people are saying, taking time to understand the points being made and asking questions as appropriate.
- Mathematics - proficiency in using mathematics to solve problems

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Investigative -Likes to involve in theory, research, and intellectual inquiry.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Converting Process**
JOB TITLE	**:**	**Section Manager**
LEVEL	**:**	**6**

Job Responsibilities:

- Leading QC/QA, development of continues improvement projects in the mill in coordination with department head.
- Lead data analysis (R&D) for current machine issues/troubleshooting, optimising cost, development of new products and customer complaint.
- Preparing department budgeting (including safety equipment, personnel, equipment and etcetera).
- Provide training framework for the department technicians and engineers on the plant process, new process approach and ISO protocols.
- High level of competency and experience in pulp and papermaking industry.
- Setting of goals for the department.
- Lead ISO Audit requirements
- Manage employee hiring's for respective department.

Knowledge:

- Production design
- project management principles.
- diagnose and troubleshoot technical issues
- aligning vendor's technology
- Budget management and control

Skills:

- technical problem solving
- leadership skills.
- project management skills.
- verbal and written communication
- The ability to think strategically
- Budget management
- decision-making

Attributes (Attitude):

- Work ethic
- attention to detail.
- Flexibility.
- Results-oriented.
- ollaboration

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Converting Process**
JOB TITLE	**:**	**Process Engineer**
LEVEL	**:**	**5**

Job Responsibilities:

- Process Engineer responsible for designs and implements systems and equipment procedures used by manufacturing facilities. Their main duties include testing and monitoring equipment, updating current system processes and conducting risk assessments.

Knowledge:

- CAD/CAM Software - proficiency in computer aided design CAD software
- Automation Skills - proficiency in using technology, programs, robotics or processes to achieve outcomes with minimal human input
- Technical Engineering - ability to design and build or use machines, tools and technical equipment.
- Mechanical - Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- Workplace Safety and Health - proficiency in legal requirements, certification and registration, monitoring and surveillance, accident reporting and work injury compensation.
- Systems Analysis - proficiency in the process of observing systems for troubleshooting or development purposes.

Skills:

- Engineering and Technology - Knowledge of the practical application of engineering science and technology that applies principles, techniques, procedures, and equipment to the design of goods and services
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods
- English Language - Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar
- Mathematics - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications

Attributes (Attitude):

- Investigative -Likes to involve in theory, research, and intellectual inquiry.
- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Converting Process**
JOB TITLE	**:**	**Production Planner**
LEVEL	**:**	**4**

Job Responsibilities:

- Production Planner plan, direct and coordinate the business services activities of the company or organisation concerned. Responsible for plan, organise, direct, control and coordinate sales and marketing activities of an enterprise or organisation

Knowledge:

- Critical Thinking - proficiency in using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
- Monitoring - proficiency in monitoring/assessing performance of yourself, other individuals, or organisations to make improvements or take corrective action
- Speaking - proficiency in communicating effectively as well as convey information verbally and in a way that can understand.
- Coordination - proficiency in adjusting actions in relation to other's actions

Skills:

- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods
- Administration and Management - Knowledge of business and management principle involved in strategic planning, resource allocation, human resources modelling, leadership technique, production methods, and coordination of people and resources
- Customer and Personal Service - Knowledge of principles and processes for providing customer and personal services.
- Personnel Human Resources - Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relatons and negotiation, and personnel information systems

Attributes (Attitude):

- Social -Likes to communicating and teaching people, often involve helping or providing service to others.
- Enterprising -Likes to involve in starting up and carrying out projects and often deal with business
- Conventional -Likes to involve in managing data, information, and processes.
- Investigative -Likes to involve in theory, research, and intellectual inquiry.
- Public Relations -Likes to meet people, converse, discuss and sometimes deal with influence people.
- Calculation -Likes working with numbers, statistics and calculations.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**Converting Process**
JOB TITLE	**:**	**Leader**
LEVEL	**:**	**3**

Job Responsibilities:

- Leading a team of production workers, including setting goals, evaluating performance, and providing feedback and coaching.
- Managing production schedules to ensure that deadlines are met and that production runs smoothly.
- Managing inventory levels to ensure that production runs smoothly and that there are no delays due to lack of materials.
- Troubleshooting production problems and implementing solutions to resolve them.
- Implementing quality control procedures to ensure that products are of the highest quality.

Knowledge:

- Engineering and Technology.
- Design.
- Production and Processing.
- Manufacturing Process
- Quality Assurance / Quality Control

Skills:

- Technical expertise.
- Leadership.
- Communication.
- Problem-solving.
- Quality control.

Attributes (Attitude):

- Attention to detail.
- Adaptability.
- Continuous Learning.
- Professionalism.
- Positive attitude.
- Integrity.
- Teamwork

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product**
AREA	**:**	**CONVERTING PROCESS**
JOB TITLE	**:**	**Handler/ QC Technician**
LEVEL	**:**	**2**

Job Responsibilities:

- Daily field checklist
- Assist DCS operator /team leader on troubleshooting if plant encounter operational issues
- Assist in the plan safety procedure and following the LOTO system when required.
- Conduct 5s/housekeeping in the plant

Knowledge:

- Public Safety - Knowledge involves protecting the public, safeguarding people from crimes, disaster, and other potential dangers and threats.
- Customer and Personal Service - Knowledge of principles and processes for providing customer and personal services.
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods

Skills:

- Coordination - proficiency in adjusting actions in relation to other's actions
- Time Management - proficiency in managing time effectively to meet deadline.Commercial Driving - proficiency in operating large, heavy, or placarded hasardous material vehicles in commerce
- Equipment Maintenance - proficiency of routine maintenance on equipment and determining when and what kind of maintenance is needed.

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Conventional -Likes to involve in managing data, information, and processes.

MSIC DIVISION	**:**	**C17 - Manufacture of Paper and Paper Product**
MSIC GROUP	**:**	**C170 - Manufacture of Paper and Paper Product AREA**
	:	**Converting Process**
JOB TITLE	**:**	**Printing Operator/ Packaging Operator**
LEVEL	**:**	**1**

Job Responsibilities:

- Printing Operator maintains inventory of supplies needed to operate printing machines. Troubleshoots issues with printing machine and makes basic repairs.
- Performs routine maintenance on printing machines.

Knowledge:

- Active Listening Skills - proficiency in giving full attention to what other people are saying, taking time to understand the points being made and asking questions as appropriate.
- Monitoring - proficiency in monitoring/assessing performance of yourself, other individuals, or organisations to make improvements or take corrective action
- Speaking - proficiency in communicating effectively as well as convey information verbally and in a way that can understand.
- Time Management - proficiency in managing time effectively to meet deadline.

Skills:

- Mechanical - Knowledge of machines and tools, including their designs, uses, repair and maintenance
- Production and Processing - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximising the effective manufacture and distribution of goods

Attributes (Attitude):

- Realistic - Likes to work outside, and do not involve a lot of paperwork or working closely with others.
- Conventional -Likes to involve in managing data, information, and processes.

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OCCUPATIONAL FRAMEWORK
MSIC C17
SECTION C : MANUFACTURING
DIVISION 17 : MANUFACTURE OF PAPER AND PAPER PRODUCTS

2024