OCCUPATIONAL FRAMEWORK

SECTION J: INFORMATION AND COMMUNICATION

DIVISION 58: PUBLISHING ACTIVITIES

First Printing 2021

ABSTRACT

An Occupational Framework (OF) is the outcome of the analysis conducted to identify the occupational areas' work scope in terms of competencies. It is used to analyse skilled manpower's competency requirements for the industry. The OF aims to provide an overall view of the industry's Occupational Structure (OS) and identify skills gaps, critical job titles, and Occupational Descriptions (OD) that would assist in further understanding the job requirements of the various occupations in the industry. Department of Skills Development (DSD) is the custodian of this document. The OF identifies the suitable occupational areas that either require the development of skills training programmes or the review and enhancement of existing skills training programmes. The OF for Publishing Activities are based on the Malaysian Standards Industrial Classification 2008 (MSIC 2008) under Section J: Information and Communication, Division 58: Publishing Activities. This document is divided into several chapters. Chapter 1 includes the standard definitions of terminology used in the DSD skills training system and documentation, followed by the OF development's objectives, scope, and justification. Chapter 2 includes the industry overview highlighting the definition and scope of the industry, stakeholders, legislation, initiatives, and market intelligence of the industry. Chapter 3 explains the methodology used in the OF development, such as qualitative analysis through brainstorming discussion sessions. Chapter 4 discusses findings from the previous study, focus group discussion findings transformed into the OS, OD, jobs in demand, skills in demand, and emerging skills. Chapter 5 concludes that the total number of job areas identified is 24, with 101 job titles and 21 job titles are identified as critical job titles, and 27 job titles are related to Industrial Revolution 4.0 (IR4.0).

ABSTRAK

Kerangka Pekerjaan (OF – *Occupational Framework*) merupakan hasil analisis yang dijalankan untuk mengenal pasti skop kerja bidang pekerjaan dari segi kompetensi. Bahan ini digunakan untuk menganalisis keperluan kempetensi tenaga kerja mahir untuk industri. OF bertujuan memberikan pandangan menyeluruh tentang Struktur Pekerjaan (OS – *Occupational Structure*) industri dan mengenal pasti jurang kemahiran, jawatan pekerjaan kritikal dan Deskripsi Kerja (OD – *Occupational Description*) yang akan membantu pemahaman terhadap keperluan kerja pelbagai pekerjaan dalam industri. Jabatan Pembangunan Kemahiran ialah jabatan yang bertanggungjawab terhadap dokumen ini. OF mengenal pasti bidang pekerjaan yang sesuai sama ada yang memerlukan pembangunan program latihan kemahiran atau kajian semula dan peningkatan program latihan kemahiran yang sedia ada. OF untuk aktiviti penerbitan berasaskan Klasifikasi Perindustrian Piawaian Malaysia 2008 (MSIC – *Malaysia Standard Industrial Classification* 2008) di bawah Seksyen J - Maklumat dan Komunikasi, Bahagian 58 – Aktiviti Penerbitan. Dokumen ini dibahagikan kepada beberapa bab, iaitu Bab 1 merangkumi takrifan piawai bagi istilah yang digunakan dalam Sistem Latihan Kemahiran Jabatan Pembangunan Kemahiran dan dokumentasi, diikuti oleh objektif, skop dan justifikasi pembangunan Kerangka Pekerjaan. Bab 2 merangkumi gambaran industri yang menonjolkan definisi dan skop industri, pihak berkepentingan, perundangan, inisiatif dan kecerdasan pasaran industri. Bab 3 menjelaskan metodologi yang digunakan dalam pembangunan seperti analisis kualitatif melalui sesi sumbang saran perbincangan. Bab 4 membincangkan penemuan kajian daripada kajian lampau, perbincangan kumpulan fokus yang diterjemahkan ke dalam Struktur Pekerjaan, Deskripsi Kerja, pekerjaan yang diperlukan, kemahiran yang diperlukan dan kemahiran baru muncul. Bab 5 menyimpulkan bahawa jumlah bidang kerja yang dikenal pasti ialah 24 bidang dengan 101 jawatan pekerjaan dan 21 jawatan pekerjaan yang dikenal pasti sebagai jawatan pekerjaan kritikal dan 27 jawatan pekerjaan yang berkait rapat dengan Revolusi Industri 4.0.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
AR	Augmented Reality
BDA	Big Data Analytics
BEA	Bureau of Economic Analysis
BSJ	Bernama School of Journalism
CBT	Competency Based Training
DDIs	Domestic Direct Investment
DOSM	Department of Statistic Malaysia
DSD	Department of Skills Development
FDIs	Foreign Direct Investment
FinTech	Financial Technology
GDP	Gross Domestic Product
IoT	Internet of Things
IDC	International Data Corporation
ICT	Information Communication Technology
IKKM	*Institut Koperasi Malaysia*
IP	Internet Protocol
IPPTAR	*Institut Penyiaran dan Penerangan Tun Abdul Razak*
IR4.0	Industrial Revolution 4.0
ISIC	International Standard Industrial Classification
IT	Information Technology
IT-BPM	Information Technology and Business Process Management
JPK	*Jabatan Pembangunan Kemahiran*
LS	Low Skilled Worker
MABOPA	Malaysian Book Publishers Association
MaGIC	Malaysia Global Innovation and Creative Centre
MAMPU	Malaysian Administrative Modernisation and Management Planning Unit
MAPIM	*Majlis Penerbitan Ilmiah Malaysia*
MASCO	Malaysia Standard Classification of Occupation
MCMC	Malaysian Communications and Multimedia Commissions
MDEC	Malaysian Digital Economy Corporation
MIDA	Malaysian Investment Development Authority
MIMOS	Malaysian National Applied Research and Development Centre
MITI	Ministry of International Trade and Industry
MOSQF	Malaysia Occupational Skills Qualification Framework
MPI	Malaysia Press Institute
MQA	Malaysia Qualifications Agency
MQF	Malaysian Qualification Framework
MSAP	Mandatory Standard for Access Pricing
MSC	Multimedia Super Corridor
MSIC	Malaysia Standard Industrial Classification
My IPO	Intellectual Property Corporation of Malaysia
NACSA	National Cyber Security Agency
NASSCOM	National Association of Software and Services Companies
NCS	National Competency Standard
NOSS	National Occupational Skills Standard

NUJ	National Union of Journalist
OA	Occupational Analysis
OAS	Occupational Area Structure
OF	Occupational Framework
OD	Occupational Description
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OS	Occupational Structure
PERGRAKAN	*Pertubuhan Pereka Grafik Kebangsaan*
PIKOM	*Persatuan Industri Komputer dan Multimedia Malaysia*
PSISP	Public Sector ICT Strategic Plan
S	Skilled Workers
SIRIM	Standard and Industrial Research Institute
SJPP	Business Loan Guarantee Scheme (*Syarikat Jaminan Pembiayaan Perniagaan*)
SME	Small Medium Enterprise
SS	Semi-Skilled Workers
SSM	*Suruhanjaya Syarikat Malaysia*
TVET	Technical and Vocational Education and Training

GLOSSARY

Book Publishing	The activities of publishing books in print, electronic or audio form or on the Internet
Business and other applications	Collection of components that provides a business functionality that you can use internally, externally, or with other business applications. You can create business applications of individual components, which are related to each other.
Fiction	Literature in the form of prose, especially novels, that describes imaginary events and people.
Operating System	A suite of programs that starts up when you switch on your computer and manage and run all the other programs installed on the computer
Non-Fiction	Prose writing that is informative or factual rather than fictional.
Publishing Activities	Publishing activities include publishing books, brochures, leaflets, dictionaries, encyclopedias, atlases, maps and charts; publishing of newspapers, journals and periodicals; directory and mailing list, and other publishing, as well as software publishing.
Software Publishing	Publishing of ready-made (non-customized) software such as operating systems, business and other applications, computer games for all platforms.
Software	A generic term describing all kinds of computer programs, applications and operating systems

CHAPTER I

INTRODUCTION

1.1   Introduction

This chapter presents the statement of the problems, research objectives, scope of the study, and justification of MSIC 2008 section selection for the development of the Occupational Framework (OF) for Section J: Information and Communication. Section J was divided into six divisions: (i) Publishing Activities (Division 58); (ii) Motion Picture, Video, and Television Programme Production, Sound Recording, and Music Publishing Activities (Division 59); (iii) Programming and Broadcasting Activities (Division 60); (iv) Telecommunications (Division 61); (v) Computer Programming, Consultancy and Related Activities (Division 62) and (vi) Information Service Activities (Division 63). This OF only focused on 2-digits MSIC 2008 Division 58: Publishing Activities. This division includes the publishing of books, brochures, leaflets, dictionaries, encyclopedias, atlases, maps and charts, publishing of newspaper, journals and periodicals, directory and mailing list and other publishing, as well as software publishing. The concept of the OF and its function in skills training and curriculum development was also elaborated in this chapter.

1.2   Problem Statement

The COVID-19 pandemic induced lockdowns and created a highly uncertain outlook for the labour market. Information and Communication industries like publishing activities are expected to see an increase in demand in the future. This can be attributed to the fact that publishing activities are at the forefront of adopting 4.0 technologies. However, the pace of technology adoption is expected to remain unabated and may accelerate in some areas. The skills gap also remains high as in-demand skills across jobs change in the next five years (The Future of Jobs, 2020).

The demand for publishing activities has been increasing throughout the years. The insufficient numbers of skilled workers in this industry caused drawbacks such as slow progress in the industry, unable to progress in terms of development of the industry, and also caused a massive difference in technology advancement compared to other developed countries. The identification of Occupational Structure (OS) is a must to identify the critical jobs in the industry. Various National Occupational Skills Standard (NOSS) documents had been developed under OF for the Information and Communication of publishing activities. However, a complete analysis of the OS of the publishing activities has not been undertaken before this. Therefore, research and study were essential to identify the industry's overall structure and available career paths.

1.3 Research Objectives

The objectives of this study are as follows:

a) To develop Occupational Structure (OS) for the publishing activities based on Malaysia Standard Industrial Classification 2008 (MSIC 2008);

b) To identify the skills in demand in the publishing activities;

c) To determine critical jobs for the industry of the Publishing activities;

d) To determine the relevant job titles that are in line with IR 4.0, and;

e) To develop the Occupational Description (OD) for each job title based on the industry Occupational Structure (OS).

1.4 Scope of Study

The scope of this research was based on MSIC 2008 under Section J: Information and Communication and only focused on Division 58: Publishing Activities. The scope includes the literature review study on the current industry and covers the input from the relevant sector representatives for the publishing activities industry. The study also focused on the job in demand which was in line with emerging technology requirements. The focus group discussion was conducted with the sector representatives and any order methods to achieve the study outcome. The outcome of the research was the OS, OD, jobs in demand and skills in demand.

1.5   Research Approach

Table 1.1 displays the data sources, research methods and data analysis implemented within this study based on research objectives.

Table 1.1 Summaries of Research Objectives, Research Questions, Data Sources & Methods and Data Analysis

Research Objectives	Research Questions	Data Sources & Methods	Data Analysis
RO1: To develop Occupational Structure (OS) for the publishing activities based on MSIC 2008.	**RQ1:** How to develop OS based on MSIC 2008?	Document Analysis **Qualitative Method:** Focus Group Discussion (N=15)	Propose OS based on MSIC 2008 Summarize an OS for publishing activities
RO2: To identify the skills in demand in the publishing activities.	**RQ2:** What competencies are in demand in the publishing activities industries?	Review on existing research **Quantitative Method:** Survey (Cluster Sampling) **Qualitative Method:** Focus Group Discussion (N=15)	Descriptive (Percentage, Chart, Frequency) List of competencies List the critical jobs List of jobs relevant to 4IR
RO3: To determine critical jobs for the industry of the Publishing activities	**RQ3:** What are the critical job for the industry of the Publishing activities?		
RO4: To determine the relevant job titles in line with 4IR.	**RQ4:** What are the relevant job titles in line with 4IR?		
RO5: To develop the Occupational Description (OD) for each job title based on the industry Occupational Structure (OS).	**RQ5:** How to develop the OD for each job title?	**Qualitative Method:** Focus Group Discussion (N=15)	Summarize an OD for each job title

1.6 Structure of Chapters

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

a) Chapter 1

This chapter introduces the research, problem statement, research objective, research scope, and justification based on 2-digits MSIC 2008 Division 58: Publishing Activities.

b) Chapter 2

This chapter consists of a review of the research explained in this chapter to give further clarification about the research. The information was gained from different sources such as the National Occupational Skills Standard (NOSS), Malaysia Standard Industrial Classification 2008 (MSIC 2008), and other related documents.

c) Chapter 3

This chapter consists of the research approach and method deployed to achieve the research objective, such as the focus group discussion with an expert from the industry, a survey from the company related to the industry, and document analysis based on published information in this chapter.

d) Chapter 4

This chapter consists of the results and findings of the research based on the approach. The methods deployed throughout this research are listed in this chapter.

e) Chapter 5

This chapter explains the discussion, recommendations, and conclusion on the research done.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter provides a brief overview of the publishing activities in Malaysia. The first part reviews the background of the Occupational Framework (OF). It is followed by the scope of this OF, which is the Malaysia Standard Industrial Classification 2008 (MSIC 2008) Version 1.0. Next, the discussion continued with the industry and market analysis and the relation of the industrial revolution to the occupation. NOSS relevant the Publishing sector that had been developed previously is also being revisited.

2.2 Occupational Framework (OF)

The Occupational Framework (OF) is described as the outcome of the occupational analysis process to identify the Occupational Structure (OS) of an industry. The OF, which was previously known as Occupational Analysis (OA), consists of Occupational Structure (OS), Occupational Descriptions (OD), and skills in demand. The development of the OF was a preliminary process in developing relevant National Occupational Skills Standard (NOSS). Once developed, the NOSS can be used to conduct skills training and skills certification of competent personnel.

2.2.1 Elements of Occupational Framework

The main elements of the Occupational Framework (OF) consist of (i) Occupational Structure (OS) and Occupational Description (OD). Occupational Structure refers to the aggregate distribution of occupations in the organisation, classified according to skill level, economic function, or social status. It depicts the occupational areas and career paths for a particular

profession. In addition, it contains the list of responsibilities, requirements, job level, and soft skills attributed to the particular job. Skills in demand indicate the shortage of skilled workforce in the industry. This shortage is said to happen based on various factors, such as legislative requirements, global trades, and the introduction of new processes and emerging technologies.

2.2.2 The Importance of Occupational Framework

There are a few documents used in guiding the structure of the process. The classification of an OF is produced based on the Malaysian Standard Industrial Classification (MSIC) 2008 issued by the Department of Statistics Malaysia (DOSM). The MSIC 2008 is a governed field classification document that aims to restructure the industry sector to be in line with any national and international standards as a whole. Later, the disclosed OF report will be one of the references in developing the National Occupational Skills Standard (NOSS) for related industries. The following sub-heading highlights the MSIC 2008 and associated information in the publishing activities sector.

2.3 Malaysia Standard Industrial Classification 2008 (MSIC 2008)

This section provides the details of Malaysian Standard Industrial Classification (MSIC) 2008 Version 1.0, in the scope of publishing activities. The definition of MSIC 2008 and title selection criteria are explained in this section.

2.3.1 Overview of MSIC

The MSIC 2008 is intended to be a standard classification of productive economic activities. Its primary purpose is to provide a set of activity categories that can be utilised to collect and present statistics according to such activities. Therefore, MSIC aims to present these set of activity categories so that entities can be classified according to the economic activity that they carry out. For the purposes of international comparability, the MSIC 2008 Version 1.0 conforms closely to the International Standard Industrial Classification (ISIC) of all economic activities Revision 4, published by the United Nations Statistics Division, with some modifications to suit national requirements. The objective of an industrial classification system is to classify data in respect of the economy according to categories of activities and the characteristics of which have been similar. Thus, the MSIC is a classification of all types of economic activities and is not a classification of goods and services or occupations.

2.3.2 MSIC Sections related to Section J: Information and Communication

There are six divisions under Section J, as shown in Figure 2.1.
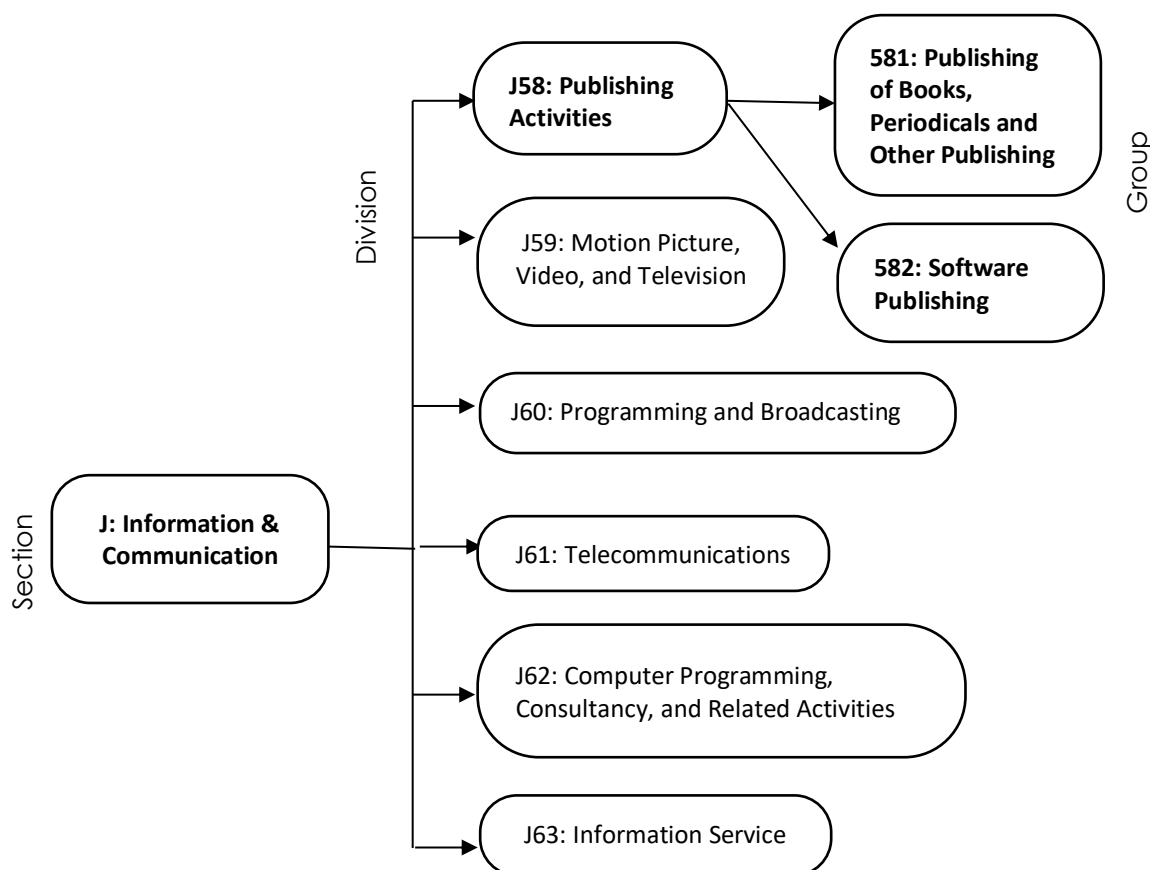
Figure 2.1: Section J: Information And Communication

2.3.3 Scope of Occupational Framework Based on MSIC 2008 (Publishing Activities)

In order to review that the scope of the publishing activities is comprehensively covered in this OF research, the definition of publications has to be spelt out clearly. Under MSIC, the area being researched falls under the Section and Division listed below:

Table 2.1: Summary of MSIC 2008 by Section, Division and Group (MSIC, 2008)

Section	J	Information and Communication
Division	58	Publishing Activities
Group	581	Publishing of Books, Periodicals, and Other Publishing Activities
	582	Software Publishing

To further understand the scope of this particular Occupational Framework based on MSIC 2008, Table 2.2 below can be referred to.

Table 2.2: Description of MSIC 2008 by Section, Division, Group, Class, and Item (MSIC, 2008)

Classification	Code	Description
Division	58	**Publishing Activities** This division includes the publishing of books, brochures, leaflets, dictionaries, encyclopedias, atlases, maps, and charts; publishing of newspapers, journals, and periodicals; directory and mailing list and other publishing, as well as software publishing. Publishing includes the acquisition of copyrights to content (information products) and making this content available to the general public by engaging in (or arranging for) the reproduction and distribution of this content in various forms. All the feasible forms of publishing (in print, electronic or audio form, on the internet, as multimedia products), except publishing of motion pictures, are included in this division. This division excludes the publishing of motion pictures, videotapes, movies, or similar media (division 59) and the production of master copies for records or audio material (division 59). Also excluded are printing (see 1811) and the mass reproduction of recorded media (see 1820).
Group	581	**Publishing of Books, Periodicals, and Other Publishing Activities** This group includes activities of publishing books, newspapers, magazines, and other periodicals, directories and mailing lists, and other works such as photos, engravings, postcards, timetables, forms, posters, and reproductions of works of art. These works are characterised by the intellectual creativity required in their development and are usually protected by copyright.
Class	5811	**Book Publishing** **Include:** The activities of publishing books in print, electronic or audio form or on the Internet.
Classification	**Code**	**Description**
		Excludes: (a) production of globes, see 32909 (b) publishing of advertising material, see 58190 (c) publishing of music and sheet books, see 59200 (d) activities of independent authors, see 90004
Item	58110	**Publishing of books, brochures, and other Publications** **Includes:** (a)publishing of leaflets and similar publications, including

		publishing of dictionaries and encyclopedias (b) publishing of atlases, maps, and charts (c) publishing of audiobooks (d) publishing of encyclopedias, etc. (e) online publishing of books, etc.
Class	**5812**	**Publishing of directories and mailing lists**
Item	**58120**	**Publishing of mailing lists, telephone book, other Directories** **Includes:** Online publishing of directories and mailing lists
Class	**5813**	**Publishing of newspapers, journals and** **Periodicals**
Item	**58130**	**Publishing of newspapers, journals, magazines and** **periodicals in print or electronic form** **Includes:** (a) on the Internet and publishing of radio and television schedules (b) publishing of advertising newspapers (c) Online publishing of newspapers, etc.
Class	**5819**	**Other publishing Activities** **Include:** Online publishing of other information (greeting cards, statistics, etc.), database publishing. **Exclude:** (a) retail sale of software, see 4741 (b) publishing of advertising newspapers, see 58130 (c) Online provision of software (application hosting and application service provisioning), see 63111
Item	**58190**	**Publishing of catalogues, photos, engraving and** **postcards, greeting cards, forms, posters,** **reproduction of works of art, advertising material and** **other printed matter n.e.c.**
Classification	**Code**	**Description**
Group	**582**	**Software Publishing** This group includes publishing ready-made (non-customized) software such as operating systems, business, and other applications, computer games for all platforms.
Class	**5820**	**Publishing of ready-made (non-customized) Software** **Include:** Online software publishing **Exclude:** (a) reproduction of software, see 18200 (b) retail sale of non-customized software, see 47412 (c) production of software not associated with publishing, see 62010 (d) Online provision of software (application hosting and

		application service provisioning), see 63111
Item	58201	**Business and other applications**
Item	58202	**Computer games for all platforms** **Includes:** Publishing of software for video game consoles
Item	58203	**Operating Systems**

2.4 Industry and Market Analysis

Industry and market intelligence is the collection and analysis of data of an industry by various sources of data to be utilised by the industry to make business decisions, human resources developments, and training requirements. Industry intelligence is critical for developing strategies in the development of the industry, areas of human resources development, and the impact of those developments. This section focuses on a discussion regarding the current growth of the industry and employment statistics of the publishing activities industry.

2.4.1 The Digitisation in the Malaysia Publishing Industry

The transition from analogue to digital forms is experiencing a substantial technological shift in the publishing industry. This change challenges existing business models and encourages companies to re-examine their product portfolios as their core competencies. Despite the examples of digitisation in other creative industries, what is not clear for the publishing one is the model to follow in its digitalisation process, notwithstanding those publishing companies will not be impervious to technical change and that, therefore, current publishing ways will be modified in future. Specifically, many publishers have had to face the new challenges posed by all the innovations and technological changes associated with the Internet, the e-book, or print on demand, among others.

Diaz and Jesus (2019) mentioned that digital publishing is a new model of publishing where

content is created, published, and produced using only digital technology, and digital products or services are published online. It offers the possibility of having the content in various formats like (i) Paperback; (ii) E-Book; (iii) Audio Book; (iv) Interactive Book (i-Book) or (v) Augmented Reality Book (AR Book), depending on customer's preferences.

There are more than 200 publishing companies of private capital in Malaysia. However, the vast majority publishes less than ten titles per year. The sectoral structure is mainly comprised of small and medium enterprises, and where more than a quarter belongs to a business group. Five hundred twenty-two (522) e-book titles were uploaded to the e-book platform for 2021 (MABOPA,2021). Most of the books participated in the ABM2020 book award nominations. As an initiative, these uploaded e-books will be marketed overseas through an e-Sentral platform. MABOPA has partnered with e-Sentral to appoint e-Sentral as the aggregator for this goal. These are among the promotional activities that can be done to lift books nominated to gain more significant market opportunities.

Figure 2.2 shows the statistics of an hour spent reading an e-Book through the e-Sentral platform by category. From these statistics, most readers prefer to read romance books (fiction) compared to academic books (non-fiction). While figure 2.3 shows the reading hours on e-Book for the year 2020. During the lockdown, most of the netizens downloaded the e-Book reader and bought e-book through E-Sentral. Besides E-Sentral, readers also can get e-books from other sources such as Google Books and Amazon Kindle.

Category Malay	Hours spent
Romantik	356,710.63
Novel Am	288,372.8
Novel Remaja	26,336.52
Jenayah	8,687.67
Islam	3,875.20
Motivasi	3,149.50
Chick-Lit	2,893.19
Akademik Am	2,740.31
Keluarga & Kesihatan	2,006.35
Sejarah	1,926.15
Komik	1,895.31
Gaya Hidup	1,870.05
Agama	1,801.18
Perkahwinan	1,490.60
Pengurusan dan Perniagaan	880.10
Kanak-kanak	670.03
Kewangan & Pelaburan	652.95
Majalah	587.58
Politik	322.17

Figure 2.2: E-Book In Demand By Category (E-Sentral, 2020)
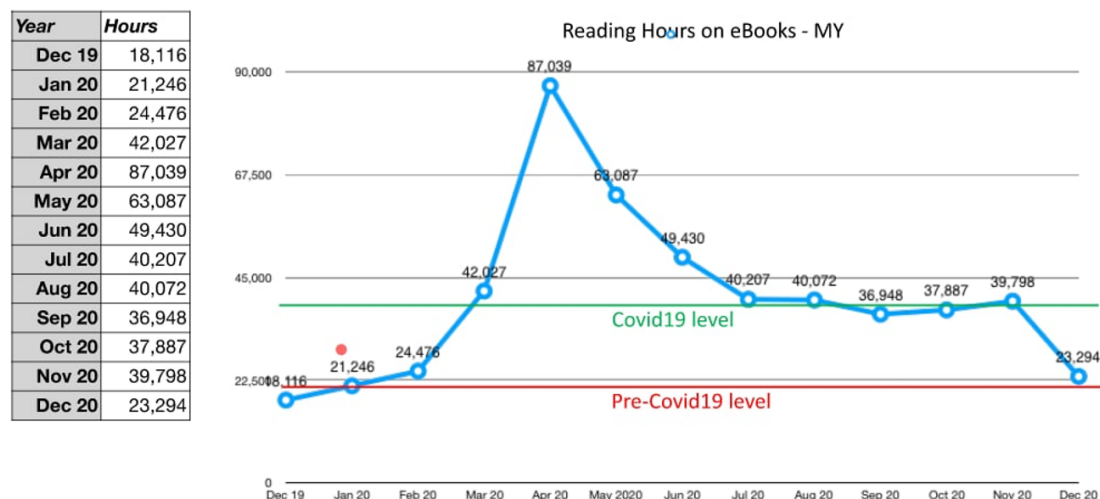
Figure 2.3: Reading Hours on e-Book for the year 2020 (E-Sentral, 2020)

MAPIM also took the initiative to start publishing e-books in 2020 as sales of paperback books are quite limited. Therefore, the usual physically held book fair had to be cancelled. All book fairs are held virtually where all publishers share knowledge through webinars, forums, virtual visits, etc. However, the demand for paperback books is still in demand. The Malaysian National Book Council (MBKM) also holds copyright trade cooperation programs for cooperation with foreign publications. Table 2.3 shows the total of publications by MAPIM members for the year 2020. Based on this data, Universiti Utara Malaysia (UUM) published an e-book with around 150 titles, followed by Universiti Teknologi Malaysia (UTM) with 135 titles, UiTM with 61 titles, and Universiti Kebangsaan Malaysia (UKM) with 57. Dewan Bahasa dan Pustaka (DBP) still publishes paperback versions with 211 titles, whereas DBP has its target buyers and book categories, such as textbooks.

Table 2.3: Total of Publication by MAPIM (2020)

Publisher (MAPIM)	Publications		Total of Publications
	Paperback	e-Book	
UKM	264	57	321
DBP	211	0	211
UTM	19	135	154
USIM	66	62	128

UMT	59	57	116
UUM	48	150	198
UiTM	30	61	91
UTeM	76	10	86
UPSI	38	35	73
UM	35	20	55
UTHM	20	29	49
UMK	26	20	46
UMP	41	1	42
USM	28	9	37
UNIMAS	34	3	37
UMS	29	7	36
UPNM	21	11	32
ITBM	29	0	29
UPM	28	0	28
UIAM	22	0	22
UNISZA	15	6	21
MARDI	13	0	13
UNIMAP	12	0	12
UTP	8	3	11
UNIKL	6	0	6
KUIM	5	0	5
KUIS	4	0	4
YDSM	0	0	0

2.4.2 The Global Publishing Industry

In order to increase the adoption of new digital formats, e-Book and audiobook trials and sales surged due to on-demand culture and reluctance to visit bricks and mortar stores or wait for delivery. New digital formats, like chat books and e-Book subscription services, are emerging in Asia, combining reading with online social connectivity and peer referral. This demonstrates a trend toward digital publications.

The demand for digital textbooks and online educational resources has increased due to school closures and the transition to remote learning. Book Selling, Purchasing, and Discovery is adapting to the new normal. Most small and medium-sized publishers adopt digital-first strategies, and independent bookstores are developing e-commerce and fulfilment capabilities to compete on localised services and unique catalogues by smaller publishers. International book fairs are providing hybrid on- and offline experiences. Publishers are shifting to the online author and title marketing, and discovery strategies include editing and evaluation. Educational publishers adapt to home-based teaching and learning while incorporating student and teacher

wellbeing in product development. Figure 2.4 shows the evaluation of books by format in the year 2014-2018 (WIPO, 2019)

Figure 12. Evolution of books deposited in legal repositories by format, 2014–2018
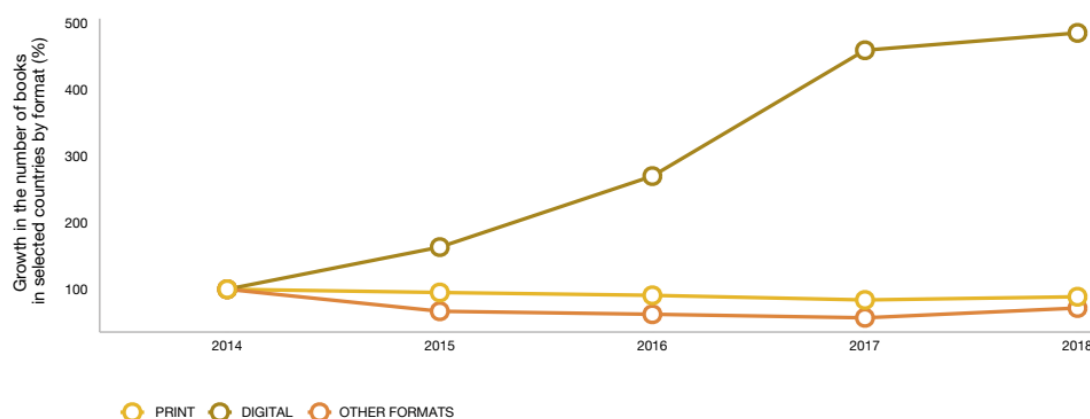
Note: the graph covers 17 countries/territories.
Source: WIPO Statistics Database, December 2019.

Figure 2.4: Evolution of books by format for the year 2014 to 2018 (WIPO, 2019)

2.4.3   Growth of Software Publishing Activities

For software publishing, MDEC has introduced initiatives to boost digital content creators, allowing them to better realise their potential by providing them with essential tools and knowledge. This results in locally made content that is now captivating a worldwide audience. Malaysia's digital content market has grown substantially over the years, in which 11,590 jobs have been created in creative industries (MDEC, 2018). As Malaysia's digital content market continues to grow, the local digital creative content industry has expanded to accommodate said growth, as shown in table 2.4.

Table 2.4: Industry size for Creative Tech Industry

Industry	Total of Companies
Animation	100
VFX Companies	114
Games and Interactive Media Companies	53
New Media & Platform Companies	84
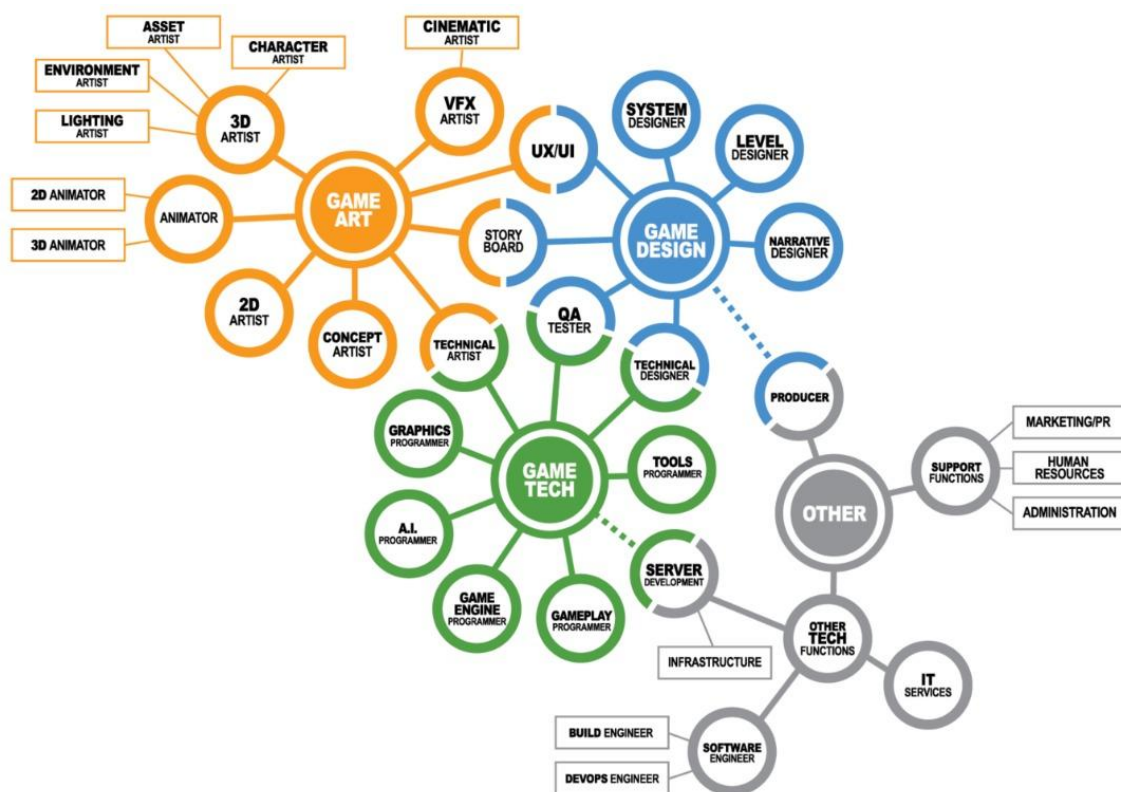
Figure 2.5: Jobs Title for Creative Industry

2.4.4 Factors Influencing The Labour Market Competitiveness

The sudden outbreak of COVID-19 worldwide has understandably drawn all attention to itself. The pandemic has affected each sector, including publishing activities industries—this dramatic situation is illustrated with the increase of the unemployment rate in 2021. Unemployment represents a waste of resources and potentially decreases the gross domestic product, causing the loss of human capital, wellbeing, and even health. The interconnectedness of the economy and the labour market strongly influences the demand for work, while the supply for work unquestionably is under the influence of factors such as employment and activity rates, mindset change, upskilling/reskilling, duration of education, and life-long learning (Cvečić and Danijela, 2018). Figure 2.6 shows the processes and factors influencing the labour market competition. Lack of labour demand, inadequate workers' skills, institutional factors such as Employment Protection Legislation, labour taxation, tight fiscal positions, the extinguishing of industries, disruptive technologies, and other factors are often cited as causes of unemployment or inactivity.
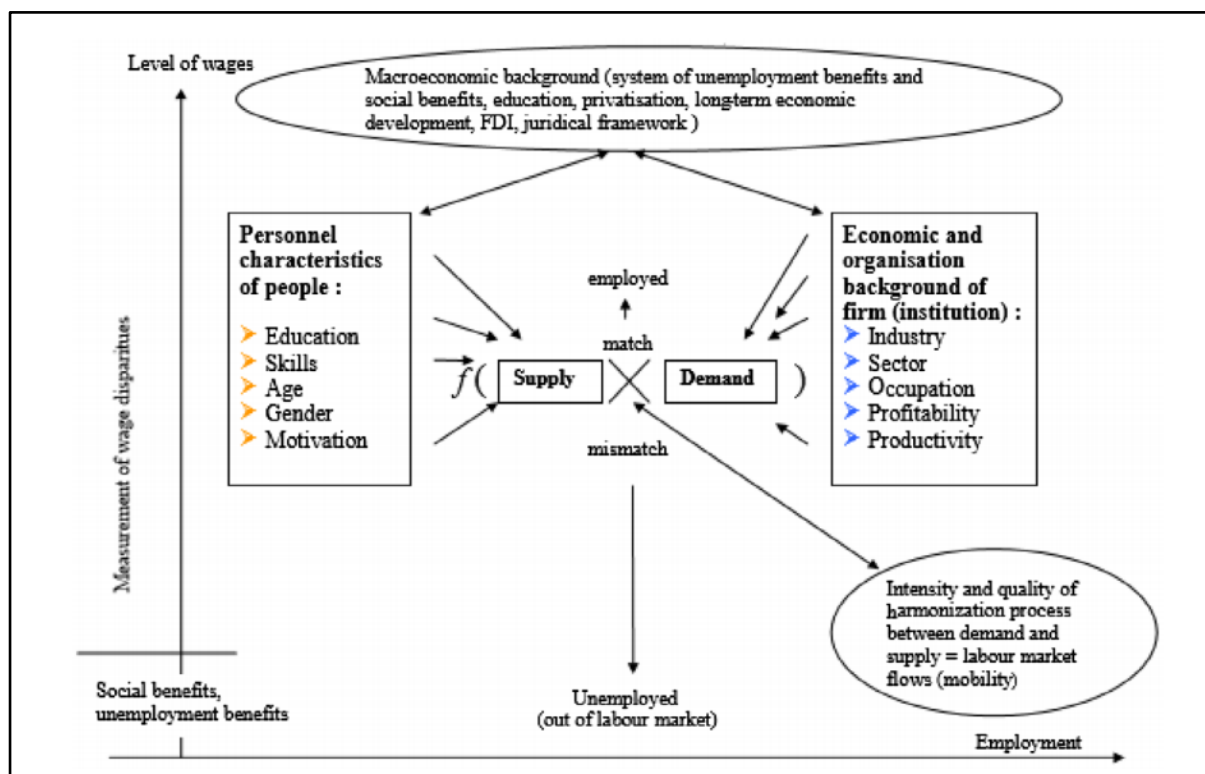
Figure 2.6: Processes and factors influencing the labour market competition (Cvečić and Danijela, 2018).

2.4.5 Employment Statistics

This section provides an overview regarding the labour force, labour demand in Malaysia, and employment statistics of the publishing activities industry.

a) Labour Force in Malaysia

Labour force can be defined as the sum of persons in employment plus persons in unemployment. Together these two groups of the population represent the current supply of labour for producing goods and services in a country through market transactions in exchange for remuneration. The concept and definition of the labour force in Malaysia are stated in table 2.12. Malaysia's labour force increased by 0.8%, from 15.96 million persons in November 2020 to nearly 16.09 million persons in April 2021. Nevertheless, with the impact of the COVID-19 outbreak in late 2020, the worldwide labour market continues to confront problems. Malaysia is no exception; during the crisis, the unemployment rate registered more than 4.5% compared to the pre-crisis level of below 4.0%. According to Asia Pacific Employment and Social

Outlook (APESO) 2020 by International Labour Organisation (ILO), job losses was estimated that 81 million job losses occurred in the Asia Pacific region due to the COVID-19 pandemic. As a result, the number of employees in the Asia Pacific region in 2020 dropped to 1.84 billion persons from the pre-crisis estimate of 1.92 billion employed persons. The Labour force participation rate (LFPR) in April 2021 stood at 68.6% during the month. Since April 2020, the labour force has grown by 2.4% or 382.5 thousand employed people, while the LFPR has increased by 0.5 percentage points to 68.1%. This shows that the country's economy is still operating with full employment where the unemployment rate is below 4.0%.

2.4.6 Overview of services sector labour demand

Labour demand refers to the entire amount of labour that the economy is willing to employ at any particular time. At the microeconomic level, a firm's labour demand relates to roles within the company, and the information of filled positions and vacancies can be calculated through the hiring and firing process. In addition, based on the statistic from DOSM (2021), table 2.6-2.8 shows the information and communication activity percentage.

Table 2.5: Concept and definition of the labour force in Malaysia (DOSM, 2021)

Category	Descriptions
Labour Force	▪ The population in the working-age group of 15 to 64 years. ▪ Either employed or unemployed.
Outside Labour Force	▪ All persons not classified as employed or unemployed (eg, housewives, students, retired, disabled person, and those not interested in looking for a job).
Employed	▪ All persons who, at any time during the reference week worked at least one hour for pay, profit, or family gain either as employers, employees, own-account workers, or unpaid family workers. ▪ Persons who did not work during the reference week because of illness, injury, bad weather, leave, labour dispute, and social or religious reasons but had a job, farm, enterprise, or another family enterprise to return to. ▪ Those on temporary lay-off with pay would be called back to work.
Unemployed	▪ All persons who did not work during the reference week and are classified into two groups that are actively unemployed and inactively unemployed.

Table 2.6: Annual Percentage Share of Filled Jobs by Economic Activity and Skill 2018-2020

Economic Activity *Information and Communication*		2018 (%)	2019 (%)	2020 (%)
S	Skilled	58.3	58.5	58.0
SS	Semi-skilled	32.6	32.4	33.5
LW	Low-skilled	9.1	9.1	8.5

Table 2.7: Annual Rate of Filled Jobs by Economic Activity and Skill 2018-2020

Economic Activity _Information and Communication_		2018 (%)	2019 (%)	2020 (%)
S	Skilled	99.5	99.7	99.8
SS	Semi-skilled	99.8	99.9	99.9
LW	Low-skilled	99.8	99.9	98.8

Table 2.8: Annual Percentage Share of Jobs Created by Economic Activity and Skill 2018-2020

Economic Activity _Information and Communication_		2018 (%)	2019 (%)	2020 (%)
S	Skilled	87.2	88.0	80.8
SS	Semi-skilled	12.6	11.6	19.0
LW	Low-skilled	0.2	0.4	0.2

2.5 Malaysia Skills Certification System (MSCS)

The Malaysian Skills Certification System (*Sistem Persijilan Kemahiran Malaysia*) is a skill and work-based certification system in Malaysia achieved through assessment and training. Candidates will be able to acquire the Malaysian Skills award if they meet the National Occupational Skills Standard requirements developed and regulated by the Department of Skills Development (formerly known as the National Vocational Training Council).

It is conferred as a formally recognised certificate to individuals who have shown capabilities acquired or practised with competencies to do a task or work, usually in basic vocational skills. The criteria and standards of the Malaysian Skills Certification System are articulated with higher-level qualifications to enable holders to progress from the level of semi skills to skilled production, right up to supervisory, executive, and managerial functions.

The Malaysian Skills Certification System was established in 1993 to replace the National Trade Certification System (*Sistem Persijilan Pertukangan Kebangsaan*) as part of more significant reform to streamline the higher and further education systems in Malaysia. The system was also eventually mapped to the Malaysian Qualifications Framework in 2007, providing a framework for the credit equivalency and transfer between the vocational education and training sectors and the higher education sectors.

2.5.1 National Skills Development Act 2006 (Act 652)

The National Skills Development Act, 2006 (Act 652) came into effect on 1st September 2006 after it was officially gazetted on 29th June 2006, with the mandate of promoting, through skills training, the development and improvement of a person's abilities, which are needed for vocation, and to provide for other matters connected in addition to that. Act 652 is significant because, for the first time in the history of skills training in Malaysia, national legislation has been enacted exclusively for skills training and development. In addition, the meaning and scope of skills training have been clarified and given a statutory interpretation that can be used to distinguish it from other components of the country's national education and training system. Act 652 also provides for implementing a Malaysia Skills Certification System, leading to the award of five (5) levels of national skills qualification, namely Malaysia Skills Certificate Level 1, 2, and 3; Malaysia Skills Diploma; and Malaysia Skills Advanced Diploma.

2.5.2 Malaysian Qualification Framework (MQF)

Qualifications Agency sets out its composition, functions, and responsibilities. This act repeals the National Accreditation Board Act 1996 (Act 556) and dissolves the National Accreditation Board. The MQF refers to the policy framework that satisfies both the national and internationally recognized qualifications. It consists of titles and guidelines, together with principles and protocols covering articulation and issuance of qualifications and statements of attainment. Elements of the qualification's framework indicate the achievement of each qualification title. It also provided progression routes for all the graduates in the respective occupational fields.

The MQF has eight levels of qualifications in three sectors, supported by lifelong education pathways, as shown in Table 2.9. Department of Skills Development (DSD) governs the skills sector, in which there are five levels of skills qualification. The definition for each level of skills qualification is specified in the Malaysia Occupational Skills Qualification Framework (MOSQF) that can be referred to in Annex 1.

Table 2.9 Malaysian Qualification Framework (MQF) Chart (MQA, 2017)

MQF Level	Minimum Graduating Credit	Academic Sector	TVET Sector	Lifelong Learning/APEL Criteria for APEL(A)
8	No credit rating	Ph.D. by Research		Admission criteria: 35 years old Bachelor's degree in the relevant field/equivalent 5 years' work experience Passed APEL assessment
	80	Doctoral Degree by Mixed Mode & Coursework		
7	No credit rating	Master's by Research		Admission criteria: 30 years old STPM/Diploma/equivalent Relevant work experience Passed APEL assessment
	40	Master's by Mixed Mode & Coursework		
	30	Postgraduate Diploma		
	20	Postgraduate Certificate		
6	120	Bachelor's degree		Admission criteria: 21 years old Relevant work experience Passed APEL assessment
	66	Graduate Diploma		
	36	Graduate Certificate		
5	40	Advanced Diploma	Advanced Diploma	
4	90	Diploma	Diploma	Admission criteria: 20 years old Relevant work experience Passed APEL assessment
3	60	Certificate	Certificate	Admission criteria: 19 years old Relevant work experience Passed APEL assessment
2	30	Certificate	Certificate	3R
1	15	Certificate	Certificate	3R

2.5.3 National Occupational Skills Standard (NOSS) and National Competency Standard (NCS)

National Occupational Skills Standard (NOSS) is defined as a specification of the competencies expected of a skilled worker who is gainfully employed in Malaysia for an

occupational area, level, and pathway to achieve the competencies and was gazetted in Part IV of Act 652. NOSS is developed by industry experts based on the needs of the industry and is utilised as the main tool in the implementation of the Malaysia Skills Certification System in which the performance of existing industry workers and trainees are assessed based on the NOSS to award the Malaysia Skills Certificate. Meanwhile, National Competency Standard (NCS) describes the knowledge, skills, and attitudes needed to perform in a particular occupation but does not directly relate to any particular job classification. Standards were developed by the industry experts based on the needs of the industry and are utilised as the main tool in the implementation of the Malaysian Skills Certification System in which the performance of existing industry workers and trainees were assessed based on Standards for awarding of Malaysian Skills Certificate.

2.6 Relation of Industry Revolution with Occupation

The Fourth Industrial Revolution (4IR) refers to the disruptive transformation of industries through emerging technology. It was founded by Klaus Schwab, founder and executive chairman of the world economic forum and author of The Fourth Industrial Revolution. The 4IR is used to describe the emergence of the digital economy and automation and data exchange in industrial technologies. In other words, the 4IR can best be described as the blurring of boundaries between the physical, digital, and biological worlds. It is a fusion of advances in artificial intelligence, robotics, the IoT, 3D printing, genetic engineering, quantum computing, and other technologies. It is the collective force behind many products and services that are fast becoming indispensable to modern life.

2.6.1 National 4IR Policy

In general, the National 4IR Policy supports national development policies such as the Twelfth Malaysia Plan (RMKe-12) and *Wawasan Kemakmuran Bersama* 2030 (WKB 2020). It is also complimenting the Malaysia Digital economy Blueprint in driving the growth of the digital economy. The policy and the blueprint will act as guiding documents to leverage the potential of 4IR.

In 1760, the first industrial revolution (Industry 1.0) began. The revolution continued to the 1830s with mass production using electronic power. In the year 1969-the 2010s, industry 3.0 focused on using electronics and information technology to automate production. Industry 4.0 aims to optimize what has been done in Industry 3.0 and focuses on the manufacturing sector,

whereas 4IR encompasses almost every industry and all aspects of human life. The various stages of the industrial revolution and the intensity of digitalisation are shown in Figure 2.7. The Ministry of International Trade and Industry (MITI) has identified the main pillars of Industry Revolution 4.0, and the description of each is given in Table 2.10.
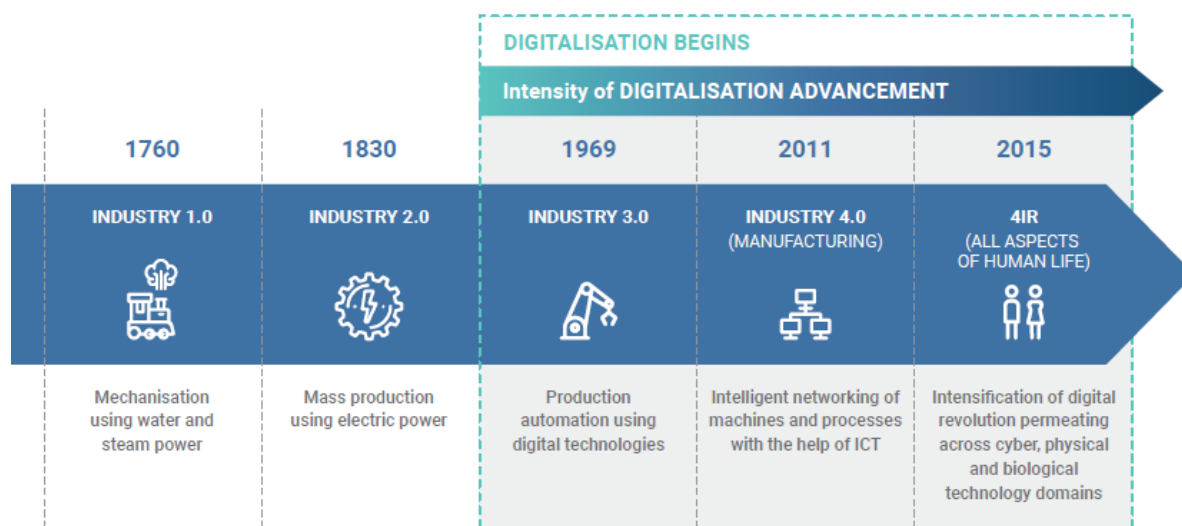
Figure 2.7: The Industrial revolutions and intensity of digitalisation

Table 2.10: The 9 Pillars of Industry Revolution 4.0's Pillars Acknowledged by MITI

NO	IR 4.0 PILLARS	BRIEF DESCRIPTION
1	Autonomous Robots	Robotic activities that are coordinated and automated to perform tasks intelligently with minimum human involvement.
2	Big Data Analytics	Analysis of ever-larger data sets. Circulation, collection, and analysis of information are necessary because they support productivity growth based on real-time decision-making.
3	Cloud Computing	A term that refers to the delivery of various services over the Internet. These resources include data storage, servers, databases, networking, and software, among others.
4	Internet of Things (IoT)	All machines and systems connected to the production plant (and 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.
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	It is the process of physically or functionally connecting multiple computer systems and software applications in order for them to work as a coordinated whole through the Internet of Things (IoT).
7	Cyber-security	With the increased connectivity and use of standard communications protocols, the need to protect critical industrial systems and manufacturing lines from cybersecurity threats increases.
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, including machines, products, and humans. This allows operators to test and optimise the machine settings for the following product in line in the virtual world before the physical changeover, thereby driving down machine setup times and increasing the output quality.

2.6.2   Relationship between 4IR and The Digital Economy

The government has developed two guiding documents, namely The National 4IR Policy and the Malaysia Digital Economy Blueprint, to improve the country's readiness to harness the potential of the 4IR and embrace the digital economy. The digital economy is defined as economic and social activities that involve the production and use of digital technologies by

individuals, businesses, and the government. Figure 2.8 shows the convergence of digital, physical, and biological domains in the 4IR.
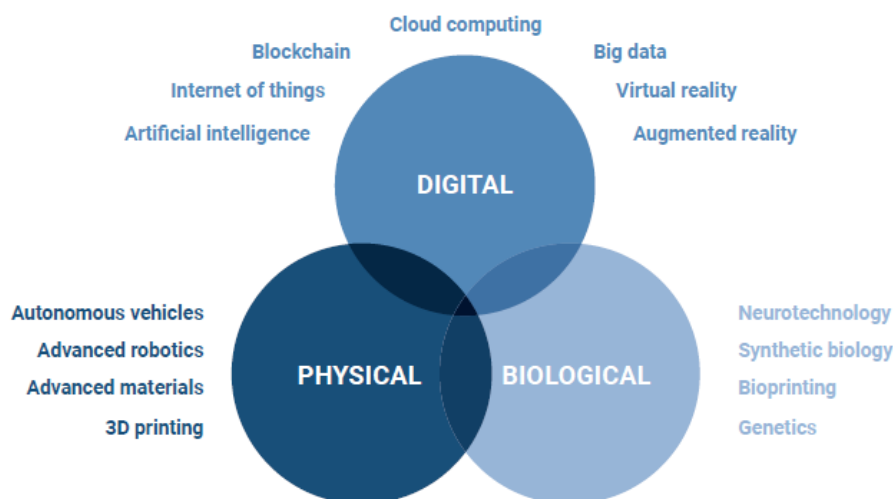
Figure 2.8: Convergence of Digital, Physical and Biological Domains in The 4IR.

2.6.3   Skills for the future.

To align with Industry 4.0, workers should carry out new skill sets. Aulbur et al. (2016) categorised skills into skill families. These new skill sets will not replace the existing skill sets. Core work-related skills can be classified into three categories, namely (i) Abilities, (ii) Basic Skills, and (iii) Cross-Functional Skills, as shown in Table 2.11. Figure 2.9 shows that cognitive abilities, system skills, and complex problem solving are the top three skills expected to be high in demand and remain important. The bar chart shows the percentage of jobs indicating growing/ stable/declining demand for a particular skill family as a core skill set.

Table 2.11: Categorisation of skills into skill family

CATEGORIES	SUB-CATEGORIES	SKILLS
Abilities	Cognitive Analytics	- Cognitive Flexibility - Creativity - Logical Reasoning - Problem Sensitivity - Mathematical Reasoning - Visualisation
	Physical Abilities	- Physical strength - Manual dexterity - Manual precision
Basic Skills	Content Skills	- Active learning - Oral expression - Reading comprehension - Written expression - ICT literacy
	Process Skills	- Active listening - Critical thinking - Monitoring self and others
Cross-Functional Skills	Social Skills	- Coordinating with others - Emotional intelligence - Negotiation - Persuasion - Service orientation - Training & teaching others
	Resource Management Skills	- Managing financial resources & material resources - People management - Time management
	Technical Skills	- Equipment maintenance, repair, operation & control - Programming - Quality control - Troubleshooting - Technology & user experience design
	System Skills	- Judgment and decision making - Systems analysis
	Complex Problem Solving Skills	Complex Problem Solving
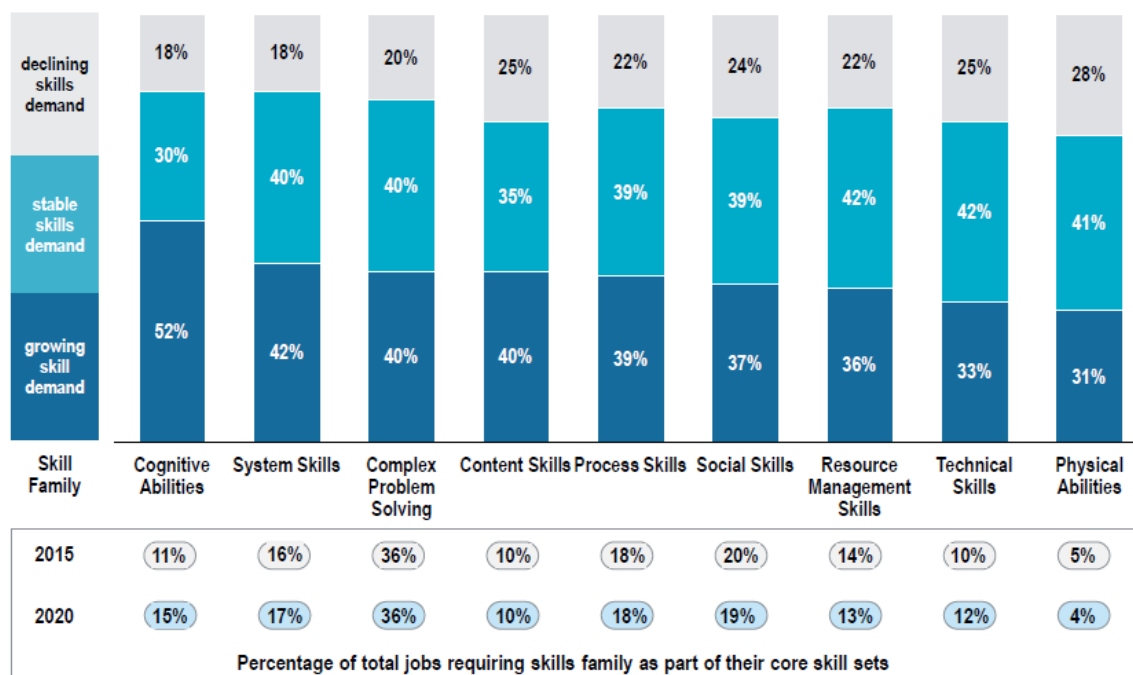
Figure 2.9: Change in demand for core work-related skills, 2015-2020 for all industries

2.7   NOSS Relevant to MSIC 2008 Section J, Division 58

Currently, there are 26 NOSS developed by DSD that are relevant to the sub-sectors and areas in the publishing activities. The details of the existing NOSS relevant to the publishing activities industry are presented in Table 2.12.

Table 2.12: Summary of NOSS Developed under the Division 58
(Source: NOSS Registry Jun 2021)

MSIC GROUP	ACTIVITIES	CORRESPONDING NOSS/LEVEL		
581 Publishing Of Books, Periodicals And Other Publishing Activities	Journalism Activities	J581-001-5:2016 (06-12-2016)	Journalism	Level 5
		J581-001-4:2016 (06-12-2016)	Journalism	Level 4
		EE-141-3:2014 (25-09-2014)	Journalism	Level 3
	Publishing	PR-025-5:2015 (17-07-2012) (29-09-2015)	Publishing Management	Level 5
		PR-025-4:2015 (17-07-2012) (29-09-2015)	Publishing Implementation	Level 4
		PR-025-3:2014 (17-07-2012) (25-09-2014)	Publishing Support	Level 3

	Text Translation	PR-028-5:2016 (04-02-2016)	Specific Text Translation and Management	Level 5
		PR-028-4:2016 (04-02-2016)	Text Translation	Level 4
582 Software Publishing	Creative Multimedia- 2D Game Visual	IT-061-3:2014 (16-12-2014)	2D Game Visual Art	Level 3
	Creative Multimedia – 3D Game Visual	IT-062-5:2016 (04-02-2016)	3D Game Art Development and Management	Level 5
		IT-062-4:2016 (04-02-2016)	3D Game Art Production and Development	Level 4
		J582-002-3:2020 (16-12-2014) (13-11-2020)	3D Game Asset Production	Level 3
	Creative Multimedia- Arts Animation	IT-065-3:2016 (04-02-2016)	Visual Art	Level 3
	Game Development – Game Design	IT-067-5:2016 (24-05-2016)	Game Design Management	Level 5
		IT-067-4:2016 (24-05-2016)	Game Design	Level 4
	Game Development – Game Programming	IT-068-5:2016 (24-05-2016)	Advanced Game Programming	Level 5
		IT-068-4:2016 (24-05-2016)	Game Programming	Level 4
	Interactive Multimedia	IT-070-5:2011 (30-09-2000) (20-12-2011)	Creative Content Development	Level 5
		IT-070-4:2011 (30-09-2000) (20-12-2011)	Creative Content Development	Level 4
		J582-001-3:2019 (30-09-2000) (18-11-08) (07-08-2019)	Interactive Multimedia Design	Level 3
	Digital Creative	IT-051-5:2012 (30-09-2000) (05-04-2012)	Audio Production	Level 5
		IT-051-4:2012 (30-09-2000) (05-04-2012)	Audio Production	Level 4
		IT-051-3:2011 (30-09-2000) (20-12-2011)	Audio Production	Level 3
		IT-051-2:2011 (30-09-2000) (20-12-2011)	Audio Production	Level 2
	Creative Multimedia – Concept Design	IT-053-5:2013 (24-04-2013)	Concept Design	Level 5
		IT-053-4:2013 (24-04-2013)	Concept Design	Level 4

2.8   Competency-Based Training (CBT)

Competency-Based Training (CBT) is an approach to vocational training that emphasizes what a person can do in a workplace based on his or her education and training. CBT is based on performance standards set by the industry with the main focus on measuring the performance while taking into account knowledge and attitude rather than the duration taken to complete the course. CBT is a learner-centric, outcome-based approach to training that allows individuals to develop skills at their own pace for a similar outcome. Thus, training practices are customised for each individual to achieve a similar outcome. CBT concept is the basis of the Malaysia Skills Certification System, which is coordinated by DSD.

2.9   Key Stakeholders

The key stakeholders for the publishing activities in Malaysia are comprised of government agencies, regulatory bodies, industry associations, professional bodies of book publishing, and software publishing. Stakeholders are defined as a person, group, or organisation that has an interest or concern in an organisation. Stakeholders can affect or be affected by the organisation's actions, objectives and policies.

2.9.1   Government Agencies

The regulatory bodies and relevant government agencies empowered by the legislation according to the scope and powers are given in the related acts that directly regulate the publishing activities industry can be referred to in Tables 2.13 and 2.14.

Table 2.13: List of Government Agencies (Book Publishing)

NO	ORGANISATIONS	OVERVIEWS, ROLES, FUNCTION, AND RESPONSIBILITIES
1	Perpustakaan Negara Malaysia (PNM) / National Library of Malaysia	The primary function of the National Library of Malaysia is divided into three (3) main activities that are (i) Management Activity, (ii) Library Development Activity and (iii) Information Services Activity. Each activity is supported by sub-activity or division to achieve its goals and objectives of the National Library of Malaysia. a) Management Activity ▪ Management Service and Human Resource ▪ Corporate Service ▪ Human Capital Development ▪ Information Technology ▪ Integrity b) Library Development Activity ▪ Information and Knowledge Infrastructure

		▪ Resources Development
		c) Library Services Activity
		   ▪ Information and References Service
		   ▪ Branch and Community Library
		   ▪ National Digital Library

2	Perbadanan Kota Buku	Perbadanan Kota Buku was founded in line with the National Book Policy that supports the importance of books, particularly in advancing the local book industry by establishing a Book City in Malaysia.
		a) Book Industry Hub
		   To provide infrastructure to authors, publishers, printers, suppliers, distributors, wholesalers, retailers, and other related parties and local associations of book-related industry under one roof. In addition, to provide infrastructure for any activity with the gathering and collecting of information and other related information that may directly or indirectly impact the development of the national book industry.
		
		b) International Platform
		   To be the centre of learning, book institution, learning, research, consultation and exhibition and demonstration of all kinds of reading and printing material as well as being the centre for distribution, selling, publishing, printing, and other viable commercial transactions related to books and other related reading and printing materials and the book industry as a whole and importantly bringing it all worldwide.
		
		c) Future Book Enabler
		   To manage, provide facilities and access to a collection of local and international books to librarians, academicians, students, bibliophiles, public and relevant parties interested in books and any kinds of reading material.

3	Majlis Buku Kebangsaan Malaysia (MBKM) / National Book Council of Malaysia (NBCM)	The Ministry of Education Malaysia established the National Book Council of Malaysia (NBCM) in 1968 based on the UNESCO declaration, which recommended the establishment of a special body responsible for promoting the reading interest and fostering the book industry among developing nations. The establishment of NBCM, formerly known as the National Book Development Council (MKBK), serves as a professional body and national book adviser. Members of the Council comprise several ministries and government agencies, industry associations, and non-governmental organisations involved in the book industry and its development. In addition, there are three individuals capable of contributing to the role and function of the National Book Council of Malaysia. The National Book Policy (DBN) is the essential guidance of NBCM to promote their book publication activities and reading nationally. Prior to the actual employment, the Permanent Secretariat of NBCM serves as a Unit in the Ministry of Education Malaysia with its shared administrative officers from various departments. However, through the Employment Warrant dated December 31, 2005, the Secretariat of NBCM is now operating as one of the divisions under the Policy and Education Development Sector of the Ministry of Education Malaysia led by a Director. The division is responsible for managing the administration of the National Book Council of Malaysia and coordinating all collaborative programs related to the development of the book industry through the development, publication, and promotion of reading culture with the

		government agencies, non-governmental organisations, and the private sector. In addition, NBCM collaborates with publishers and entrepreneurs of the local book industry to promote Malaysian books internationally through Malaysia's participation in book fair festivals abroad.
3	Majlis Penerbitan Ilmiah Malaysia (MAPIM)	The Majlis Penerbitan Ilmiah Malaysia (MAPIM) is an active body in developing the field of scientific and scientific publications. Its members consist of all Public Institutions of Higher Learning (IPTA) publishers, research centres in Malaysia, and Dewan Bahasa dan Pustaka (DBP). Among the roles of MAPIM are as follows: a) Strengthen Malaysian scholarly publications at the national and international levels. b) Increase the cooperation of members in publishing activities. c) Collaborating to increase the marketing of publication at the national and international levels d) Implement any plans and programs coordinated by the Board of Meetings. e) Prepare activity planning and an annual budget of MAPIM. f) Report the activities of the Implementing Committee to the Board. g) Increase the quantity and quality of publications as well as obtain international ratings and rankings. h) Improve writing skills and editorial professionalism among MAPIM Members. i) Improving skills and professionalism in the production and marketing of scientific publications. j) Increase promotional and marketing activities of MAPIM publications. k) Appoint members as representatives of MAPIM in any activities with external parties l) Provide incentives and awards to improve scholarly writing and publishing for academics, researchers, and publishing staff m) To cooperate and coordinate scholarly publishing activities from time to time among MAPIM Members and external parties. n) Create and enhance cooperation networks with relevant parties that can bring benefit to MAPIM. o) Create an information network to monitor the progress of publications to avoid duplication and waste of energy, expertise, time, and money. p) Establish a sub-committee to plan and implement activities according to functions and needs for three (3) years, with a maximum of six (6) years. q) Establish ad hoc committees to carry out activities if required. r) Appoint an Internal Auditor from among the Directors/Chief Issuer of UA for three (3) years, with a maximum of six (6) years.
4	Dewan Bahasa dan Pustaka (DBP)	DBP was founded on 22 Jun 1956 in Johor Bharu, Johor, Malaysia, as a small department under the Ministry of Education and initially named the Balai Melayu. Its formation is for the purpose of disseminating the Malay language as the national language and the official language for the country, which is to be liberated from the British Government then. The 3rd. Congress on The Malay Language and Letters in Singapore and Johor Bharu on 16 - 21 September 1956 officially named the department Dewan Bahasa dan Pustaka (DBP) and upgraded it as an institution with its Board of Directors. In 1957, it moved to Kuala Lumpur when the Malay language became the country's national language and official language.

		In 1959, DBP became a semi-government body. With the enforcement of The Ordinance of Dewan Bahasa dan Pustaka 1959, it was upgraded and given the autonomous power to draft its specific legislation and policies; to structure its programme for the development and dissemination of language and literature; and to carry out its publishing activities and business competitively in line with the principles and practices of the publishing industry and profession. To date, DBP has become one of the largest publishing houses in Malaysia, publishing and marketing textbooks and almost all types of books from early years to general reading and higher learning in all fields of studies and all genres, including magazines and journals. Its' Charter described it as producing all publications in the form of a high-quality standard Malay language through a competent, efficient, and excellent service, with priority to its customers and a promise of production and services upholding its extended core function of the language, literature, and publishing. Among the dedicated services are: to provide complete, up to date, authoritative, and consistent language references and guides; to provide a complete Malay language and other Malay databases which are accessible by all; to perform the activities of disseminating and socialisation of the Malay literature to the public at home and internationally; to conduct high-quality research on traditional and modern literature in the areas of knowledge, thinking and esthetic to fulfil the demands of its customers; to ensure that all forms of appreciation at state, the national and international level is given to scholars and publications which fulfil the standards applied; ensuring the rights of its writers through the Publishing License Contract; and publication under the house style, Gaya Dewan. The objectives of Dewan Bahasa dan Pustaka as stated in the DBP Act (revised, 1978; amended and expanded 1995) are as follows: a) To develop and strengthen the national language in all fields, including science and technology; b) To disseminate literary talent and aptitude, especially in the national language; c) To print or to publish or to assist in the printing or publication of books, magazines, brochures, and other forms of literary works in the national language and other languages; d) To standardise spelling and pronunciation and develop appropriate terminologies in the national language; e) To encourage the usage of a correct national language and; f) To encourage the use of the national language to be used widely for all occasions under the enforced legislation.
5	Pusat Sitasi dan Infometrik Malaysia / Citation and Infometric Centre	Citation and Infometric centre, formerly known as Malaysia Citation Centre (MCC), is set up by the Ministry of Higher Education (MoHE), in line with the MOE's aspiration to improve Malaysian university ranking by improving the quality of Malaysian publications especially scholarly journals. The one-stop centre would help internationalise Malaysian journal publications, making their contents accessible globally and indexed locally by MyCite. It also proposes their indexation by international indexing agencies such as Scopus and the ISI (Institute of Scientific Information) databases. The functions of CIC:

		a) Coordinate, monitor, integrate & strengthen standards of scientific publication process towards creating a rating system of scientific issues. b) List & evaluate all scientific issues systematically Malaysia c) Provides an online database for the 'bibliographic control' scholarly publications Malaysia for open access d) Record the collection of scientific, intellectual property issues e) Integrate, manage and disseminate information listing the scientific issues of the country.
6	Malaysian Research Assessment (MyRA)	MyRA is an acronym for the Malaysian Research Assessment Instrument. It is a comprehensive system developed to assess all Higher Education Institutions (HEIs) research capacity and performance in Malaysia. In 2006, its first objective was to meet the Malaysian Research University (MRU) agenda of the Ministry of Higher Education (MoHE). That was to identify five universities in Malaysia for an award of MRU status. MRU agenda is well enshrined in the National Higher Education Strategic Plan (PSPTN) 2007-2020, which elevates public HEIs to attain world-class status. It also creates differentiated higher education scenarios to meet the socio-economic aspirations of the country while being aware of the limited resources available to pursue such goals. Thus MyRA used to accredit and monitor the research performance of public universities. However, beginning in 2014, all HEIs in the country were mandated to participate in the annual assessment exercise to coincide with the opening up of MoHE research grants to all universities (public or private) in the country. As a result, MyRA now includes a 6-Star rating system, and all participating HEIs are Document-audited and Site-audited by a panel of trained auditors. Between March and October 2015, 27 auditors audited 58 HEIs. On the 30th of November 2015, at an inaugural gala ceremony, the Minister of Higher Education presented congratulatory certificates to all HEIs that achieved 3-Star ratings and above for their 2014 MyRA assessment.
7	Intellectual Property Corporation of Malaysia (MyIPO)	Intellectual Property Corporation of Malaysia (MyIPO) provides registration of patents, trademarks, industrial designs, geographical indications, and voluntary copyright notification. Also acts as advisory services on Intellectual Property (IP); provides IP information/ statistics; IP training; patent agent examination; online search, filing, and application status; outreach programmes and helpdesk.
8	Institut Terjemahan dan Buku Malaysia (ITBM)/ Malaysian Institute of Translation and Books	The Malaysian Institute of Translation & Books (276206 D) (formerly known as the Malaysian National Institute of Translation) was established on 14 September 1993 to provide the infrastructure for Malaysia's translation industry, in line with the country's Vision 2020. As a limited company, its share capital is wholly owned by the Ministry of Finance. The Ministry of Education manages its administration. In line with the Companies Act 1965, its objectives, jurisdiction, board members and matters about the functions of ITBM are governed by its Memorandum and Articles of Association approved by the Registrar of Companies. ITBM was established to elevate the translation industry in the country, dealing with matters relating to translation, interpreting and knowledge

		transfer at all levels, both national and international. It is also tasked with enhancing and increasing the publication of works of local writers to boost the national publishing industry, consistent with the extension of its mandate as announced by the Prime Minister on 16 December 2011.

Table 2.14: List of Government Agencies (Software Publishing)

NO	ORGANISATIONS	OVERVIEWS, ROLES, FUNCTION, AND RESPONSIBILITIES
1	Suruhanjaya Komunikasi Multimedia Malaysia (SKMM) / Malaysian Communications and Multimedia Commission (MCMC)	The vision of MCMC is to establish a communications and multimedia industry that is competitive, efficient and increasingly self-regulating, generating growth to meet the economic and social needs of Malaysia. Roles and responsibilities are as follow: a) Implement and enforce the provisions of the communications and multimedia law. b) Regulate all matters relating to communications and multimedia activities not provided for in the communications and multimedia law. c) Consider and recommend reforms to the communications and multimedia law. d) Supervise and monitor communications and multimedia activities. e) Encourage and promote the development of the communications and multimedia industry. f) Encourage and promote self-regulation in the communications and multimedia industry. g) Promote and maintain the integrity of all persons licensed or otherwise authorised under the communications and multimedia industry. h) Render assistance in any form to, and to promote cooperation and coordination amongst, persons engaged in communications and multimedia activities.
2	Malaysia's National Applied Research and Development Centre (MIMOS)	MIMOS is Malaysia's national Applied Research and Development Centre. A strategic agency under the Ministry of International Trade and Industry (MITI), MIMOS contributes to transforming Malaysia's industry through patentable technology platforms, products and solutions. Over the past 12 years, MIMOS has filed more than 2,000 Intellectual Properties in various technology domains and across key socio-economic areas. Serving a central role in Malaysia's digital transformation journey. MIMOS endeavours to create a culture of innovation by nurturing relationships with internal and external stakeholders in the spirit of smart partnerships and inclusive growth models and strategies. MIMOS research and development has evolved from fundamental discoveries in microelectronics and ICT in the year 1985 to 2005 to cutting edge applied frontier technology which is in line with the changing models and key trends in the global industry. Currently, MIMOS focuses on Big Data and the Internet of Things, apart from pursuing advanced electrical and electronics engineering technologies.
3	Cybersecurity Malaysia	a) CyberSecurity Malaysia is committed to providing a broad range of cybersecurity innovation-led services, programmes and initiatives to

		help reduce the vulnerability of digital systems, and at the same time, strengthen Malaysia's self-reliance in cyberspace. b) Provides specialised cyber security services, as follows: ▪ Cyber security responsive services. ▪ Cyber security proactive services. ▪ Outreach and capacity building. ▪ Strategic study and engagement. ▪ Industry and research development.
4	Intellectual Property Corporation of Malaysia (MyIPO)	MyIPO provides registration of patents, trademarks, industrial designs, geographical indications and copyright voluntary notification; advisory services on Intellectual Property (IP); provide IP information/statistics; IP training; patent agent examination; online search, filing, and application status; outreach programmes and helpdesk.
5	Malaysia Digital Economy Corporation (MDEC)	a) MDEC was established to strategically advise the Malaysian government on legislation, policies and standards for ICT and multimedia operations. b) Entrusted to oversee the development of the Multimedia Super Corridor (MSC) Malaysia initiative, the platform to nurture the growth of local tech companies whilst attracting foreign direct investments (FDIs) and domestic direct investments (DDIs) from global multinational companies to invest and develop cutting-edge digital and creative solutions in Malaysia. c) Plays a catalytic role in driving Malaysia's transition towards a developed digital economy by 2020. In 2012, Digital Malaysia was official.
6	Majlis Rekabentuk Malaysia (MRM) / Malaysia Design Council	The Malaysia Design Council (MRM) was established in 1993 to pave a future of innovation and design for Malaysia. It spearheads design programmes in the country to boost the industry's design expertise, capabilities and standards. MRM is under the supervision of the Ministry of International Trade and Industry and SIRIM Berhad is an appointed secretariat to MRM. It is regarded as a think tank and advisor to evolve innovative designs among Malaysians and to ensure that we are on par with international standards. For the past ten years, MRM has strived to promote the effective use of design and thinking in business, education and government. To date, it continues with its efforts to elevate designing methods and to catapult creativity among manufacturers. With the guidance and recommendations from MRM, Malaysian companies are now able to move ahead and forge a greater bond with their consumers through their increased expertise in creating eye-catching products. MRM Objectives: a) Lead and coordinate design activities among Malaysian society b) Nurture new groups of innovative and creative younger generations c) Guide manufacturers towards world-class design capabilities d) Provide the competitive edge and ensure our manufacturers are on par with the international market e) Promote good design among manufacturers without compromising on quality

7	Game Development Council of Malaysia (GDCOM)	The Game Development Council of Malaysia (GDCOM) was established to advise on or implement matters pertaining to the Malaysian Game Development Ecosystem that is related to the functions of the Ministry of Education, Malaysia (Academic Development Management Division). The Game Development Council of Malaysia (GDCOM) reports and takes instructions from the Academic Development Management Division, Ministry of Education, Malaysia.

2.9.2 Industry Associations

The following lists in Table 2.15 and 2.16 are the key industry associations and professional bodies that will add value to the industry and to the whole economy for the publishing activities.

Table 2.15: List of Industry Associations (Book Publishing)

NO	ORGANISATIONS	OVERVIEWS, ROLES, FUNCTION, AND RESPONSIBILITIES
1	Malaysian Book Publishers Association (MABOPA) / Persatuan Penerbit Buku Malaysia	Malaysia Book Publishers Association or MABOPA (formally known as MBPA) was established on 14th January 1969. The number of members stood at 16 in 1969. In 1991 the number of members had increased to 100. MABOPA has been very active in publishing activities in Malaysia. The aims and objectives of MABOPA are as follows: a) To encourage the widest possible spread of publications. b) To foster the development of the publishing industry in Malaysia. c) To promote, preserve and propagate Malaysia's heritage and cultural diversity through publications. d) To encourage Malaysian authorship. e) To encourage the improvement of the technical and professional qualifications of members of the association. f) To promote and protect by all lawful means the principles of copyright and to defend copyright against all infringements which may restrict the rights of the copyright owner. g) To promote and protect by all lawful means the mutual interests of the members of the Association. h) To examine all legislative proposals likely to affect the publishing industry and to support, oppose or certain amendments, as may be expedient. i) To study and resolve problems related to the publishing industry. j) To encourage fair trade practices and maintain high standards of workmanship and service in the publishing industry.
		k) To cooperate with other associations, organisations and bodies to promote reading and the publishing industry. l) To purchase, take on lease or rent premises for the use of the Association in line with its objectives. m) To 35rganize or participate in book fairs, conventions, seminars and other functions pertaining to the publishing industry. Subject to the condition, prior approval is obtained from the other relevant authorities.

		n) To establish, own and manage companies pertaining to the development of the publishing industry, which would be of benefit to the Association. All profits derived shall be used to promote the objectives of the Association. o) To participate in business activities with prior approval of the General Meeting and relevant authorities.
2	Malaysian Press Institute (MPI)	Malaysian Press Institute or popularly known as MPI, was instituted as a foundation on the 13th of April 2007 under Malaysia's Company Act of 1965. Prior to that, it was known as Institut Akhbar Malaysia (IAM), a non-governmental 36rganizes36n36 registered under the National Society's Act. IAM was established in 1968 by the Malaysian media with the support of the government via the Ministry of Information, mainly to provide basic training in journalism for Malaysian media practitioners as, unlike today, there was no journalism, media or communication school in the country then. It was then known as South East Asia Centre.
3	National Press Club (NPC)	The National Press Club of Malaysia, or NPC, as it is fondly known by the media fraternity, is one of the oldest clubs in the country. The club was founded on June 6, 1948, when a group of journalists came together at an inaugural meeting at the old Majestic Hotel. The club was then called the Press Club of Malaya, and its first president was Mr A.S. Rajah of the then Malaya Tribune. The club now has more than 500 active members. Membership of the club is open to journalists and individuals, and corporate bodies associated with the media. A non-profit 36rganizes36n36, the NPC regularly 36rganizes social events for journalists and other media practitioners. The club also 36rganizes talks and workshops on media practices and current events affecting the profession. Besides journalists and other media practitioners, speakers include international figures, diplomats, innovators and, of course, Malaysian political leaders, including cabinet ministers, academics and other renowned speakers.
4	National Union of Journalists Malaysia (NUJ)	The National Union of Journalists Malaysia (NUJ) is the only 36rganizes36n36 of working journalists in the country representing the industrial, social and welfare interests of some 1,400 journalists. Formed on August 30, 1962, NUJ Malaysia is the sole authority to negotiate and determine the proper rates of remuneration and other terms and conditions of employment for journalists in the various publishing houses which produce Bahasa Melayu, English and Chinese newspapers and periodicals.
5	Persatuan Penterjemah Malaysia (PPM) / Malaysian Translators Association.	The Malaysian Translator's Association is a voluntary professional 36rganizes36n36 formed with the 36rganizes36n that there is a need to activate and implement all fields of translations collectively to consolidate all translation activities in Malaysia. With the main aim to foster and strengthen co-operation among translators, hence improving the quality of translation by translators throughout the country, PPM provides positive contributions towards all efforts to increase reading materials in the Malay Language, which encompasses all fields of knowledge. By enriching, promoting, and developing the Malay Language through translation, PPM plays a crucial role in helping to stimulate the reading interest of translated works among the people of the country. It is also in the interest of PPM

		to safeguard the legal rights and interests of translators, providing support in their assignments, and working towards promoting translators' talents, thus translating a profession to be proud of.
		As a professional body representing the country in the field of translation, PPM is known to foster close co-operation with organisations or institutions and represent members of the Association locally or abroad related to translation activities and the field of translation. PPM upgrades the quality of translation through lectures, workshops, seminars, courses, conferences etc. In the field of publishing, PPM also publishes or assists in publishing translated works in various fields of knowledge, 37rganizes translation contests, prizes and awards, coordinates activities of writing, printing, publishing, and circulating any magazines, news article or other publication to ensure the success of the Association as well as for the benefit of its members.
6	Persatuan Pengiat dan Pelukis Komik Malaysia (PEKOMIK)	PEKOMIK or also known as Persatuan Pengiat dan Pelukis Komik Malaysia is a non-governmental organisation in Malaysia which was officially formed in 2008. The aim is to strengthen the relationship between writers and painters, publishers and comic readers in Malaysia. Their objective of the establishment is to promote, develop and elevate the Malaysian comic art scene.
7	Rumah Kartun dan Komik Melayu	Rumah Kartun dan Komik Malaysia (RKKM) is an organisation that collects the old and new works of cartoonists. RKKM also acts as an Art Gallery that displays the history of cartoons and comics in Malaysia. It also provides a place for people to learn about drawing cartoons and comics.

Table 2.16: List of Related Industry Associations (Software Publishing)

NO	ORGANISATIONS	OVERVIEWS, ROLES, FUNCTION, AND RESPONSIBILITIES
1	Persatuan Animasi Malaysia / Animation Society of Malaysia (ANIMAS)	ANIMAS was finally officially registered only on 29 May 2007. However, even before registration, ANIMAS began to play an active role in the industry. ANIMAS was part of the main committee organising the Malaysia Film Festival and many other events. One of its founding members, Pak Hassan Abd Muthalib, had been invited to Japan and China on a number of occasions to present several papers on the Malaysian animation industry.
2	Creative Content Industry Guild (CCIG)	CCIG stood for Creative Content Industry Guild and was founded on the 23rd of August 2011. This NGO is led by Malaysian creative content practitioners to facilitate the most comprehensive certification and recognition for all creative industry practitioners. It also plays the role of protecting and producing competent and high-income creative content practitioners.
3	Post-Production, Animation & Creative Content Association Malaysia (POSTAM)	Post Production, Animation & Creative Content Association Malaysia (POSTAM) is a non-profit organisation consisting of members from animation, post-production, visual effects, games, digital media, and other creative content companies in Malaysia. The mission of this association is to be the voice of the Creative Content industry to the Malaysian government.
4	International Game Developers Association (IGDA)	The International Game Developers Association (IGDA) is the world's largest non-profit membership organisation serving all individuals who create games. IGDA bring together developers at key industry conferences and in over 150 chapters and special interest groups (SIGs) to improve their lives and their craft.
5	Serious Games Association (SGA)	In general, the SGA roles are to promote and improve communication and understanding in the international community of serious games. Within the field of serious games and related game technology, its aims shall be to encourage research and the application of knowledge and to disseminate information and promote collaboration.

2.9.3   Training Centres

These are the training centre that build custom training material that documents its best practices and procedures for the publishing activities can be referred to in the following Table 2.17 and 2.18.

NO	ORGANISATIONS	OVERVIEWS, ROLES, FUNCTION, AND RESPONSIBILITIES
1	Akademi Dewan Bahasa dan Pustaka (Akademi DBP)	Akademi Dewan Bahasa dan Pustaka (Akademi DBP) is a section in Dewan Bahasa dan Pustaka (DBP) developed with the purpose to formulate strategies and methods of implementing lifelong educational programmes, particularly in Malay language, literature and publishing. ADBP began operations on November 4, 2011, to enhance the use of the Malay language in the community in line with the government policy to uphold the Malay language. ADBP provides training and reskilling programmes in the field of language (Malay language), literature, publishing, information technology and communications, as well as management and administration. These courses are designed for staff members, professionals and the general public. Courses organised by ADBP are clustered into Short Courses, Individual Courses, Packaged Courses as well as the Malay Language for Foreign Speakers. The ADBP is also entrusted with Malay languages development programmes such as the Munsyi Dewan programmes, which serves to develop a resource of Malay language, literature and Jawi experts. Pusat Pembangunan Keilmuan dan Kemahiran, Akademi DBP under Dewan Bahasa dan Pustaka started in 2014. It now offers 3 accredited courses in the field of Editorial, and participants will be awarded with either Sijil Kemahiran Malaysia (Editorial) Tahap 3 (SKM 3), Diploma Kemahiran Malaysia (Editorial) Tahap 4 (DKM 4) or Diploma Lanjutan Kemahiran Malaysia (Editorial) Tahap 5 (DLKM 5) respectively.
2	Akademi Kota Buku/ Kota Buku Academy	The establishment of Kota Buku Academy is to create a training centre for local industry players by focusing on conventional publishing and digital content. The objectives of establishing Kota Buku Academy as a branded training program are as follows:

Table 2.17: List of Training Centre (Book Publishing)

NO	ORGANISATIONS	OVERVIEWS, ROLES, FUNCTION, AND RESPONSIBILITIES
		a) To prepare the relevant contents for the training purposes to cater the needs of the world's book trade by focusing on the aspects of 'Future Books'. b) To prepare customized training programs depending on the needs of the market. c) To make training an important core program in the agenda of building the national book capacity.
3	Institut Terjemahan dan Buku Malaysia (ITBM)	The ITBM Academy provides courses/training conducted by a group of qualified and experienced trainers in the fields of language, translation, and interpreting. It is conducted in a conducive and comfortable atmosphere and uses various techniques such as individual/group work training in the classroom as well as video/film tape presentations. This diversity of methodologies aims to liven up the classroom atmosphere so that training is more effective. In addition to the course/training schedule provided, the ITBM Academy is also ready to organise courses/training upon request and needs - at Wisma ITBM or at other locations of choice.
4	Malaysian Press Institute (MPI)	MPI's programmes concentrate on journalism and, more specifically, focus on those who work in media organisations, whether they are members of MPI directly or not. The objectives are: a) To inculcate ethical and responsible journalism b) Sharpen the skills of media practitioners. c) Upgrade support services in journalism for selected disciplines among new journalists. d) Further, develop understanding among young journalists on how the state institutions operate. e) Upgrade academic qualifications of journalists. f) Recognition of excellence in journalism through awards and prizes g) Publishing specialised literature in journalism, the media and communications h) A resource centre of expertise and instructors in for more advanced or experienced local and foreign journalists, especially those who are veterans. i) Offer a panel of jurors and judges with integrity to preside over competitions. j) Creating a network of like-minded organisations, both at home and abroad, in journalism. k) To build bridges and strengthen ties between the newsroom and corporate media practitioners.

Table 2.18: List of Training Centre (Software Publishing)

NO	ORGANISATIONS	OVERVIEWS, ROLES, FUNCTION, AND RESPONSIBILITIES
1	Persatuan Industri Komputer dan Multimedia Malaysia (PIKOM) @ The National Tech Association of Malaysia	PIKOM works to improve the business climate in the interests of all its member companies and to promote industry growth in line with national aspirations. PIKOM objectives are to: a) Spearhead, promote and encourage the development of resources, professional skills and programs in the local ICT industry. b) Represent the local ICT industry to the government and private sector, both local and overseas. c) Maintain a balanced view between industry and regulatory on ICT-related issues. d) Provide a platform for ICT players and users to meet, network, learn and share ideas in order to bring the industry to the next level. e) Foster high standards of conduct, service and performance throughout the ICT industry. f) Promote and market local ICT services to the region and overseas. Lease or rent premises for the use of the Association in line with its objectives.
2	Malaysia Co-operative Institute (MCI)	a) Provide courses related to information technology and communication (ICT) and the appropriate courses. b) Conducting research and providing advice to cooperatives related to ICT. c) Contributed articles to scientific publications Institut Kemahiran Malaysia (MKM).
3	Malaysia Digital Economy Corporation (MDEC)	MDEC was established to strategically advise the Malaysian Government on legislation, policies and standards for ICT and multimedia operations and entrusted to oversee the development of the MSC Malaysia initiative, the platform to nurture the growth of local tech companies whilst attracting foreign direct investments (FDIs) and domestic direct investments (DDIs) from global multinational companies to invest and develop cutting-edge digital and creative solutions in Malaysia. MDEC has played a catalytic role in driving Malaysia's transition towards a developed digital economy by 2020.
		In 2012, Digital Malaysia was officially unveiled as the nation's transformational programme to achieve this objective. Digital Malaysia is a national agenda that is fully developed with a sustainable digital economy built upon a vibrant domestic ICT industry, transformative adoption of digital solutions by government, businesses and citizens, as well as a robust enabling ecosystem.
4	Technology Park Malaysia	a) To facilitate and nurture knowledge-based enterprises by providing expertise, facilities, equipment and support services. b) To facilitate research & development, innovation and commercialisation activities by providing advanced infrastructure, equipment and facilities. c) To promote and stimulate an intellectual, creative and innovative community for the development of a knowledge-based economy by creating a conducive Technology Park environment. d) To facilitate government and private sector smart partnership in technology development and commercialisation of research results. e) To provide a platform for the establishment of strategic business

		and technology linkages between research institutions, academia, financial community and industry, local and global.

2.9.4 Legislations, Policies and Initiatives

It was imperative that this research had referred to legislation, by-laws and policies that were directly related to publishing activities.

a) Government Legislations

The following table 2.19 indicates the relevant legislations to the overall Information and Communication Industry which includes the publishing activities.

Table 2.19: List of Relevant Legislations (Publishing Activities)

NO	ORGANISATIONS	DESCRIPTION
1	Copyright (Amendment 2012) Act 1987	Malaysian law which was enacted to make better provisions in the law relating to copyright in Malaysia and for other matters connected therewith. It repealed the Imperial Copyright Act of 1911, which was the copyright law used in British Malaya as well as throughout the British Empire in its heyday.
2	Electronic Commerce Act 2006 (Act 568)	An Act to provide for legal recognition of electronic messages in commercial transactions, the use of the electronic messages to fulfil legal requirements and to enable and facilitate commercial transactions through the use of electronic means and other matters connected therewith.
3	National Library Act 1972 (Amendment 2006) (Act 80)	The National Library Act 1972 relates to the executive power, roles of the Director-General and the establishment of the National Library of Malaysia.
4	Deposit of Library Material Act 1986 (Act 331)	The Act requires publishers to submit materials published in the country to the National Library of Malaysia through the National Publication Submission centre. The materials received are made into a National Collection that reflects the intellectual heritage of the Malaysian community in various fields. The concept of legal surrender has been practised since time immemorial through the Straits Settlements Book Ordinance 1886, FMS Book Enactment (FMS Cap 90) 1916, Preservation of Books Ordinance 1950 and the Preservation of Books Act 1966.

NO	ORGANISATIONS	DESCRIPTION
5	Printing Presses and Publications Act 1984	The Printing Presses and Publications Act 1984 (Malay: Akta Mesin Cetak dan Penerbitan 1984) is a Malaysian statute governing the usage of printing presses and the printing, importation, production, reproduction, publishing and distribution of publications in Malaysia. It replaced the Printing Presses Act 1948 and the Control of Imported

		Publications Act 1958 (Revised 1972). A controversial amendment was made after Operation Lalang, where all printing presses were required to renew their licence annually through the Ministry of Home Affairs, seen as a move to curtail press freedom. The act was subsequently amended in 2012 to remove the requirement for annual licence application and the government's 'absolute discretion' over permits and reinstated judicial overview.
6	National Archive Act 2003	An Act to provide for the creation, acquisition, custody, preservation, use and management of public archives and public records; and for other matters connected therewith.
7	Sedition Act 1948	The law prohibits discourse deemed as seditious. The act was originally enacted by the colonial authorities of British Malaya in 1948 to contain the local communist insurgence. The act criminalises speech with "seditious tendency", including that which would "bring into hatred or contempt or to excite disaffection against" the government or engender "feelings of ill-will and hostility between different races."
8	Official Secrets (Act 1972)	The document specified in the Schedule and any information and material relating thereto and includes any other official document, information and material as may be classified as 'Top Secret', 'Secret', 'Confidential' or 'Restricted', as the case may be, by a Minister, the Menteri Besar or Chief Minister of a State or such public officer
9	Bernama Act 1967	An Act to establish and incorporate the Pertubuhan Berita Nasional Malaysia or in English, the Malaysian National News Agency and to make provisions for the management and supervision thereof and other matters connected therewith.

2.9.5   Government Policies and Initiatives

This section provides information regarding government policies and initiatives for related publishing activities industry.

a)   National Book policy @ Dasar Buku Negara

One of the main goals of the National Book Policy is to raise the standard of professionalism in the book industry. In other words, the National Book Policy (DBN) is the guidance for the National Book Council of Malaysia (NBCM) to promote their book publication activities as well as reading nationally. The NBCM was established by the Ministry of Education Malaysia in 1968 based on the UNESCO declaration, which recommended the establishment of a special body responsible for promoting the reading interest and fostering the book industry among developing nations.

The establishment of NBCM, formerly known as the National Book Development Council (MKBK), serves as a professional body and national book adviser. Members of the Council are comprised of several ministries and government agencies, industry associations and non-governmental organisations that are involved in the book industry and its development and also there are three individuals who are capable of contributing to the role and function of the National Book Council of Malaysia.

b)   Malaysia Digital Economy Blueprint

MyDIGITAL is a national initiative that symbolises the aspirations of the Government to successfully transform Malaysia into a digitally-driven, high-income nation and a regional leader in the digital economy. The Malaysia Digital Economy Blueprint spells out the efforts and initiatives to deliver the aspirations of MyDIGITAL. The Blueprint charts the trajectory of the digital economy's contribution to the Malaysian economy and builds the foundation to drive digitalisation across Malaysia, including bridging the digital divide.

Figure 2.10 shows Malaysia's Digital Economy Journey related to publishing activities industries. This policy focus to build a knowledge-based society to leverage Information and Communication Technology (ICT). The Government is formulating new policies and related initiatives to create a more conducive environment and provide opportunities for the continued growth of the digital economy. Some of the focus areas include creative industries

like animation and visual effect projects, interactive media, computer games and emerging technologies.
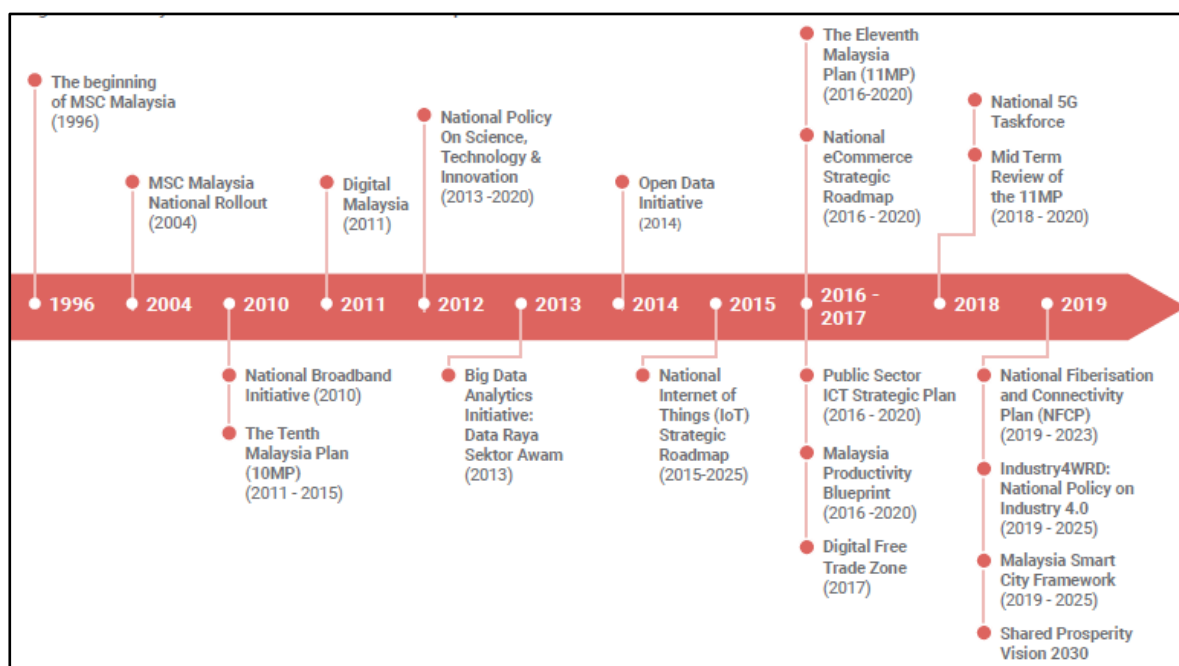
Figure 2.10: Policy Evolution in Relation to ICT Development

Among the total of 28 sectoral initiatives developed in this policy, three themes involved are (i) Digital Adoption, (ii) Data Sharing and Analytics and (iii) Digital Skills. One of the initiatives that are related to publishing activities is to nurture and upskill talent in the creative industry. As such, the targets are at least 200 IP creation in digital content by 2020, 8% average annual growth rate of digital content export from 2021 to 2025 and becoming top 20 under knowledge and technology pillar in the Global Innovation Index. For book publishing, the initiatives involved are to encourage textbook and workbook publishers to explore digitalisation and move to e-book and interactive formats. The targets are all students in Malaysia will have access to online learning and to increase the digital adoption rate across businesses.

c) Digital Content Ecosystem Policy 2020-2030

Malaysia's rapidly maturing digital creative industry, which includes animations, movies, and video games, is proving to be a significant growth driver to the nation. In general, creative digital content nurturing and assists the content and tech industry that have activities involved in the creation, delivery and enhancement of digital content. These include the

development, production, aggregation, distribution and merchandising of IP and the supply of the associated technological tools, services and platforms. It is an ongoing process in order to develop the nation's Digital Economy (Figure 2.11) by implementing efforts that are centred on attracting investments, building local tech champions, catalysing digital innovation ecosystems with supportive policies and propagating diversity and inclusivity.

Figure 2.11: Digital Content Ecosystem Policy

d) Public Sector ICT Strategic Plan 2016-2020

The Public Sector ICT Strategic Plan (PSICTSA) is a 5-year plan that outlines the strategic direction of the implementation of ICT practices and policies in the public sector. This strategic plan emphasises the consolidation of efficiency and service effectiveness that enables a high-impact delivery system. This plan also introduces the new ICT Vision that is in line with the national transformation agenda that visualises Malaysia as a developed country by the year 2020. This plan outlines the strategies and programmes that serve as guidelines for various ministries and agencies in the implementation of the ICT initiative at their respective organisations (Figure 2.12).
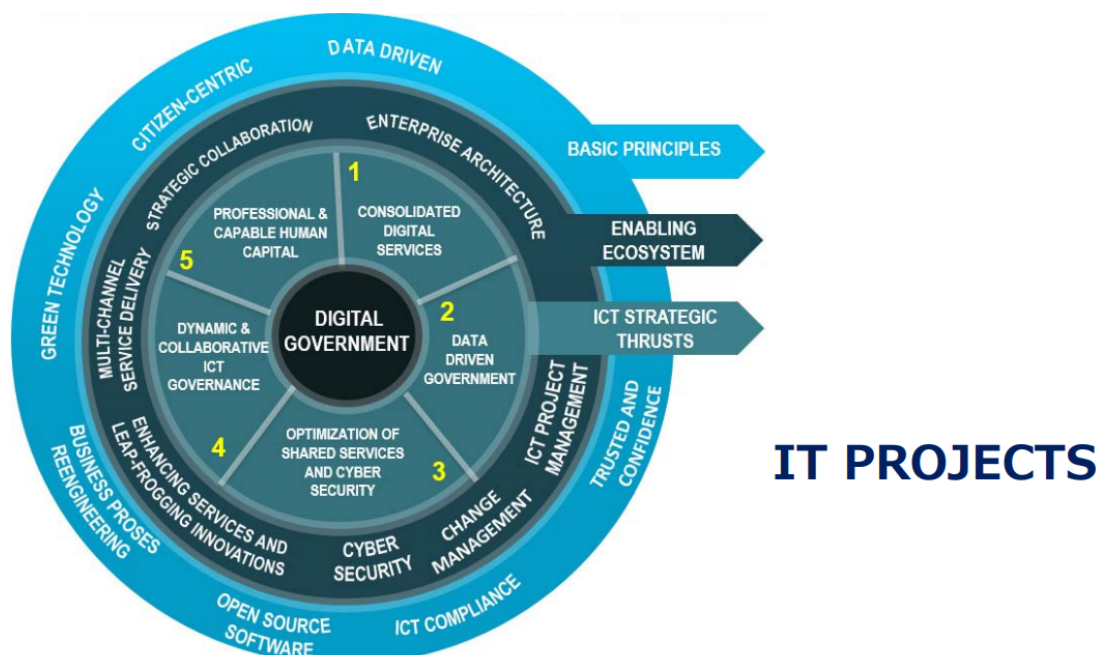
Figure 2.12: Public sector ICT Strategic Plan 2016-2020

The Public Sector ICT Strategic Plan, 2016-2020, was developed to support the National Transformation Program and enhance the Public Sector agencies' service delivery system. The theme "Humanising Digital Services" is in line with the aspirations of the 11thMalaysia Plan (11 MP). PSICTSA was developed to achieve the following objectives:

i.   To support Government aspirations in realising Vision 2020;
ii. To align the utilisation of technology with the direction of the Public Sector's core business;
iii. To align the implementation strategies of ICT agencies with the Public Sector ICT agenda; and
iv. To generate business value by exploiting the technology and the planned ICT implementation in the Public Sector.

2.9.6   Occupational Comparison Between Malaysia and Selected Countries

Since gaining independence in 1957, Malaysia has successfully diversified its economy from initially agriculture and commodity-based to one that now plays host to robust manufacturing and service sectors, which have propelled the country to become a leading exporter of electrical appliances, parts, and components.

Malaysia is one of the most open economies globally, with a trade to GDP ratio averaging over 130% since 2010. Openness to trade and investment has been instrumental in employment creation and income growth, with about 40% of jobs in Malaysia linked to export activities. After the Asian financial crisis of 1997-1998, Malaysia's economy has been on an upward trajectory, averaging growth of 5.4% since 2010. It is expected to transition from an upper-middle-income economy to a high-income economy by 2024.

However, the COVID-19 (coronavirus) pandemic has had a significant economic impact on Malaysia, particularly vulnerable households. Having revised its national poverty line in July 2020, 5.6% of Malaysian households live in absolute poverty. The Government focuses on addressing the poorest 40% of the population ("the bottom 40"). This low-income group remains particularly vulnerable to economic shocks and increases in the cost of living and mounting financial obligations.

Income inequality in Malaysia remains high relative to other East Asian countries but is gradually declining. While income growth for the bottom 40 has outpaced the top 60 over much of the last decade, the absolute gap across income groups has increased, contributing to widespread perceptions of the poor being left behind. Following the removal of broad-based subsidies, the Government has gradually moved toward more targeted measures to support the poor and vulnerable, mainly in cash transfers to low-income households.

Malaysia's near-term economic outlook will be more dependent than usual on government measures to sustain private sector activity. The shock of COVID-19 reduces export-led growth and limits public investment-led expansion as a depleted fiscal space. Over the longer term, as Malaysia converges with high-income economies, incremental growth will depend less on factor accumulation and more on raising productivity to sustain higher potential growth. While significant, Malaysia's productivity growth over the past 25 years has been below that of several global and regional comparators. Ongoing reform efforts to tackle critical structural constraints will be vital to support and sustain Malaysia's development path.

According to the World Bank's Human Capital Index, Malaysia ranks 55th out of 157 countries. To fully realise its human potential and fulfil the country's aspiration of achieving the high-income and developed country status, Malaysia will need to advance further in education, health and nutrition, and social protection outcomes. Key priority areas include enhancing the quality of schooling to improve learning outcomes, rethinking nutritional interventions to reduce childhood stunting, and providing adequate social welfare protection for household investments in human capital formation.

2.9.7   Emerging and Declining Jobs

Based on the Future of Jobs Survey (2020) that involved various countries such as South Africa, United Kingdom, USA, France, OECD countries, EA17, Mexico, Germany, Republic of Korea, Canada, Japan, Australia and Italy, there are top 20 job roles with increasing and decreasing demands across industries. Table 2.20 below outlines these top 20 job roles in the Malaysian setting, organised into distinct professional clusters according to the skills similarity. This evidence reflects the adoption of the new technologies and increasing demand for new products and services, which are driving greater demand for green economy jobs, roles at the forefront of the data and AI economy, and new roles in engineering, cloud computing and product development.

Table 2.20: Top 20 job roles in increasing and decreasing demand across industries in Malaysia

	Increasing Demand			Decreasing Demand
1	Data Analysts and Scientists		1	Data Entry Clerks
2	AI and Machine Learning Specialists		2	Administrative and Executive Secretaries
3	Big Data Specialists		3	Accounting, Bookkeeping and Payroll Clerks
4	Digital Marketing and Strategy Specialists		4	Accountants and Auditors
5	Process Automation Specialists		5	Assembly and Factory Workers
6	Business Development Professionals		6	Business Services and Administration Managers
7	Digital Transformation Specialists		7	Client Information and Customer Service Workers
8	Information Security Analysts		8	General and Operations Managers
9	Software and Applications Developers		9	Mechanics and Machinery Repairers
10	Internet of Things Specialists		10	Material-Recording and Stock-Keeping Clerks
11	Project Managers		11	Financial Analysts
12	Business Services and Administration Managers		12	Postal Service Clerks
13	Database and Network Professionals		13	Sales Rep., Wholesale and Manuf., Tech. and Sci.Products

14	Robotics Engineers	14	Relationship Managers
15	Strategic Advisors	15	Bank Tellers and Related Clerks
16	Management and Organisation Analysts	16	Door-To-Door Sales, News and Street Vendors
17	FinTech Engineers	17	Electronics and Telecoms Installers and Repairers
18	Mechanics and Machinery Repairers	18	Human Resources Specialists
19	Organisational Development Specialists	19	Training and Development Specialists
20	Risk Management Specialists	20	Construction Laborers

Findings based on Digital Communication and Information Technology industry identified as being in high demand within their organisation as shown in Table 2.21.

Table 2.21: Emerging job Roles

Rank	Emerging Job Roles
1	AI and Machine Learning Specialists
2	Data Analysts and Scientists
3	Big Data Specialists
4	Information Security Analysts
5	Process Automation Specialists
6	Digital Marketing and Strategy Specialists
7	Software and Applications Developers
8	Digital Transformation Specialists
9	FinTech Engineers
10	Architects and Surveyors

2.9.8   Impact of COVID-19 on Companies Strategy

Due to COVID-19, many people are forced to work from home and do online. Classes, exams, seminars, conferences, and business meetings have been held online worldwide. For the Information Technology industries, there are several strategies used by most companies when facing the pandemic, as shown in Figure 2.13. Most of the respondents (90%) agree that accelerating the digitalisation of the work process by using online meetings, conducting an online webinar is the best practice, and most of it is related to digitalisation skills. The percentage is followed by working remotely from home (86.7%), accelerating the implementation of upskilling/ reskilling programmes (63.3%), accelerating automation of tasks (53.3%) and accelerating the digitalisation of upskilling/ reskilling (50%) to use education technology, training provider and others.
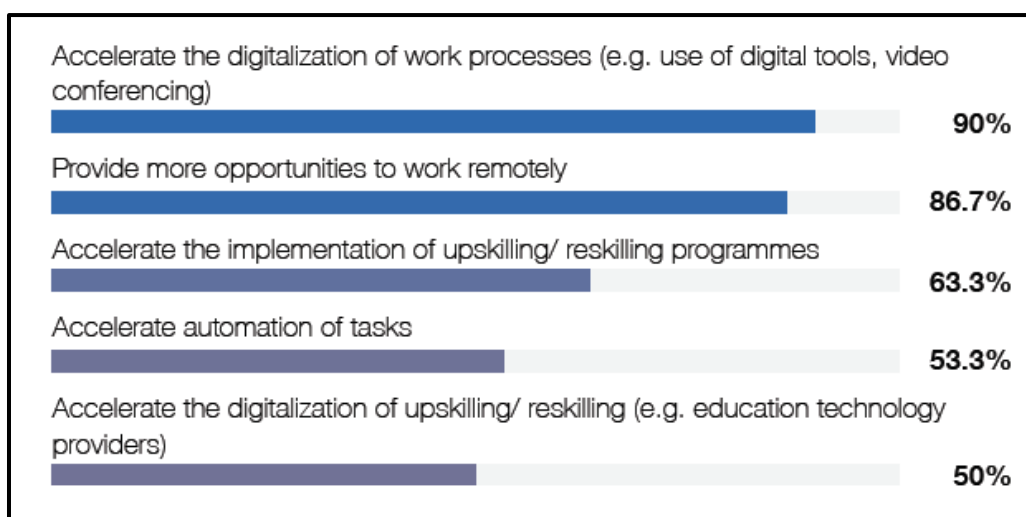
Figure 2.13: Company Strategies during pandemic

For the technology adoption in the industry, as highlighted in Future of Jobs Survey (2020), cloud computing, big data, and e-commerce remain the high priorities for business leaders, following a trend established in previous years. However, there has also been a significant rise in interest in encryption, nonhumanoid robots and artificial intelligence, as shown in Table 2.22.

Table 2.22: Technology Adoption in Industry

Technology	Percentage
Cloud Computing	95
Big data analytics	95
Artificial intelligence (e.g. machine learning, neural networks, NLP)	95
Encryption and cyber security	95
Internet of things and connected devices	92
Text, image and voice processing	90
E-commerce and digital trade	82
Augmented and virtual reality	73
Distributed ledger technology (e.g. blockchain)	72
Robots, non-humanoid (industrial automation, drones, etc.)	61

2.10 Conclusion

Based on the literature review findings, publishing is seen as one of the main contributors to economic performance and foreign investment. Currently, several stakeholders in the industry

comprise government agencies (i.e. DBP, MAPIM, MCMC, MDEC, etc.) involved in the development and monitoring of the industry in terms of compliance with the relevant acts and regulations.

The occupational areas must be redefined in the job competencies to increase employee mobility for the workforce. This allows scalability of skills and accommodates the emerging skills required in the current industrial revolution, which is the IR4.0. Segmentation of the industry based on the Malaysia Standard Industrial Classification (MSIC) is also considered to be in sync with data from the Department of Statistics on labour demographics. This industry, in particular, falls under Section J: Information and Communication, Division 58: Publishing Activities under MSIC 2008.

CHAPTER III

METHODOLOGY

3.1 Introduction

The research approach used in the occupational analysis process to produce the Occupational Framework (OF) for the publishing activities in the book and software industry is described in detail in this chapter. The details contain an overview of the research design, a description of the overall research approach, and an explanation for the research methodology chosen. The qualitative technique was used to understand better the current state of the publishing activities book and software in Malaysia using the Focus Group Discussion technique. Document analysis, Focus Group Discussions (FGDs) with agencies and industries experts, and survey research are essential parts of the technique since they help identify the sector's key issues. As a result, this qualitative approach is an appealing technique for describing study data in natural settings.

3.2 Research Approach

Considering the publishing activities and the types and sources of information required to construct the OF, document analysis, focus group discussion and survey research were chosen as the main methods of acquiring and analysing the necessary input in this study. Figure 3.1 shows the operational framework of the research and outcomes.
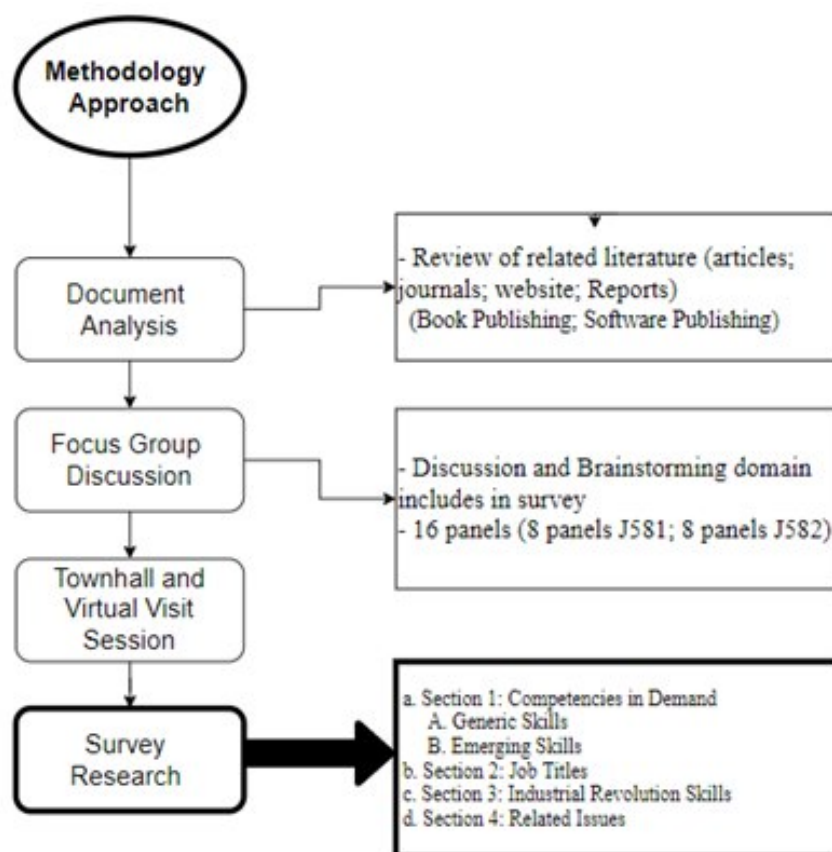
Figure 3.1: Methodology Approach in OF Publishing Activities

3.2.1 Document Analysis

This method requires a thorough assessment of existing literature that answers a specific question. The review searches, identify, chooses, appraises, and summarises relevant research evidence systematically, reproducible, and bias-free. Document analysis is more thorough than a literature review since it incorporates published and unpublished material. Gray literature is an essential component of a systematic review that adds value. This is because gray literature is frequently more current than published literature and is more likely to be free of publication bias. Unpublished studies, reports, dissertations, conference papers and abstracts, and governmental research are examples of gray literature. This method is intended to give a broad overview of the publishing activities, comprised of books and software in the current state and prospects such as publishing trends and prospects. Besides, at the sectoral level, it gives a macroeconomic overview of the publishing demands in future.

3.2.2   Focus Group Discussion

Industry engagement based on FGD is conducted to enable in-depth discussions on the issues of the industry workforce. Four series of FGD are conducted. Initially, the FGD discusses the Occupational Structure (OS), Occupational Competencies (OC), Occupational Description (OD), assessment of curriculum and training programmes, accreditation and qualification based on NOSS and MQA framework, potential workforce challenges; outlook, and strategic recommendations to be proposed. A survey questionnaire is designed based on industrial feedback and analyses from these four series of FGD and the derived themes.

Sixteen industry experts are appointed for the FGD (Annex 2). A facilitator fosters interaction among the panel members while keeping the discussion under control. In terms of industry, experts must have at least seven years of experience in the linked field and have worked for an SSM-registered firm. The results of the FGD debate are recorded, transcribed and analysed by the researcher. In the first FGD meeting, semi-structured questions are utilised. It is designed on OS and OD construction based on four themes: competency in demand, jobs in demand, emerging skills, and related issues. The identification of critical jobs in the specialised construction activities industry is also determined in the FGD. The second phase in FGD is to verify and validate the findings. Due to this COVID-19 pandemic situation, industry engagement sessions are conducted through an online platform, as highlighted in Table 3.1.

3.2.3   Townhall Session

After completing the FGD with the experts, the researcher conducts a town hall session. A town hall meeting or session is a goal-oriented, mingling event, not a series of presentations, but about joint participation. In other words, a town hall session is a meeting in which an executive report is made. Then guests have an opportunity to ask questions and engage with the researchers. For this study, a Town Hall Session through an online platform is an alternative to validate the findings from FGD and gain more input from the stakeholder. With the minimum requirements of at least 30 stakeholders attending the town hall session, all the feedback and comments from the industry are taken to improve the OF documentation. During the town hall, guests can give feedback about the draft OF presented by researchers. Figure 3.2 show the step to conduct a town hall session.

Table 3.1: List of Agencies and Industries Engagement Sessions

NO	PLATFORM	ACTIVITY
1	Webex Meeting	Involved 11 experts and JPK (1) Agenda: ▪ Introduce all the researchers & experts from industry and government agencies ▪ Roles as an Experts ▪ Project Timeline ▪ Introduction about OF J58 ▪ Table of Contents in OF ▪ Problem Statement, Research Objectives, Scope of Study ▪ Main References – MSIC 2008, MASCO 2020, NOSS, IR4.0, MQF and others ▪ Key Stakeholders ▪ Government Policies & Initiatives ▪ Government Legislations
2	Webex Meeting	Involved 14 experts and JPK (2) Agenda: ▪ Introduce to new members ▪ Update Project Timeline ▪ Update checklist ▪ Update New References (4IR/ Emerging Skills/Blueprint) ▪ Update Key Stakeholders, Government Policies & Initiative ▪ Discussion and brainstorming of items in the survey ▪ Draft research instruments
3.	Webex Meeting	Involved nine experts and JPK (2) Agenda: ▪ Data Collection process ▪ Update the latest information about critical jobs ▪ Occupational Structure (OS) ▪ Job title related to IR4.0
4	Webex Meeting	Involved 12 experts and JPK (2) Agenda: ▪ Findungs and Discussion ▪ Update Occupational Structure (OS) ▪ Occupational Competencies (OR) ▪ Occupational Description (OD) ▪ Discussion for TownHall Session ▪ Discussion for Virtual Visit

Figure 3.2: Step to Conduct Town Hall Session

Another goal of the Town Hall session is to promote collaborative teamwork, get everyone in the same room or on an online webinar platform, and encourage key stakeholders to mingle and exchange ideas and feel connected to the whole. Hearing the voice of the industry from a different part of the organisation will familiarise and encourage members to reach out to solve shared problems.

3.2.4 Virtual Visit

To gain more input about the critical job from the industry, the researcher conducted a virtual visit that involved four presenters from Penerbitan Pelangi Sdn. Bhd, Institut Terjemahan & Buku Malaysia (ITBM), MaGIC and Sony Playstation. It is a sharing session from industries that highlight the Occupational Structure, competency in demand, and job title related to the publishing activities. During the virtual visit, the researcher acted as a moderator to ask related questions to the presenter.

In other words, a virtual visit is an on-site remote interaction between stakeholders and researchers and the audiences. The goals are to learn more about publishing activities, update the current trend, interact with the public and communicate among stakeholders. The tentative for the virtual visit is as follows:

i.   Company Organisational Chart

ii. Description of the work structure practised

iii. Job descriptions critical to the industry

iv. Interview session for further explanation of the work structure existing and feedback regarding OF developed.

3.2.5   Survey

A survey was utilised to gather the four essential pieces of information for this study: generic skills, job titles, emerging skills, and related issues. A survey was also used to compile the results of the document analysis and focus group discussions. The survey was conducted through the Google form platform. The survey was sent to the appropriate organisation in the proper level.

The survey research was comprised of four sections:

Section 1: Competencies in Demand.
This section will cover generic and emerging skills, focusing on related job titles. This section is divided into (i) Generic Skills and (ii) Emerging Skills.

Section 2: Job Titles
This section aims to identify which worker categories are in short supply or oversupply. Malaysia Standard Classification of Occupations (MASCO) divides workers into different categories: skilled workers, semi-skilled workers, low-skilled workers, and level of skilled workers.

Section 3: Industrial Revolution Skills
This section determines whether industry players and the labour force are ready for Industry 4.0. The pillars or technology drives of IR4.0 are listed, and respondents must assess how relevant each aspect is in their field of duty.

Section 4: Related Issues
This section explores the industry's most common problems. The respondents are asked to select whether the issues are industry related.

3.3 Population and Sampling

A population is the group of people, animals, or achieves interest in examining. Residency, occupation, gender, age and time frame are characteristics that might define a population. The researcher will focus on respondents and stakeholders involved in publishing activities (book and software) in this study. While sampling is the procedure used to obtain the sample. The extent to which a sample represents the population is dependent on the amount of bias in the sampling procedure. The sampling used in this research was cluster sampling. Cluster sampling is a type of probability sampling in which groups or clusters are randomly selected instead of individuals. In this research, respondents and stakeholders in publishing activities will be grouped based on book and software publications (Figure 3.3 and Figure 3.4).

3.3.1   J581: Publishing of books, periodicals, and other publishing activities
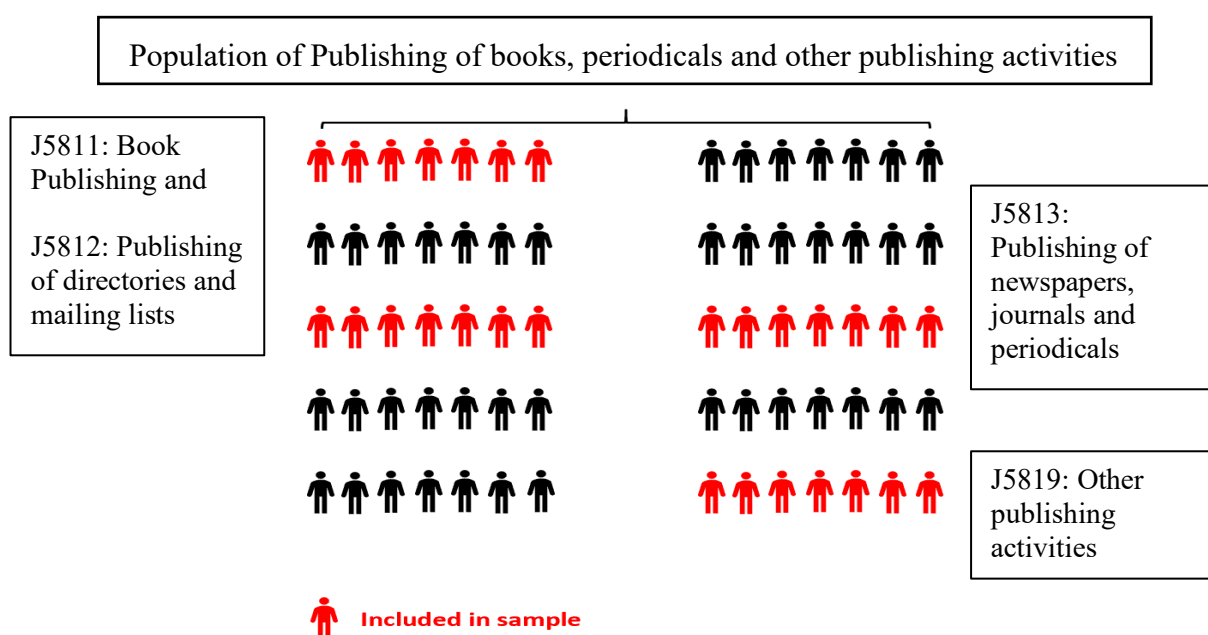
Figure 3.3: Population and Cluster Sampling in Publishing Activities (Book)

3.3.2 J582: Software Publishing
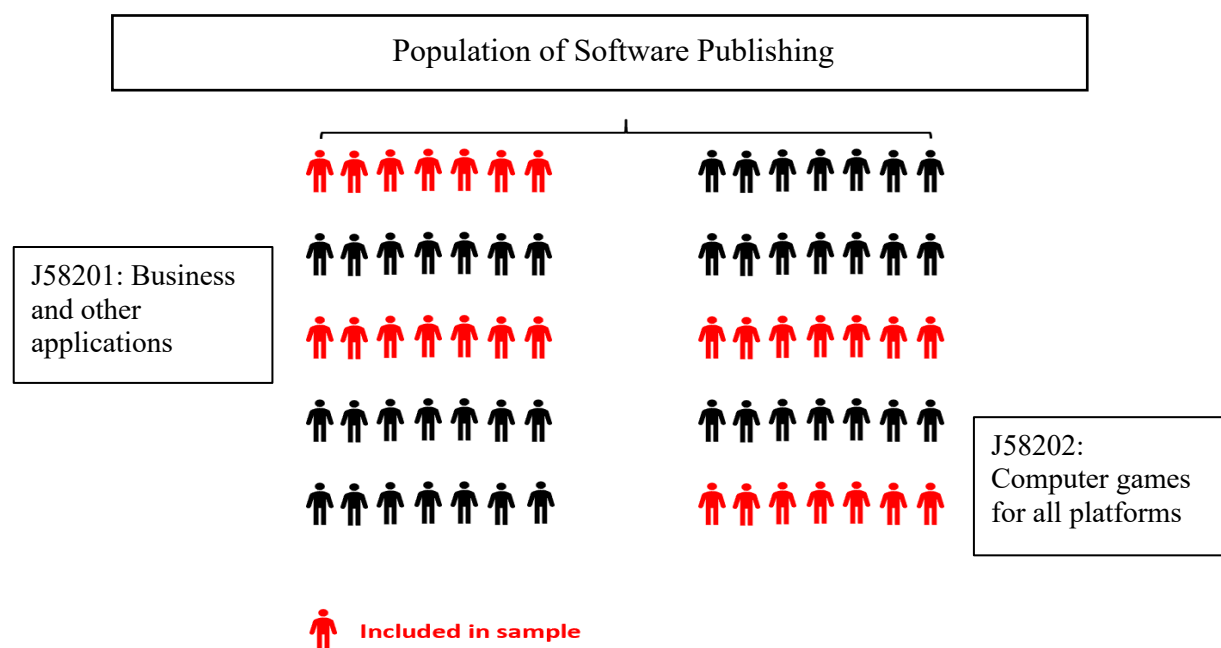
Figure 3.4: Population and Cluster Sampling in Publishing Activities (Software)

3.4 Data Analysis

Based on the activities conducted above, substantial data and information were collected. The data and information were discussed and analysed in development workshops and focus group discussions. The involvement of industry experts ensured that the development of the Occupational Framework was current and relevant. The data collected were analysed using quantitative-descriptive data analysis using the scoring method and presented in tables, graphs, pictures, and descriptions.

Analysis of data collected from the FGD and survey focused on the following:

a) Development of Organisational Structure, Job Title, Job Descriptions and Competencies.
b) Analysis of job in demand and critical jobs for the Publishing sector.
c) Determination of the relevant jobs title relevant to the technology revolution.
d) Issues relevant to the industry

3.4.1 Occupational Structure (OS) Development

The Occupational Structure development technique is explained in detail in chapter four. Several elements were referred to when developing the Occupational Structure (OS), such as follows:

a) Identification of sub-sector/area/sub-areas (MSIC)
b) Identification of Job Title (Organisation Structure, and others)
c) Identification of levelling based on MOSQ

3.5 Conclusion

The major purpose of this chapter is the process and techniques for developing the OF for the Publishing Activities. The justification of each selected research methodology was discussed. The selected research methodologies are document analysis, focus group discussion and survey research. The overall development process, Occupational Structure development, Occupational Description development, and a list of agencies and industries engagements or review sessions held during the project make up this document.

CHAPTER IV

FINDINGS

4.1   Introduction

This chapter presents the two digits Malaysia Standard Industrial Classification 2008 (MSIC, 2008) Division 58. This study used both quantitative and qualitative methods. The quantitative data was collected from the survey. In contrast, the qualitative data was collected from the Focus Group Discussion and Interview through Town Hall sessions and Virtual Visit. The findings revolve around the creation of an Occupational Structure (OS) for Publishing Activities on MSIC 2008, highlighting the competencies in demand in publishing activities, identifying critical jobs and job titles associated with the Fourth Industrial Revolution (IR4.0), as well as establishing Occupational Competencies (OC) and Occupational Descriptions (OD) for each job title in the publishing industry. This chapter, therefore, highlights the findings gathered on the key areas.

4.2   Data Analysis Results

Considering the Occupational Framework (OF) of publishing activities and the types and sources of information required to construct the OF, document analysis, focus group discussion, and survey research were chosen as the main methods of acquiring and analysing the necessary input in this study. This section provides findings analysis from the previous study, survey, and Focus Group Discussion (FGD) regarding the publishing activities industry. There are five research questions for this study.

4.2.1 Research Questions 1: How to develop an Occupational Structure (OS) based on MSIC 2008?

In order to answer this research question, there are four activities involved to produce the Occupational Structure (OS) for publishing activities: (i) Document Analysis; (ii) Focus Group Discussion; (iii) Town Hall Session and (iii) Virtual Visit. Then, the data were compiled and analysed descriptively.

i.   Findings from Previous Study

There is a related job title for the software publishing activities under Digital Technology Industry (HRDF-MDEC, 2020). Findings show that the main sub-sector related to publishing activities is Digital Creative Content, and it is divided into Animation and Video Games Development, as shown in Figure 4.1.
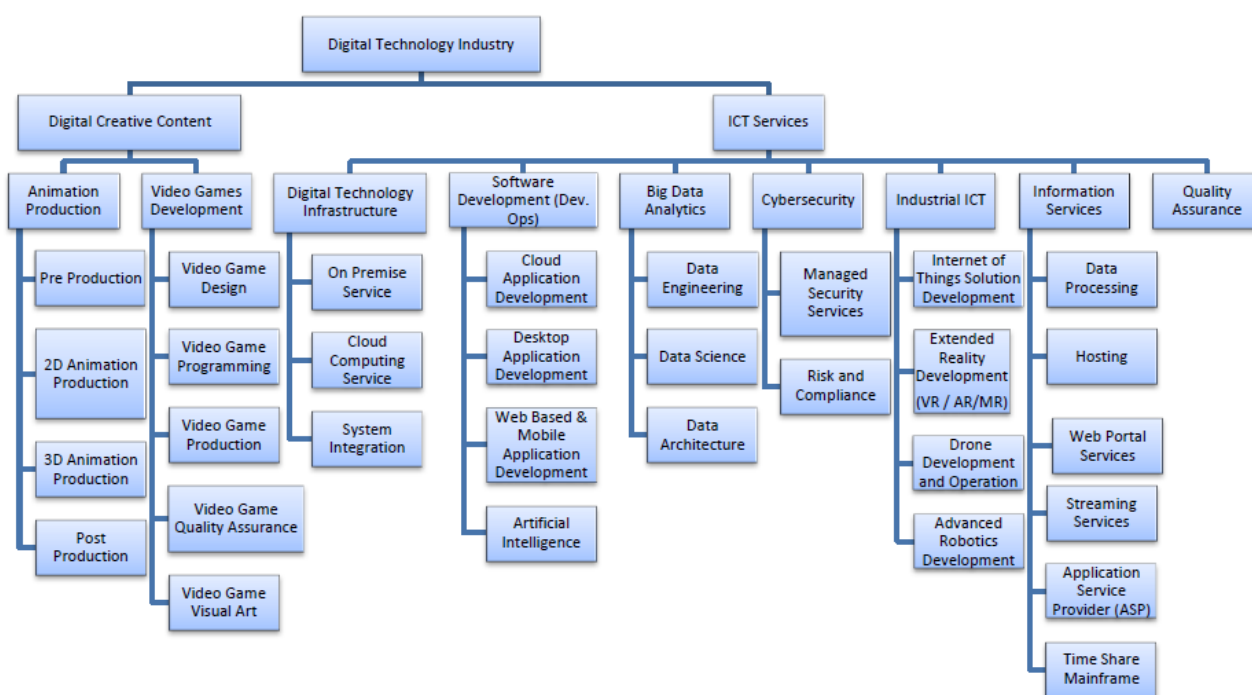
Figure 4.1: Digital Technology Industry Job Areas

In Malaysia, the New Straits Time (Malaysia) Berhad (NSTP) leads the print media. Among of popular publications under the NSTP are New Straits Times, Berita Harian, and Harian Metro. Based on information gained from official websites and inputs from panel experts, job-related journalism activities are shown in Figure 4.2.

Utusan Melayu (Malaysia) Berhad

Editor-In-Chief
Editor
Deputy Editor
News Editor
Journalist
Cadet Journalist

Berita Harian

Group Editor
Executive Editor
Associate Editor
Senior News Editor
News Editor /
Graphic Editor
Journalist
Cadet Journalist

Sinar Harian

Editor-in-Chief
Deputy Editor
News Editor
Journalist
Cadet Journalist

Malaysiakini - Online Portal

Editor-in-Chief
Executive Editor
Associate Editor
Managing Editor
Senior News Editor
Deputy News Editor
News Editor
Sub-Editor
Graphic Editor
Visual Editor
Assistant Editor
Journalist
Cadet Journalist

Figure 4.2: Journalism Job in Malaysia

ii.   Focus Group Discussion

A session of Focus Group Discussion (FGD) with experts from industry and government agencies was conducted to gain more information. During the discussion with an expert, the job title has been identified for each level in OS. Findings from the Focus Group Discussions with the industry representatives reveal that there are 24 areas, 101 job titles, 21 critical job titles, and 27 job titles related to the technology revolution identified within the publishing industry, all of which will be featured in the OS. Variation of the job area for book publishing are (i) Editorial; (ii) Authors/ Writers; (iii) Text Translation; (iv) Journalist and (v) News Editor. On top of that, the variations of the job area for the software publishing are (i) Interactive Multimedia (Graphic Design, Web Development, Mobile Application, Animation) and (ii) Computer Games for All Types of Platforms.

iii. Town Hall Session

During the Town Hall session, there were little feedbacks about job titles that fall under other OFs. Recommendations from the panel of experts who attended the Town Hall session suggested that the division should be carried out according to job area. Improvements have been made according to the recommendations given. There are also title jobs that are dropped for being involved with other OF fields. Fifty (50) representatives from industry and government agencies and fifteen (15) OF development experts were also present in this session. The JPK officers also provided additional information for the amendment of OF documents.

iv. Virtual Visit

Penerbitan Pelangi Sdn. Bhd. represented the book publishers for a virtual visit session, in which the Occupational structure and the critical job title in the publishing industries had been highlighted. Figure 4.3 shows the OS for Editorial Section. Most of the editors start with Editorial Assistant, followed by Editor. Editors can also be promoted to editorial manager, become a senior publishing manager, and become a publishing director for the editorial career path.
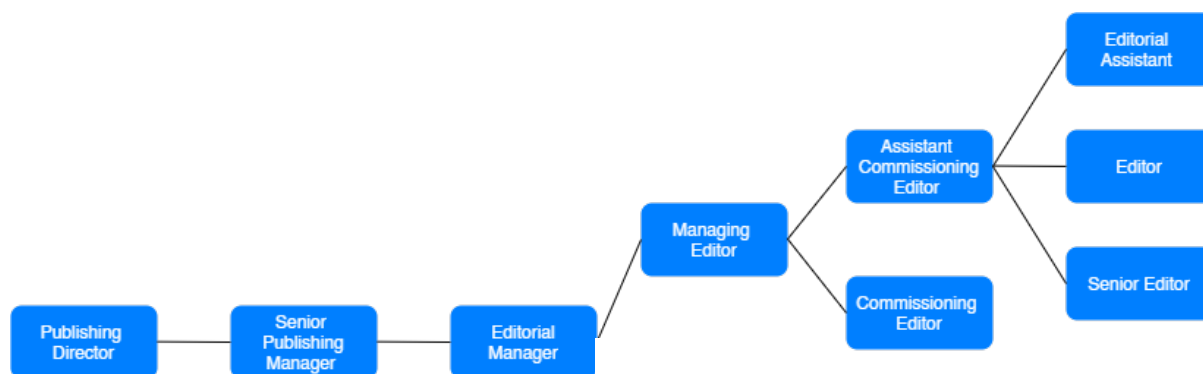
Figure 4.3: Editorial Section (Penerbitan Pelangi Sdn. Bhd)

Figure 4.4 shows the illustrations section, which falls under software publishing under Interactive Multimedia. This section starts with Junior Illustrator and then is followed by Mid Illustrator, Senior Illustrator, Lead Illustrator, and Art Manager.
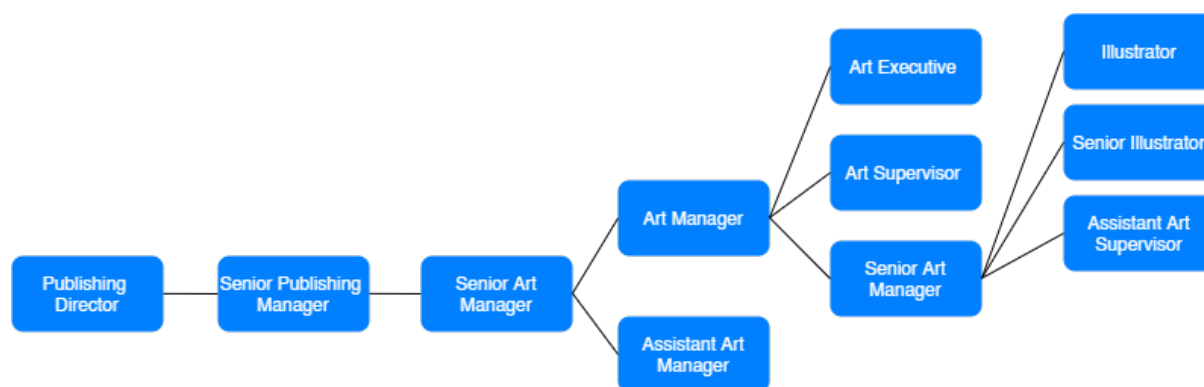
Figure 4.4: Illustration Section (Penerbitan Pelangi Sdn. Bhd)

Figure 4.5 shows the digital department involved with creative content development—the job title starts with Junior 2D Animator, then Junior 3D Animator, and Senior 2D Animator.
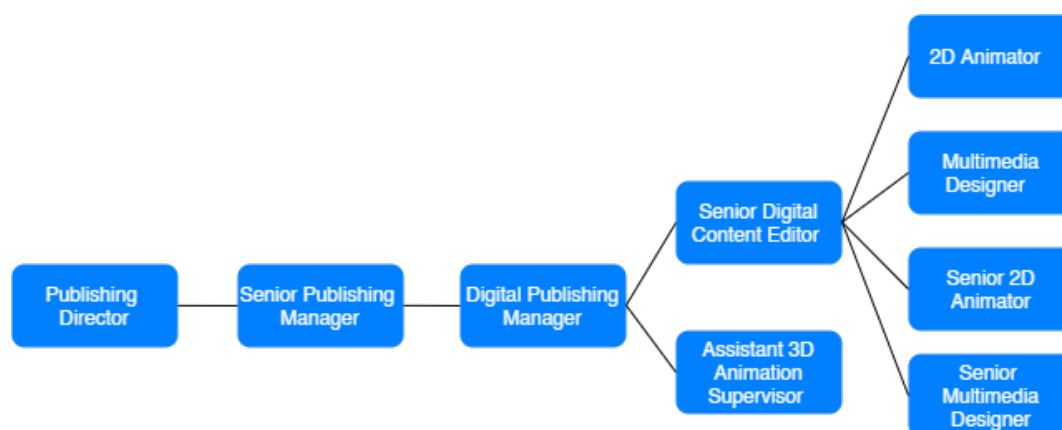
Figure 4.5: Digital Department

For the text translation department at *Institut Terjemahan dan Buku Malaysia* (ITBM), the main business is translating documents and books. ITBM also provides translation services for information, software, and other literature from various languages into Malay and other languages. ITBM also deals with interpreting and knowledge transfer at all levels, both national and international. Figure 4.6 shows the department under ITBM.
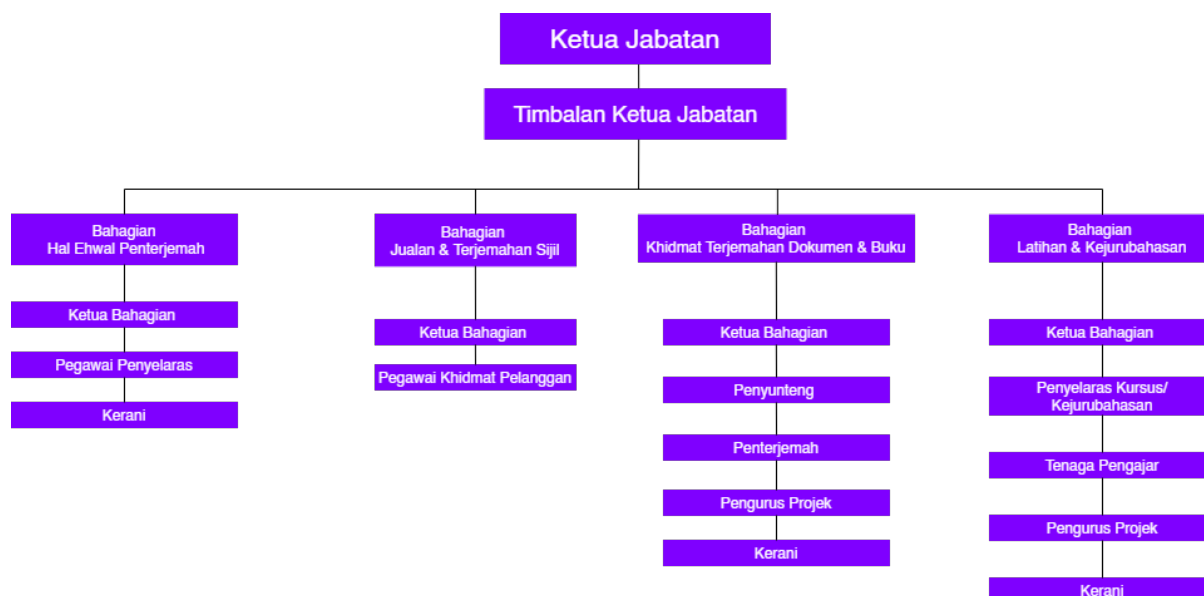
Figure 4.6: Department at ITBM

For the creative industry under computer games for all platforms, Sony PlayStation's presenter highlighted the job roles under the Computer Games industry (Table 4.1).

Table 4.1: Job title at Sony PlayStation related to software publishing.

No	Department	Job Roles	Responsibility
1	Art	- Senior/Mid/Junior Asset Artist - Senior Lighting Artist - Senior/Mid/Junior Character Artist - Senior Rigging Artist - Senior Environment Artist - Senior Texture Artist - Senior Concept Artist - Environment Lighting Artist - Cinematic Lighting Artist	3D Modelling - Texturing - Lighting - Rigging - Concept Art - Graphic Design
2	Animation	- Lead/ Senior/Mid/Junior Animator (In-Game) - Lead/ Senior/Mid/Junior Animator (Cinematic)	Animation (In-game and cinematic)
3	Tech Art and Engineering	- Lead/ Mid/ Junior Technical Artist - Lead DevOps Engineer - Senior/ Mid Software Engineer	- Develop and maintain pipelines tools - Solve problems in the pipeline - Support production team

Occupational Structure (OS)

The term Occupational Structure (OS) refers to the aggregate distribution of professions in an

organisation categorised according to the skill level, economic function, or social standing of the workers in that organisation. Figure 4.7-4.10 shows the job title from Level 1- level 6 for publishing activities. Table 4.2 shows the Occupational Structure for Group 581: Publishing of Books, Periodicals, and Other Publishing Activities. Findings indicated that there are five job areas under this group (i) Editorial; (ii) Authors/Writers, (iii) Text Translation; (iv) Journalist and (v) News Editor. Table 4.3-4.6 provides Occupational Competencies (OC) for every job title under 581. The Occupational Competencies listed in this section may include but are not limited to the list. These Occupational Competencies were purposely for NOSS development in the future for this industry. Table 4.7-4.10 shows the OS for Group 582: Software Publishing, and Table 4.11-4.25 provides the Occupational Competencies for software publishing activities. Table 4.26-4.30 shows the mapping OS with the available NOSS. A total of available NOOS are identified, and mapping over the OS is produced based on the NOSS registry update (NOSS, 2021).
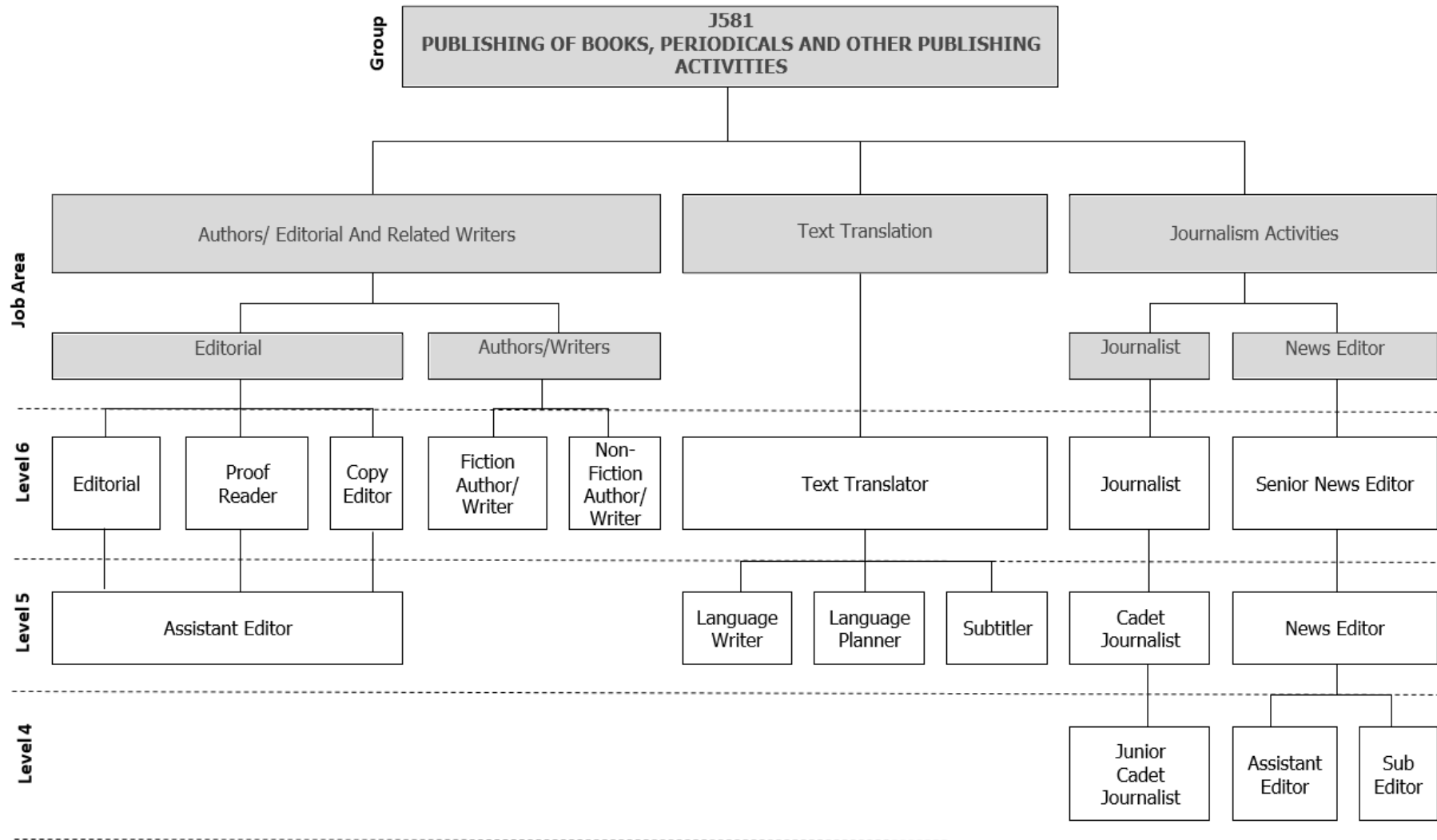
Figure 4.7: Job Areas for Group J581 (Publishing of Books, Periodicals and Other Publishing Activities)
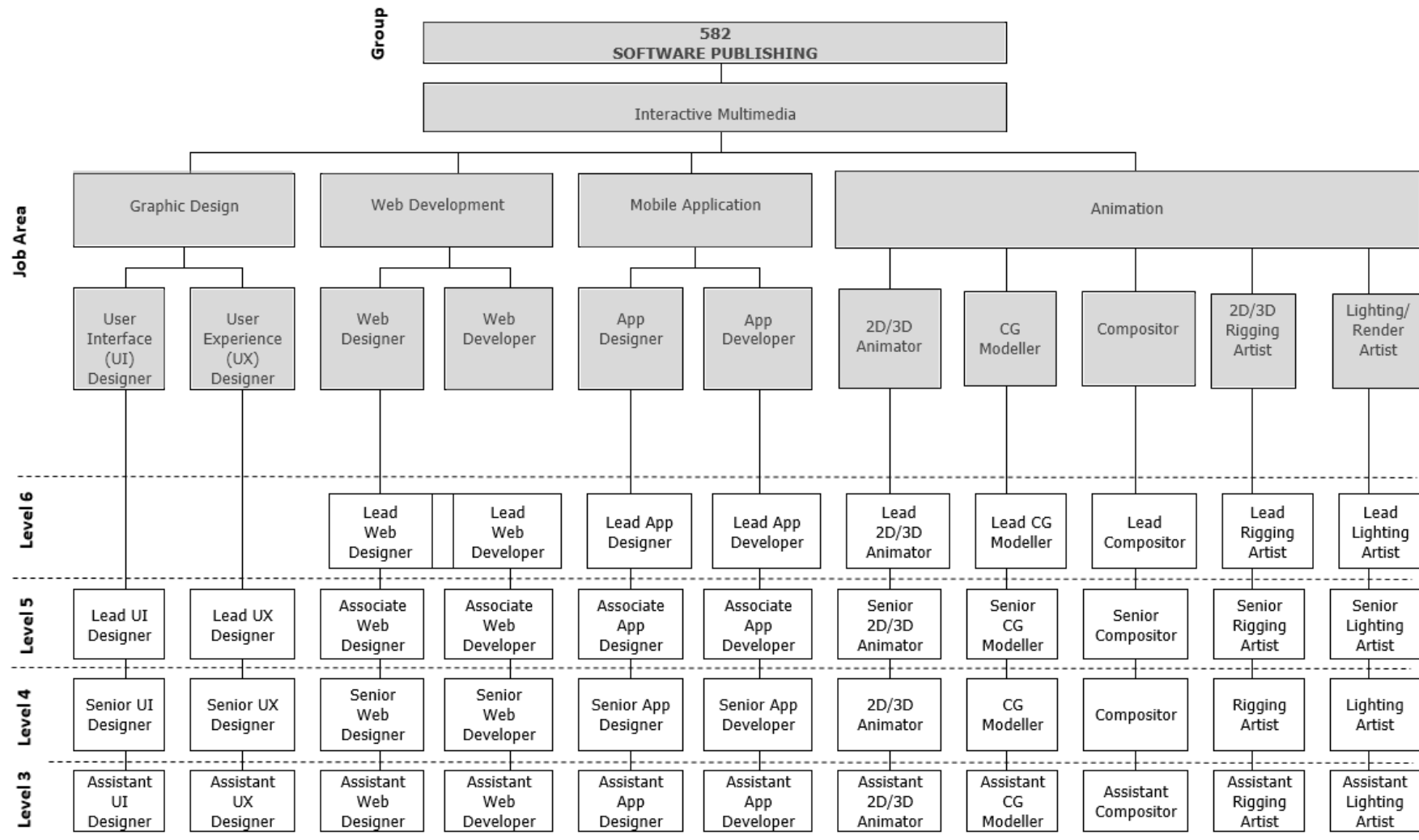
Figure 4.8: Job Areas for Group J582 (Software Publishing- Interactive Multimedia)

Group
```
┌─────────────────────────────┐
│            582              │
│     SOFTWARE PUBLISHING      │
└─────────────────────────────┘
```

┌─────────────────────────────┐
│ Computer Games for All Platform │
└─────────────────────────────┘

Job Area

| Video Game Design | Video Game Programming | Video Game Production | Video Game Quality Assurance |

Level 6

| Game Design Director | Technical Director | Game Producer | |

Level 5

| Lead Game Designer | Lead Game Programmer | Engine Programmer | Lead Backend Programmer | Game Production Manager | Lead Game Tester |

Level 4

| Gameplay Designer | Game Level Designer | Game Programmer | Tools Programmer | Senior Backend Programmer | Senior Game Production Manager | Senior Game Tester |

Level 3

| Game Designer | Assistant Game Programmer | Assistant Backend Programmer | Assistant Game Production Manager | Assistant Game Tester |

Figure 4.9: Job Areas for Group J582 (Software Publishing- Computer Games for All Platform)
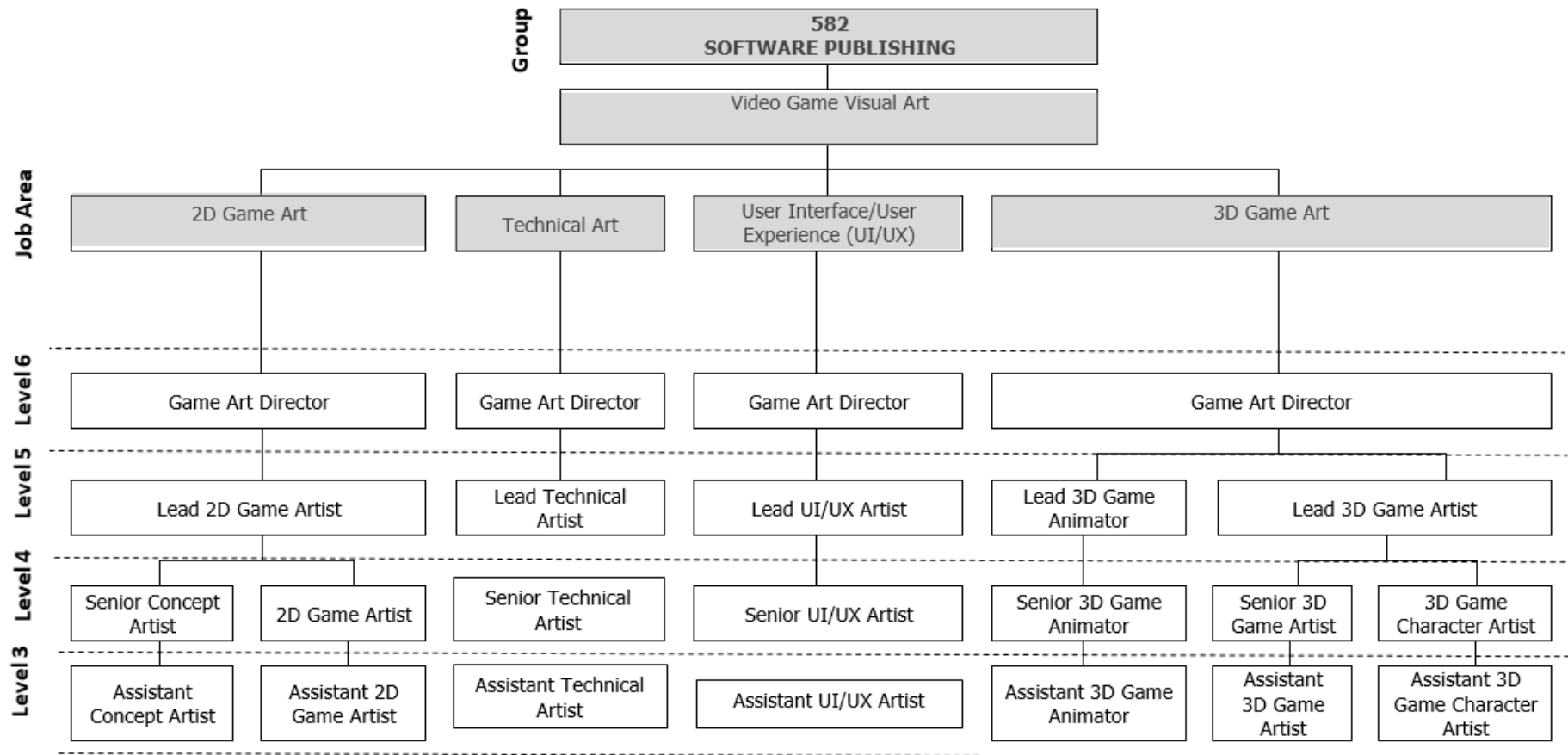
Figure 4.10: Job Areas for Group J582 (Software Publishing- Video Game Visual Art)

Table 4.2: Group 581 Occupational Structure

SECTION	(J) PUBLISHING ACTIVITIES							
DIVISION	(58) PUBLISHING ACTIVITIES							
GROUP	(581) PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES							
AREA	**Authors/ Editorial and Related Writers**				**Text Translation**			**Journalism Activities**	
	Editorial			**Authors/Writers**				**Journalist**	**News Editor**
LEVEL 8	No Job Title			No Job Title		No Job Title		No Job Title	No Job Title
LEVEL 7	No Job Title			No Job Title		No Job Title		No Job Title	No Job Title
LEVEL 6	***Editor	Proof-reader	Copy Editor	**Fiction Author/ Writer	**Non-Fiction Author/ Writer	***Text Translator		**Journalist	**Senior News Editor
LEVEL 5	Assistant Editor			No Job Title		Language Writer / Language Planner / Subtitler		Cadet Journalist	News Editor
LEVEL 4	No Job Title			No Job Title		No Job Title		Junior Cadet Journalist	Assistant Editor / Sub Editor
LEVEL 3	No Job Title			No Job Title		No Job Title		No Job Title	No Job Title
LEVEL 2	No Job Title			No Job Title		No Job Title		No Job Title	No Job Title
LEVEL 1	No Job Title			No Job Title		No Job Title		No Job Title	No Job Title

Note:

* Critical Job Titles **Job Titles Related to IR4.0

Table 4.3: Group 581 Occupational Competencies (1 of 4)

SECTION	J) PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(581) PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES				
AREA	**Authors/ Editorial And Related Writers**		**Text Translation**	**Journalism Activities**	
	Editorial	**Authors/Writers**		**Journalist**	**News Editor**
LEVEL 8	No Level	No Level	No Level	No Level	No Level
LEVEL 7	No Level	No Level	No Level	No Level	No Level
LEVEL 6	**Editor** ▪ Modify written material for publication, draft and implement editorial policy. ▪ Point out that the content of publications or news items ▪ Manage the production of publications and the staff involved.	**Fiction Author/Writer** ▪ Conjure new ideas to create stories, lyrics, scripts and poems, typically choosing one genre of fiction in which to work. **Non-Fiction Author/ Writer** ▪ Writing and publishing Nonfiction book	**Text Translator** ▪ Read original material and rewrite it in the target language, ensuring that the meaning of the source text is retained. ▪ Liaise with clients to discuss any unclear points ▪ Proofread and edit final translated versions ▪ Provide quotations for translation services offered ▪ Consult with experts in specialist areas ▪ Follow various translation-quality standards to ensure legal and ethical obligations to the customer.	**Journalist** ▪ Assess leads and pitch captivating story ideas to editors. ▪ Review and edit work for editorial approval. ▪ Prepare concise and factual articles. ▪ Adhere to the ethical code of the profession. ▪ Keep records of all notes, interviews, and audio files. ▪ Create trustworthy relationships with contacts and sources for use in future research. ▪ Keep up-to-date on the latest news developments ▪ Collect, verify and decipher data.	**Senior News Editor** ▪ Writes news articles covering finance, economics, and global impact. ▪ Develops ideas for relevant articles. ▪ To sustain a steady flow of engaging article ideas. ▪ Contributes to an editorial calendar, planning coverage in a meaningful and strategic manner. ▪ Working with analytics tools, social media networks, and email clients, plans future article topics and content. ▪ Collaborates with the graphic designer to conceive of and develop photography and design work.

Table 4.4: Group 581 Occupational Competencies (2 of 4)

SECTION	PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(581) PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES				
AREA	Authors/ Editorial And Related Writers			Text Translation	Journalism Activities	
	Editorial	Authors/ Writers			Journalist	News Editor
LEVEL 6	**Proofreader** ▪ Review documents ▪ Decides the originality of all submitted writing ▪ Ensure text meets tone and character count outlined by company policies ▪ Make corrections and suggest edits to the document ▪ Meet proofreading deadlines. **Copy Editor** ▪ Compare adherence to style guides including spelling, proper tenses and voice ▪ Working with writers to help them improve their research and article development skills. ▪ Edits the copy of the text to improve readability through formatting and conciseness. ▪ Proofreading copy to fix grammatical, spelling and punctuation errors. ▪ Verifying numbers like dates and statistics to ensure accuracy. ▪ Creating layouts for publications to arrange text, images and ads properly.					

Note:

* Critical Job Titles   **JobTitlesRelatedtoIR4.0

Table 4.5: Group 581 Occupational Competencies (3 of 4)

SECTION	PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(581) PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES				
AREA	**Authors/ Editorial And Related Writers**		**Text Translation**	**Journalism Activities**	
	Editorial	**Authors/ Writers**		**Journalist**	**News Editor**
LEVEL 5	**Assistant Editor** ▪ Work with the editor-in-chief on a regular basis ▪ Conducts research, plan and implementation of new articles. ▪ Work with other team members such as writers, reporters and photographers ▪ Write, manage, and edit written work ▪ Investigate and suggest good sources ▪ Suggest improvements for pieces ▪ Participate at current events ▪ Use social media to increase article impressions	No Job Title	**Language Writer** ▪ Apply principles of plain language and health literacy to the writing ▪ Prepare health communication materials developed for various formats and channels. ▪ Produce health content and offer practical solutions for improving text ▪ Modify with an eye toward maintaining consistency across campaign materials and with style guidelines and formatting requirements. **Language Planner** ▪ Advising the Language centre Director **Subtitler** ▪ Translate all the dialogue, music and sound effects of a film into two-line written captions that appear on the screen	**Cadet Journalist** ▪ Gather information and generate original and exclusive stories - both news and features ▪ Report on a range of different stories as well as staying abreast of community issues and interests.	**News Editor** ▪ Analyse various attributes and requirements. ▪ Produce news to present information ▪ Design innovative and unique solutions. ▪ Manage contents and provide detailed information. ▪ Prepare work schedule and deadlines to meet targets ▪ Coordinate with internal and external customer service ▪ Evaluate all-new for authenticity and check with sources

Table 4.6: Group 581 Occupational Competencies (4 of 4)

SECTION	PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(581) PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES				
AREA	**Authors/ Editorial And Related Writers**		**Text Translation**	**Journalism Activities**	
	Editorial	**Authors/ Writers**		**Journalist**	**News Editor**
LEVEL 4	No Job Title	No Job Title	No Job Title	**Junior Cadet Journalist** ▪ Help Cadet Journalist to gather information and generate original and exclusive stories - both news and features ▪ Report on a range of different stories as well as staying abreast of community issues and interests.	**Assistant Editor** ▪ Work with the News Editor on a regular basis ▪ Implement new articles ▪ Work with other team members such as writers, reporters and photographers ▪ Write and edit written work ▪ Suggest good sources ▪ Suggest improvements for pieces ▪ Participate at current events ▪ Use social media to increase article impressions **Sub Editor** ▪ Reproduce reporters' copy into tight, clear, and readable stories in line with internal style guides ▪ Identify headlines, picture captions and story summaries ▪ Define text by identifying inconsistencies and errors (in both language and content) ▪ Resolve ambiguous passages in conjunction with the Editors ▪ Identify information and story details to confirm the accuracy of stories ▪ Designing page layouts and ensuring stories and pictures are correctly placed on pages

Note: * Critical Job Titles   **Job Titles Related to IR4.0

Table 4.7: Group 582 Occupational Structure (1 of 4)

SECTION	(J) PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	**Interactive Multimedia**					
	Graphic Design		**Web Development**		**Mobile Application**	
	User Interface (UI) Designer	User Experience (UX) Designer	Web Designer	Web Developer	App Designer	App Developer
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	No Job Title	No Job Title	*** Lead Web Designer	*** Lead Web Developer	*** Lead App Designer	*** Lead App Developer
LEVEL 5	Lead UI Designer	Lead UX Designer	Associate Web Designer	Associate Web Developer	Associate App Designer	Associate App Developer
LEVEL 4	Senior UI Designer	Senior UX Designer	Senior Web Designer	Senior Web Developer	Senior App Designer	Senior App Developer
LEVEL 3	Assistant UI Designer	Assistant UX Designer	Assistant Web Designer	Assistant Web Developer	Assistant App Designer	Assistant App Developer
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title

Note: * Critical Job Titles ** Job Titles Related to IR4.0

Table 4.8: Group 582 Occupational Structure (2 of 4)

SECTION	(J) PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	Interactive Multimedia				
	Animation				
	2D/3D Animator	CG Modeller	Compositor	2D/3D Rigging Artist	Lighting/ Render Artist
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	***Lead 2D/3D Animator	*Lead CG Modeller	Lead Compositor	Lead Rigging Artist	Lead Lighting Artist
LEVEL 5	Senior 2D/3D Animator	Senior CG Modeller	Senior Compositor	Senior Rigging Artist	Senior Lighting Artist
LEVEL 4	2D/3D Animator	CG Modeller	Compositor	Rigging Artist	Lighting Artist
LEVEL 3	Assistant 2D/3D Animator	Assistant CG Modeller	Assistant Compositor	Assistant Rigging Artist	Assistant Lighting Artist
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title

Note: * Critical Job Titles ** Job Titles Related to IR4.0

Table 4.9: Group 582 Occupational Structure (3 of 4)

SECTION	(J) PUBLISHING ACTIVITIES			
DIVISION	(58) PUBLISHING ACTIVITIES			
GROUP	(582) SOFTWARE PUBLISHING			
AREA	**Computer Games for All Platform**			
	Video Game Design	**Video Game Programming**	**Video Game Production**	**Video Game Quality Assurance**
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	Game Design Director	Technical Director	Game Producer	No Job Title
LEVEL 5	Lead Game Designer	***Lead Game Programmer / ***Engine Programmer / Lead Backend Programmer	*Game Production Manager	Lead Game Tester
LEVEL 4	***Gameplay Designer / **Game Level Designer	***Game Programmer / Tools Programmer / Senior Backend Programmer	Senior Game Production Manager	Senior Game Tester
LEVEL 3	Game Designer	***Assistant Game Programmer / Assistant Backend Programmer	Assistant Production Manager	Assistant Game Tester
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title

Note: * Critical Job Titles ** Job Titles Related to IR4.0

Table 4.10: Group 582 Occupational Structure (4 of 4)

SECTION	(J) PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	**Video Game Visual Art**					
	2D Game Art		**Technical Art**	**User Interface/User Experience (UI/UX)**	**3D Game Art**		
LEVEL 8	No Job Title		No Job Title	No Job Title	No Job Title		
LEVEL 7	No Job Title		No Job Title	No Job Title	No Job Title		
LEVEL 6	Game Art Director		Game Art Director	Game Art Director	Game Art Director		
LEVEL 5	Lead 2D Game Artist		Lead Technical Artist	**Lead UI/ UX Artist	Lead 3D Game Animator	***Lead 3D Game Artist	
LEVEL 4	***Senior Concept Artist	***Senior 2D Game Artist	Senior Technical Artist	**Senior UI/ UX Artist	Senior 3D Game Animator	***Senior 3D Game Artist	Senior 3D Game Character Artist
LEVEL 3	***Assistant Concept Artist	***Assistant 2D Game Artist	Assistant Technical Artist	**Assistant UI/ UX Artist	Assistant 3D Game Animator	***Assistant 3D Game Artist	Assistant 3D Game Character Artist
LEVEL 2	No Job Title		No Job Title	No Job Title	No Job Title		
LEVEL 1	No Job Title		No Job Title	No Job Title	No Job Title		

Table 4.11: Group 582 Occupational Competencies (1 of 14)

SECTION	J) PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	Interactive Multimedia					
	Graphic Design		Web Development		Mobile Application	
	User Interface (UI) Designer	User Experience (UX) Designer	Web Designer	Web Developer	App Designer	App Developer
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	No Job Title	No Job Title	**Lead Web Designer** ▪ Analyse with internal online team, marketing team and external creative agencies to drive the look and feel of client sites ▪ Develop to translate business requirements into intuitive user interfaces ▪ Develop wireframes and design comps for new Web initiatives and implement them	**Lead Web Developer** ▪ Prepare the daily operation, infrastructure, security, and development of the company's website and related digital communication and analytics tools. ▪ analyse the technical implementation of microsites, web pages, and interactive forms	**Lead App Designer** ▪ Develop intuitive, usable, and engaging interactions and visual designs for mobile. ▪ Prepare strategic thinking and leadership. ▪ Collaborate with cross-functional teams throughout the design process	**Lead App Developer** ▪ Deliver across the entire app life cycle –concept, design, build, deploy, test, release to app stores and support. ▪ Gather requirements around functionality ▪ Translate those requirements into elegant functional solutions and specifications ▪ Build prototypes at tech scoping stage of projects ▪ Standardising app platform and in some cases apps to deliver across multiple brands with minimal duplication of effort

Table 4.12: Group 582 Occupational Competencies (2 of 14)

SECTION	J) PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	Interactive Multimedia					
	Graphic Design		Web Development		Mobile Application	
	User Interface (UI) Designer	**User Experience (UX) Designer**	**Web Designer**	**Web Developer**	**App Designner**	**App Developer**
LEVEL 5	**Lead UI Designer** ▪ Construct & analyse libraries ▪ Design systems with adherence to product branding requirements. ▪ Modify the development and delivery of effective UI. ▪ Manage a team of junior UI designers, providing training and support. ▪ Prepare with the digital analytics team to assess the impact of all UI design and usability changes. ▪ Categorize with user research, interviews, surveys and usability studies, translating findings into wireframes and prototypes.	**Lead UX Designer** ▪ Lead the major projects. ▪ Categorize input and review the other projects in the teams. ▪ Demonstrate high-quality design practices includes UX. ▪ analyse original ideas and user-friendliness to complex design roadblocks ▪ Working on a framework for judging the success or failure of the product, ▪ Prioritising feature development and structuring product failures. ▪ Connect designers in the team, fostering a collaborative, productive, and positive environment within a growing team. ▪ Manage design strategy activities to understand user needs & business opportunities, uncover business/user needs, generate potential solutions, craft a holistic vision for the end-to-end product and develop roadmaps for achieving that future.	**Associate Web Designer** ▪ Apply architecture for a web and databases ▪ Develop and execute various web apps. ▪ Prepare documents for all business & functional requirements. ▪ Use templates and style sheets for all object models and assist in data extractions ▪ Perform various unit tests on websites & assist in QA activities. ▪ Complete all test plans and scripts ▪ Design all user acceptance tests on the web & administer various mediums.	**Associate Web Developer** ▪ Sketch with the systems development team and provide support to all web development applications ▪ Monitor software development lifecycle. ▪ Administer all web technologies and design various applications as per all functional and technical requirements. ▪ Manage all test-driven practices ▪ Prepare drafts for all unit tests according to continuous integration system and provide technical support to all project managers and partners.	**Associate App Designner** ▪ Modify either iOS, Android, desktop or Web App. ▪ Construct software using the web, desktop, or mobile technology ▪	**Associate App Developer** ▪ Demonstrate regular evaluations, tests, and analyses for business applications

Table 4.13: Group 582 Occupational Competencies (3 of 14)

SECTION	J) PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	Interactive Multimedia					
	Graphic Design		Web Development		Mobile Application	
	User Interface (UI) Designer	**User Experience (UX) Designer**	**Web Designer**	**Web Developer**	**App Designer**	**App Developer**
LEVEL 4	**Senior UI Designer** ▪ Differentiate user requirements in collaboration with product managers and engineers ▪ Illustrate design ideas using storyboards, process flows and sitemaps ▪ Classify graphic user interface elements, like menus, tabs and widgets ▪ Explain page navigation buttons and search fields ▪ Classify UI mockups and prototypes that clearly illustrate how sites function and look like.	**Senior UX Designer** ▪ Apply the design of useful, usable, and desirable design patterns in a team environment. Work with leadership in design planning and goal creation. ▪ Interpret customers and their needs through market analysis, customer research, usage analytics, and feedback. ▪ Apply business requirements to assist in developing use cases and high-level requirements ▪ Prepare the design process, present and iterate on design solutions. ▪ Prepare long-term design strategies.	**Senior Web Designer** ▪ Sketch website layouts, updating sites ▪ Working with other teams to create concepts and strategies	**Senior Web Developer** ▪ Demonstrate website layouts, updating sites ▪ Create concepts and strategies ▪ Maintain and update websites ▪ Monitor website traffic ▪ Interpret up-to-date on technology	**Senior App Designer** ▪ Construct design consistency via the use of style guides, style sheets and ensuring that established standards and best practices are followed. ▪ Prepare the mobile app's UI based on market feedback ▪ Illustrate up to date with UI/UX trends and incorporating these where applicable.	**Senior App Developer** ▪ Explain, maintain, and implement the source code to develop mobile apps and mobile platform programs.

Table 4.14: Group 582 Occupational Competencies (4 of 14)

SECTION	J) PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	Interactive Multimedia					
	Graphic Design		Web Development		Mobile Application	
	User Interface (UI) Designer	User Experience (UX) Designer	Web Designer	Web Developer	App Designer	App Developer
LEVEL 3	**Assistant UI Designer** ▪ Discover requirements into style guides, design systems, design patterns and attractive user interfaces ▪ Creating a visualisation of screens within a prototype framework ▪ Identifying design problems and devising elegant solutions.	**Assistant UX Designer** ▪ Explain user research and competitor analysis ▪ Summarize data and qualitative feedback ▪ Summarize user stories, personas, and storyboards ▪ Explain information architecture and create sitemaps ▪ Explain prototypes and wireframes ▪ Explain usability testing	**Assistant Web Designer** ▪ Demonstrate website designs ▪ Compare sample sites ▪ Demonstrate feedback about draft sites ▪ Illustrate up to date with recent technological and software developments ▪ Apply skills and expertise in appropriate software/ programming languages	**Assistant Web Developer** ▪ Identify applications for websites ▪ Explain design specs ▪ Examine with graphics and other designers ▪ Troubleshoot website problems	**Assistant App Designer** ▪ Explain interfaces for iOS and Android applications ▪ Relate to the entire design process from design strategy to design execution ▪ Demonstrate user interface concepts and designs clearly for implementation ▪ Working closely with Front-end engineer to ensure that design requirements are met	**Assistant App Developer** ▪ Explain possible security threats, and providing end user support ▪ Oversee the performance of applications ▪ Solve overall application development process and continuously find ways to advance apps
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title

Table 4.15: Group 582 Occupational Competencies (5 of 14)

SECTION	J) PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	**Interactive Multimedia**				
	Animation				
	2D/3D Animator	**CG Modeller**	**Compositor**	**2D/3D Rigging Artist**	**Lighting/ Render Artist**
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	**Lead 2D/3D Animator** ▪ Create models, drawings and illustrations. ▪ Design frames and characters. ▪ Choose colour palettes, style and general look of the animation. Develop artwork for the backgrounds and layouts.	**Lead CG Modeller** ▪ Create and design accurate and efficient models	**Lead Compositor** ▪ Reframe compositing templates for the show, ▪ Improve compositing workflows, and supporting the team, in addition to doing some shot-compositing work.	**Lead Rigging Artist** ▪ Create digital skeletons for 3D computer-generated (CG) characters.	**Lead Lighting Artist** ▪ Compose shots from lighting production through to finalising on schedule

Table 4.16: Group 582 Occupational Competencies (6 of 14)

SECTION	J) PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	Interactive Multimedia				
	Animation				
	2D/3D Animator	**CG Modeller**	**Compositor**	**2D/3D Rigging Artist**	**Lighting/ Render Artist**
LEVEL 5	**Senior 2D/3D Animator** ▪ Discover, designing, and creating stunning (2D) in-game visual effects (modelling, texturing, animating, lighting, shaders, etc.) by using available tools in a real-time engine. ▪ Produce high-quality texture content for the game world.	**Senior CG Modeller** ▪ Illustrate photo-real scenes and landscapes, completing work as required.	**Senior Compositor** ▪ Create the final image of a frame, shot or sequence	**Senior Rigging Artist** ▪ Design and maintain a smooth and efficient rig for 3D model assets.	**Senior Lighting Artist** ▪ Create light settings for our environments, both interiors and exteriors.
LEVEL 4	**Assistant 2D/3D Animator** ▪ Create moving images that tell stories or provide information.	**Assistant CG Modeller** ▪ Create digital versions of the characters and props	**Assistant Compositor** ▪ Responsible for the composition of images and shots.	**Assistant Rigging Artist** ▪ In charge of creating, maintaining, and expanding Rigs for a variety of props, vehicles, characters and other CG objects that need to be animated.	**Assistant Lighting Artist** ▪ In charge of depth to sets and characters with shadows, as well as providing proper illumination to bring out the scene's emotion and, in some studios, to add surface qualities to objects.

Table 4.17: Group 582 Occupational Competencies (7 of 14)

SECTION	J) PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	Interactive Multimedia				
	Animation				
	2D/3D Animator	**CG Modeller**	**Compositor**	**2D/3D Rigging Artist**	**Lighting/ Render Artist**
LEVEL 3	<u>Junior 2D/3D Animator</u> ▪ Demonstrate the vital support role for the whole team, from prepping puppets, setting up puppets for camera tests, to animating background characters and other logistical tasks.	<u>Junior CG Modeller</u> ▪ Demonstrate 3d models based on the specifications of your clients.	<u>Junior Compositor</u> ▪ Demonstrate mattes (cut-outs) for each element that the compositor needs to digitally manipulate	<u>Junior Rigging Artist</u> ▪ Demonstrate Rigging artist to in charge of creating maintaining and expanding Rigs for a variety of props, vehicles, characters and other CG objects that need to be animated.	<u>Junior Lighting Artist</u> ▪ Demonstrate lighting artist to in charge depth to sets and characters with shadows ▪ Provide proper illumination to bring out the scene's emotion and, in some studios, to add surface qualities to objects.
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title

Table 4.18: Group 582 Occupational Competencies (8 of 14)

SECTION	PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	**Computer Games for All Platform**					
	Video Game Design	**Video Game Programming**			**Video Game Production**	**Video Game Quality Assurance**
LEVEL 8	No Job Title	No Job Title			No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title			No Job Title	No Job Title
LEVEL 6	<u>**Game Design Director**</u> ▪ Bring ideas, build prototypes, create interactive narration ▪ Develop the game's mechanics	<u>**Technical Director**</u> ▪ Manage the development plan, schedule, and process for multiple simultaneous projects, including tasks, resources, quality, time, priorities, and costs			<u>**Game Producer**</u> ▪ Assembling and managing a team of engineers, designers and artists	No Job Title
LEVEL 5	<u>**Lead Game Designer**</u> ▪ Solve for how a game looks and what it's like to play.	<u>**Lead Game Programmer**</u> ▪ Sketch the various sub-modules of the game are being implemented properly and keep track of development from a programming standpoint	<u>**Engine Programmer**</u> ▪ Report and modify game engines, developing new functionalities and features that respond to the needs of the game as it's being created.	<u>**Lead Backend Programmer**</u> ▪ Solve, build, maintain, and test a server infrastructure. ▪	<u>**Lead Game Production Manager**</u> ▪ Apply and manage the development team, oversee production, and helm the schedule.	<u>**Lead Game Tester**</u> ▪ Design the reports and works closely with designers and programmers.

Table 4.19: Group 582 Occupational Competencies (9 of 14)

SECTION	PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	Computer Games for All Platform					
	Video Game Design		**Video Game Programming**			**Video Game Production**	**Video Game Quality Assurance**
LEVEL 4	**Gameplay Designer** ▪ Designing characters, levels, puzzles, art and animation.	**Game Level Designer** ▪ The phase of game development that deals with creating the stages of the game	**Game Programmer** ▪ Develop the software to create video games.	**Tools Programmer** ▪ Help artists and designers get their art and ideas into the game as quickly and effortless as possible	**Senior Backend Programmer** ▪ Demonstrate, build, maintain, and test a server infrastructure.	**Senior Game Production Manager** ▪ Coordinates meetings regularly and manages the schedule for various game production projects.	**Senior Game Tester** ▪ Charge of developing programs that test products automatically
LEVEL 3	**Assistant Game Designer** ▪ Explain characters' stories and traits, game plots, settings, and game rules.		**Assistant Game Programmer** ▪ Explain gameplay elements, which facilitate the playability of the game and complex gameplay mechanisms.		**Assistant Backend Programmer** ▪ Explain, build, maintain, and test a server infrastructure.	**Assistant Game Production Manager** ▪ Identify meetings regularly and manage the schedule for various game production projects.	**Assistant Game Tester** ▪ Explain the game details to effectively document and any glitches or bugs.
LEVEL 2	No Job Title		No Job Title		No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title		No Job Title		No Job Title	No Job Title	No Job Title

Table 4.20: Group 582 Occupational Competencies (10 of 14)

SECTION	PUBLISHING ACTIVITIES			
DIVISION	(58) PUBLISHING ACTIVITIES			
GROUP	(582) SOFTWARE PUBLISHING			
AREA	Video Game Visual Art			
	2D Game Art	Technical Art	User Interface/User Experience (UI/UX)	3D Game Art
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	**Game Art Director** ▪ Key role in every stage of the creation of a video game, from formulating concepts to supervising production. ▪ Plan with 2D and 3D artists, animators, modellers, and other artistic staff to coordinate all the visual images used in a game. ▪ Supervise both in-house and off-site staff, handle management issues, and oversee the entire artistic production process.	**Game Art Director** ▪ Distinguish expert in their field and holds a wealth of knowledge in dealing with the technical issues around content creation for video games. ▪ Produce work that is at the highest level of quality and difficulty. ▪ Select the graphic production pipeline (modelling, animation, characters, lighting, and sfx.	**Game Art Director** ▪ Point out and lead the game's graphical identity ▪ Contrast high-quality foundation for outstanding game interface (menus, navigation, HUD, FX) ▪ Make sure that the 2D visual look-and-feel is consistent from mock-ups to final product ▪ Lead and mentor the UI/UX team	**Game Art Director** ▪ Key role in every stage of the creation of a video game, from formulating concepts to supervising production. ▪ Collaborate with 3D artists, animators, modellers, and other artistic staff to coordinate all the visual images used in a game. ▪ Supervise both in-house and off-site staff, handle management issues, and oversee the entire artistic production process.

Table 4.21: Group 582 Occupational Competencies (11 of 14)

SECTION	PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	Video Game Visual Art				
	2D Game Art	**Technical Art**	**User Interface/User Experience (UI/UX)**	**3D Game Art**	
LEVEL 5	**Lead 2D Game Artist** ▪ Conclude the visual style for various projects ▪ Create character concepts, environments & backgrounds in collaboration with the game designer and art director ▪ Conceive the game interface and menus ▪ Sketch that all the graphic assets have a unitary graphic aspect, in accordance with the game's determined style ▪ Work with the team to improve the production process and perform benchmarking ▪ Cooperating with the designer and developer team	**Lead Technical Artist** ▪ Liaising between heads of programming and design teams ▪ Researching and developing technical tools for a project ▪ Setting up workflows of art production.	**Lead User Interface/User Experience Artist** ▪ Translating requirements into style guides, design systems, design patterns and attractive user interfaces ▪ Produce UI elements such as input controls, navigational components and informational components ▪ Illustrate original graphic designs (e.g. images, sketches and tables) ▪ Identifying and troubleshooting UX problems (e.g. responsiveness) ▪ Collaborating effectively with product, engineering, and management teams ▪ Incorporating customer feedback, usage metrics, and usability findings into design in order to enhance user experience.	**Lead 3D Game Animator** ▪ Sketch to develop scenes that require animation ▪ Using software to create animated characters, scenes and graphics ▪ Modify colours, lighting, shadows and textures to perfect lifelike appearances ▪ Integrating client and stakeholder feedback into final designs	**Lead 3D Game Artist** ▪ Assisting the Art Director (AD) during the pre-production phase to figure out and establish the style, focus and visual benchmarks suitable for the project/game. ▪ Maintaining the art style and quality of the game(s) set by the AD for areas under your discipline. ▪ Keep the AD up to date on the progress of the production and include them in bigger decisions. ▪ Work with the Art Producer to assist in estimations, project planning and ensuring a smooth transition through the various project phases. ▪ Conveying expectations in terms of quality and content to the graphics team and, if needed, to freelancers / external studios. ▪ Making sure the projects have a good peer review environment. ▪ Know and understand the design of the game to ensure that the features are communicated well visually. ▪ Develop and establish 3D pipelines, set best practices for the team.

Table 4.22: Group 582 Occupational Competencies (12 of 14)

SECTION	PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	Video Game Visual Art				
	2D Game Art		Technical Art	User Interface/User Experience (UI/UX)	3D Game Art
LEVEL 4	**Senior Concept Artist** ▪ Summarize the vision of the designers to concept art ▪ Approach systematically all areas of concept art creation ▪ Produce a wide variety of drawings, including character, item & environment, ▪ Define the style and look of the game ▪ Create storyboards, sketches, in-game 2D screens, layouts and colour comps ▪ Will mentor and assist in the direction of other artists	**2D Game Artist** ▪ Explain art in a wide range of styles from realistic to cartoon, from start concept to implementation in the game. ▪ Conceptualize, design, and create stunning (2D) in-game visual effects (modelling, texturing, animating, lighting, shaders, etc.). ▪ Create high-quality texture content for the game world. ▪ Create character concepts, environments and backgrounds. ▪ Create game interface and menus ▪ Active involvement in the game creation process by interacting with the design team. ▪ Effectively contributing to the art pipeline while understanding target platform constraints. ▪ Meeting project milestones.	**Senior Technical Artist** ▪ Connect artists and engineers in the 3D art pipeline ▪ Assisting in asset performance and validation ▪ Solving complex technical issues during development	**Senior User Interface Artist** ▪ Understand the game design documents ▪ Design and implement platform-specific user menus and interfaces and preserve the uniformity of the visual and logical aspects of the user interfaces for all platforms ▪ Interact and collaborate with team members ▪ Understand the implementations and respect technical constraints ▪ Design user interface and HUD display systems that are visually appealing, intuitive and effective. ▪ Apply and maintain a consistent artistic standard for the entire interface of a project and respect brand guidelines. ▪ Design the functions, appearance and handling ease of the interface and prototypes by working in collaboration with game design and programming teams. ▪ Create models and other simple prototypes to consolidate the direction and design plans ▪ Help establish current design priorities, shortcoming and find creative solutions. ▪ Design and create high-quality artistic game elements by relying on his/her expertise in standard software such as Photoshop, Illustrator, etc. ▪ In collaboration with the interface developer, integrate the designs and animation (timeline or code) in Flash ▪ Fix the lighting bugs entered by testers	

Table 4.23: Group 582 Occupational Competencies (13 of 14)

SECTION	PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	Video Game Visual Art				
	2D Game Art	Technical Art	User Interface/User Experience (UI/UX)	3D Game Art	
LEVEL 4				**Senior 3D Game Animator** ▪ Creating armatures, rigging, and animating characters with a wide-range of armature styles. We have bipeds, quadrupeds, flyers, worms, and more! ▪ Animating within a stylised action game. Impact, timing, and spacing are important. ▪ Implementing animation assets into the game through Unity's Mecanim ▪ Able to troubleshoot and rectify asset implementation issues in Unity	**Senior 3D Game Artist** ▪ Create realistic 3D models and textures including architecture, organic objects and props in accordance with the artistic direction, production deadlines and technical specifications. ▪ Sculpt/model UV & texture and integrate both high & low polygon meshes in a PBR pipeline. ▪ Verify the quality of objects in the game, and make improvements where necessary to fit technical constraints and artistic direction	**3D Game Character Artist** ▪ Developing high detail, photorealistic 3D models (humanoid characters and other creatures, including faces, hair, armour, and weapons) ▪ Creating clean, low-resolution game topology and UV's ▪ Developing game-ready assets to match concept, photo reference, art direction, etc. ▪ Creating textures and next-gen materials for use in-game engine ▪ Exporting models and textures into the in-house engine (Serious Engine 4.x) and making sure they work correctly, touching-up textures after engine integration to optimize quality ▪ Working closely with the animation team and other artists to bring the characters to life ▪ Cleaning up scanned data

Table 4.24: Group 582 Occupational Competencies (14 of 14)

SECTION	PUBLISHING ACTIVITIES						
DIVISION	(58) PUBLISHING ACTIVITIES						
GROUP	(582) SOFTWARE PUBLISHING						
AREA	Video Game Visual Art						
	2D Game Art		Technical Art	User Interface/User Experience (UI/UX)	3D Game Art		
LEVEL 3	**Assistant Concept Artist** ▪ Identify detailed drawings and paintings of environments, characters, buildings, vehicles and props ▪ Select traditional and technological approaches to create designs in 2D and 3D through drawing and painting.	**Assistant 2D Game Artist** ▪ Differentiate good quality 2D assets and textures; ▪ Differentiate game elements such as game fake-screen, including character, background, user interface, textures, and animation; ▪ Possess a basic understanding of anatomy, composition, lighting, colour, proportion, perspective; ▪ Possess a basic understanding of the principles of animation ▪ Possess a basic understanding of the design process and create a game process.	**Assistant Technical Artist** ▪ Describe on what software and tools are required for game production	**Assistant User Interface Artist** ▪ Differentiate the game design documents to understand the intended user experience ▪ Summarize platform-specific user menus and interfaces and preserve the uniformity of the visual and logical aspects of the user interfaces for all platforms ▪ Interact and collaborate with team members	**Assistant 3D Game Animator** ▪ Select knowledge from the Game Design documents ▪ Compare Animation direction to realise the expected quality in fluidity, uniformity, justice etc. ▪ Use the 3D models and rigs provided to create animations using the chosen style.	**Assistant 3D Game Artist** ▪ Explain 3D visual solutions to animation projects. ▪ Summarize a combination of hand drawing and computer design to produce special effects & action graphics. ▪ Prepare sketches or layouts to present to team. ▪ Create 3D models, animations, and visual effects.	**Assistant 3D Game Character Artist** ▪ Compare commercial and proprietary software to create high-quality 3D art assets to fulfil the necessities of the project's functional, art and technical specifications. ▪ Explain the requirements and constraints of game design, engine and platform. ▪ Select direction in style and technique to match your work to the style of the project.

Table 4.25: Summary of Job Titles

No	Job Area	Level								Total Identified Job Titles	Total Critical Job Titles	Total Job Titles relevant to IR4.0
		1	2	3	4	5	6	7	8			
581 – PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES												
1	Author/ Editorial And Related Writers	NJT	NJT	NJT	NJT	1	3	NJT	NJT	4	1	3
2	Text Translation	NJT	NJT	NJT	NJT	3	1	NJT	NJT	4	1	1
3	Journalism Activities	NJT	NJT	NJT	3	2	2	NJT	NJT	7	0	2
582 – SOFTWARE PUBLISHING												
1	Interactive Multimedia	NJT	NJT	11	11	11	9	NJT	NJT	42	6	5
2	Computer Games for All Platform	NJT	NJT	12	14	11	7	NJT	NJT	44	15	16
Grand Total of Identified Job Titles										101	21	27

NL – No level
NA- Not Available

Table 4.26: Mapping OS to Available NOSS for 581

SECTION	(J) PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(581) PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES				
AREA	**Authors/ Editorial and Related Writers**		**Text Translation**	**Journalism Activities**	
	Editorial	**Authors/Writers**		**Journalist**	**News Editor**
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	*Editor ** | Proofreader | Copy Editor	Fiction Author/ Writer ** | Non-Fiction Author/ Writer **	*Text Translator **	Journalist **	Senior News Editor **
LEVEL 5	PR-025-5:2015 (17-07-2012) (29-09-2015) Publishing Management		PR-028-5:2016 (04-02-2016) Specific Text Translation and Management	J581-001-5:2016 (06-12-2016) Journalism	News Editor
LEVEL 4	PR-025-4:2015 (17-07-2012) (29-09-2015) Publishing Implementation		PR-028-4:2016 (04-02-2016) Text Translation	J581-001-4:2016 (06-12-2016) Journalism	Assistant Editor | Sub Editor
LEVEL 3	PR-025-3:2015 (17-07-2012) (29-09-2015) Publishing Support		No Job Title	EE-141-3:2014 (25-09-2014) Journalism	
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title

Table 4.27: Mapping OS to Available NOSS for 582 (1 of 4)

SECTION	(J) PUBLISHING ACTIVITIES					
DIVISION	(58) PUBLISHING ACTIVITIES					
GROUP	(582) SOFTWARE PUBLISHING					
AREA	**Interactive Multimedia**					
	Graphic Design		**Web Development**		**Mobile Application**	
	User Interface (UI) Designer	User Experience (UX) Designer	Web Designer	Web Developer	App Designer	App Developer
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	No Job Title	No Job Title	*** Lead Web Designer	*** Lead Web Developer	*** Lead App Designer	*** Lead App Developer
LEVEL 5	IT-053-5:2013 (24-04-2013) Concept Design		Associate Web Designer	IT-070-5:2011 (30-09-2000) (20-12-2011) Creative Content Development	Associate App Designer	IT-070-5:2011 (30-09-2000) (20-12-2011) Creative Content Development
LEVEL 4	IT-053-4:2013 (24-04-2013) Concept Design		Senior Web Designer	IT-070-4:2011 (30-09-2000) (20-12-2011) Creative Content Development	Senior App Designer	IT-070-4:2011 (30-09-2000) (20-12-2011) Creative Content Development
LEVEL 3	J582-001-3:2019 (30-09-2000) (18-11-08) (07-08-2019) Interactive Multimedia Design		Assistant Web Designer	Assistant Web Developer	Assistant App Designer	Assistant App Developer
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title

Table 4.28: Mapping OS to Available NOSS for 582 (2 of 4)

SECTION	(J) PUBLISHING ACTIVITIES				
DIVISION	(58) PUBLISHING ACTIVITIES				
GROUP	(582) SOFTWARE PUBLISHING				
AREA	**Interactive Multimedia**				
	Animation				
	2D/3D Animator	**CG Modeller**	**Compositor**	**2D/3D Rigging Artist**	**Lighting/ Render Artist**
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	***Lead 2D/3D Animator	*Lead CG Modeller	Lead Compositor	Lead Rigging Artist	Lead Lighting Artist
LEVEL 5	Senior 2D/3D Animator	Senior CG Modeller	Senior Compositor	Senior Rigging Artist	Senior Lighting Artist
LEVEL 4	2D/3D Animator	CG Modeller	Compositor	Rigging Artist	Lighting Artist
LEVEL 3	Assistant 2D/3D Animator	Assistant CG Modeller	Assistant Compositor	Assistant Rigging Artist	Assistant Lighting Artist
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title	No Job Title

Note: * Critical Job Titles ** Job Titles Related to IR4.0

Table 4.29: Mapping OS to Available NOSS for 582 (3 of 4)

SECTION	(J) PUBLISHING ACTIVITIES			
DIVISION	(58) PUBLISHING ACTIVITIES			
GROUP	(582) SOFTWARE PUBLISHING			
AREA	**Computer Games for All Platform**			
	Video Game Design	**Video Game Programming**	**Video Game Production**	**Video Game Quality Assurance**
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	Game Design Director	Technical Director	Game Producer	No Job Title
LEVEL 5	IT-067-5:2016 (24-05-2016) Game Design Management	IT-068-5:2016 (24-05-2016) Advanced Game Programming	*Game Production Manager	Lead Game Tester
LEVEL 4	IT-067-4:2016 (24-05-2016) Game Design	IT-068-4:2016 (24-05-2016) Game Programming	Senior Game Production Manager	Senior Game Tester
LEVEL 3	Game Designer	***Assistant Game Programmer / Assistant Backend Programmer	Assistant Production Manager	Assistant Game Tester
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title

Note: * Critical Job Titles ** Job Titles Related to IR4.0

Table 4.30: Mapping OS to Available NOSS for 582 (4 of 4)

SECTION	PUBLISHING ACTIVITIES			
DIVISION	(58) PUBLISHING ACTIVITIES			
GROUP	(582) SOFTWARE PUBLISHING			
AREA	Video Game Visual Art			
	2D Game Art	**Technical Art**	**User Interface/User Experience (UI/UX)**	**3D Game Art**
LEVEL 8	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 7	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 6	Game Art Director	Game Art Director	Game Art Director	Game Art Director
LEVEL 5	Lead 2D Game Artist	Lead Technical Artist	**Lead User Interface/User Experience Artist	IT-062-5:2016 (04-02-2016) 3D Game Art Development and Management
LEVEL 4	***Senior Concept Artist / ***Senior 2D Game Artist	Senior Technical Artist	**Senior User Interface Artist	IT-062-4:2016 (04-02-2016) 3D Game Art Production and Development
LEVEL 3	IT-061-3:3014 (16-12-2014) 2D Game Visual Art	Assistant Technical Artist	**Assistant User Interface Artist	J582-002-3:2020 (16-12-2014) (13-11-2020) 3D Game Asset Production
LEVEL 2	No Job Title	No Job Title	No Job Title	No Job Title
LEVEL 1	No Job Title	No Job Title	No Job Title	No Job Title

Note: * Critical Job Titles ** Job Titles Related to IR4.0

4.2.2 Research Questions 2: What competencies are in demand in the publishing industries?

In order to answer this question, data were obtained from the previous study, focus group discussion, and survey. This section provides competency in demand in publishing activities. Competency in demand is defined as a specific set of skills in a particular job highly required by the current industry. In contrast, the skills are the capabilities needed to complete the task and, therefore, a job.

i.   Findings from Previous Study

The Future of Jobs Survey (2020) report revealed 15 skills for 2025 in demand across multiple emerging professions (Table 4.31). During the Covid-19 in the year 2020, data was gathered from online learning provider Coursera to identify skills on the job. The top five emerging skills are (i) Analytical Thinking and Innovation, (ii) Active Learning and Learning Strategies, (iii) Complex Problem Solving, (iv) Critical Thinking and Analysis, and (v) Creativity, Originality, and Initiative.

Table 4.31: Top 15 skills for 2025

Rank	Emerging Skills
1	Analytical thinking and innovation
2	Active learning and learning strategies
3	Complex problem-solving
4	Critical thinking and analysis
5	Creativity, originality and initiative
6	Leadership and social influence
7	Technology use, monitoring and control
8	Technology design and programming
9	Resilience, stress tolerance and flexibility
10	Reasoning, problem-solving and ideation
11	Emotional intelligence
12	Troubleshooting and user experience
13	Service orientation
14	Systems analysis and evaluation
15	Persuasion and negotiation

Findings show that most of the job requires analysing information and using logic to address work-related issues and problems. In terms of the publishing activities industry, creativity is

needed in order to create new ideas constantly. Aligning with current technology, workers should always upgrade themselves with new information. Appropriate procedures when learning and teaching new things are important for current and future problem-solving and decision-making. Besides that, workers also should be able to identify complex problems and review related information to develop and evaluate options and implement solutions. In the ICT fields primarily, most of the jobs use logical thinking to identify the strength and weaknesses of the product and assess the performance of organisations and individuals to improve in the future. The job also requires a willingness to take on responsibilities and challenges.

The Industry Skills Framework (Software Applications) (MDEC, 2021) highlighted a few soft skills needed. The skills are Agile Problem Solving, Business Acumen, Communication, Critical and Analytic, Team Building, Time Management, Self-Development, and Design Thinking. In contrast, a job title like UI/UX Designer needs critical thinking & Problem Solving, Organising and time management, continuous learning, communication and teamwork, self-development, Design Thinking, Business Analysis and User Research, Art, creativity, and Innovative, Empathy, and Persuasive Skills. Job-related with creative digital content, especially the game industry, most soft skills needed are creative thinking, critical thinking, research and analysis, communication, teamwork, project management, and self-initiated. For the Animation job area, storytelling skills are needed and should have artistic talent and technical skills.

In other related works, a study from Aripin et al. (2014) mentioned knowledge and skills needed as a journalist. To become a journalist, the skills required are (i) News Production Skills, (ii) Technical Skills, (iii) Multimedia Skills, and (iii) Writing Skills. These skills are crucial for journalists, whose main activity is producing and distributing reports of an important event. Journalists work in media organisations at all levels, from local newspapers to national network television channels. This job includes marketing, communications, and public relations roles. Understanding the media law is also essential for journalism and having strong determination, honesty, and an open mind.

ii. Survey

In order to support and determine the competencies in demand in publishing industries, data

was gathered through the online form. It takes three weeks to get feedback from the industries and government agencies to respond.

Demographic

The survey received 209 responses. Most of the respondents are skilled workers such as general managers, publishing directors, chief executive officers, managers, or assistant managers who are involved directly in publishing. Figure 4.11 shows the percentage of the respondents for this study.
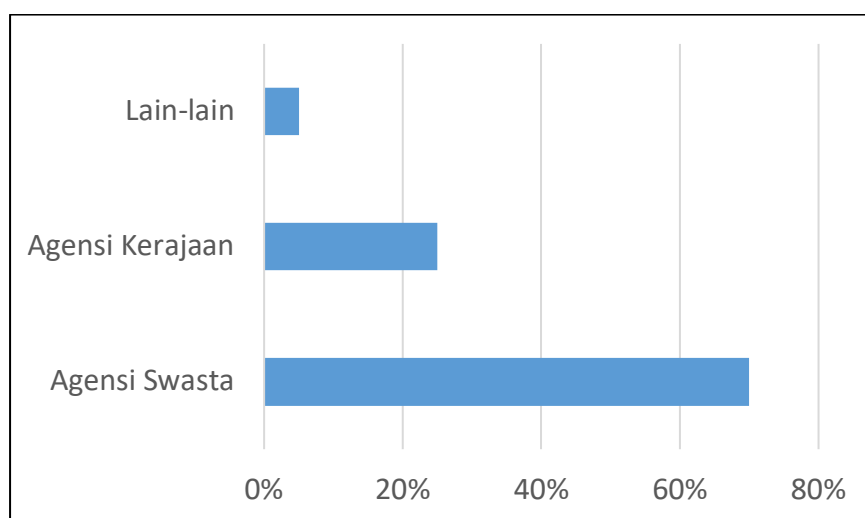
Figure 4.11: Percentage of respondents

Generic Skills

Two skills involved in this survey are (i) Generic Skills and (ii) Emerging Skills. Generic skills are those that apply across a variety of jobs and life contexts. Generic skills are also known by several other names, including key skills, core skills, essential skills, key competencies, necessary skills, transferable skills, employability skills and life skills. Table 4.32 shows the generic skills for the book and software publishing jobs. Findings show that all job areas need the ICT Skills like knowing how to protect the documents, do some searching, online evaluation and online payment etc. Communication skills are also essential, in which most of the job area need to communicate with other workers and communicate effectively with others. For the language skills, workers should be able to write, listen, read and speak. Job title under Text Translator requires the workers to understand more than two languages. Results also indicated that problem-solving is also high in demand, where workers need to be creative in handling conflict and making decisions.

Align with the technology nowadays literacy skills are also essential. Workers have to advance in file management and know how to communicate through online platforms. Besides that, teamwork and collaboration are a must for all workers in the publishing industry. Technical skills involved in risk control, analysis, project management, vendor relations, and quality control are highly demanded.

Table 4.32: Generic Skills

No	Competency in Demand	Book Publishing	Software Publishing
1	ICT Skills	High in Demand	High in Demand
2	Computational Skills	Mid in Demand	High in Demand
3	Communication Skills	High in Demand	High in Demand
4	Language Skills	High in Demand	High in Demand
5	Problem Solving	High in Demand	High in Demand
6	Numeracy Skills	Mid in Demand	High in Demand
7	Literacy Skills	High in Demand	High in Demand
8	Teamwork & Collaboration	High in Demand	High in Demand
9	Technical Skills	High in Demand	High in Demand
10	Negotiation Skills	High in Demand	Mid in Demand
11	Marketing Skills	High in Demand	Mid in Demand
12	Leadership	High in Demand	Mid in Demand
13	Administration Skills	High in Demand	Mid in Demand
14	Creative Skills	High in Demand	High in Demand
15	Entrepreneurship Skills	High in Demand	Mid in Demand
16	Innovation & Creativity	High in Demand	High in Demand
17	Flexibility and Adaptability	High in Demand	High in Demand
18	Professionalism and Work Ethics	High in Demand	High in Demand
19	Project Management	High in Demand	High in Demand
20	Sales Skills	High in Demand	High in Demand
21	Digitalisation Skills	Mid in Demand	High in Demand
22	Code & Ethics	High in Demand	High in Demand
23	Research & Development Skills	High in Demand	High in Demand
24	Intellectual Property Management Skills	High in Demand	High in Demand

Based on the findings, there is a mid in demand for Digitalisation Skills in the book publishing

industry compared to other skills. However, most job titles in book publishing, like editors or journalists, have already moved into the digital world. They use LaTeX for editing (used most often in academia and scientific papers), advance Microsoft Word formatting features and also Acrobat Reader to proofread, read and evaluate the manuscript through the system. Journalists also use the Content Management Systems to upload an article through a system like WordPress and format those articles for the web. Furthermore, most editors utilise the technology for real-time collaboration with the authors and use the track changes option to track formatting, comments and show the suggestion in the final documents. It indicates that most of the job titles under book publishing have already adapted to the technology in order to facilitate all manuscript administration matters in the publisher's house.

Emerging Skills

Emerging skills are defined as the skills that are predicted to be imperative to the industry shortly based on the recent development, trend, government policy, or study. Most of the job requires being sensitive to others' needs and feeling understanding and helpful, as part of the Emotional Intelligence of a person.

For software publishing, technology design and programming is high in demand. Workers need to write computer programming for various purposes and generate and adapt equipment and technology to serve user needs. Technology use, monitoring, and control are also important that require workers to determine the kind of tool needed and know how to control operations of equipment or systems. Table 4.33 shows the emerging skills that relate to the publishing activities industry.

Findings show that competency mid in demand in the book publishing industry is Technology Design and Programming, Troubleshooting and User Experience, Systems Analysis and Evaluation, Systems Analysis and Evaluation, Technology Use, Monitoring and Control and Instruction, Mentoring and Teaching. For other skills like Creativity, Originality and Initiative, Analytical Thinking and Innovation, Complex Problem-Solving, Leadership and Social Influence, Critical Thinking and Analysis, Resilience, Stress Tolerance and Flexibility, Reasoning, Problem Solving and Ideation, and Service Orientation are high in demand.

Table 4.33: Emerging Skills

No	Competency in Demand	Book Publishing	Software Publishing
1	Emotional Intelligence	High in Demand	High in Demand
2	Creativity, Originality and Initiative	High in Demand	High in Demand
3	Analytical Thinking and Innovation	High in Demand	High in Demand
4	Technology Design and Programming	Mid in Demand	High in Demand
5	Complex Problem-Solving	High in Demand	High in Demand
6	Active learning and Learning Strategies	High in Demand	High in Demand
7	Troubleshooting and User Experience	Mid in Demand	High in Demand
8	Systems Analysis and Evaluation	Mid in Demand	High in Demand
9	Leadership and Social Influence	High in Demand	High in Demand
10	Critical Thinking and Analysis	High in Demand	High in Demand
11	Technology Use, Monitoring and Control	Mid in Demand	High in Demand
12	Resilience, Stress Tolerance and Flexibility	High in Demand	High in Demand
13	Reasoning, Problem Solving and Ideation	High in Demand	High in Demand
14	Service Orientation	High in Demand	High in Demand
15	Instruction, Mentoring and Teaching	Mid in Demand	High in Demand

4.2.3 Research Questions 3: What are the critical job for the industry of the Publishing activities?

Jobs in Demand or critical job titles can be defined as the jobs that are hard to fill. It also refers to jobs titles that are strategic to the industry and require specific skill experience. This section comprises finding from the previous study, focus group discussion, virtual visits, and survey findings.

i.   **Finding from Previous Study**

Growth in the information technology sector is moving at a phenomenal pace, which means there will be an increasing demand for professionals, even though some jobs will always be in demand, even in a slowdown. LinkedIn (2021) research suggested that professionals with digital skillsets find themselves advantageous in seeking employment in several fields.

Apart from front liners, LinkedIn (2021) mentioned some of the fastest-growing job categories in Malaysia include software engineers, marketing executives, teachers, web developers, system analysts, and graphic designers. In all these areas, there is an evident shortage in the supply of good quality fresh graduates and experienced professionals in many different ICT areas, including Digital Content (Editor, Copywriter), Software and Technology (Web Developer, Mobile App Developer, Frontend Developer, Full Stack Engineer), Translator and Graphic Designer among others.

ii.   **Focus Group Discussion**

Based on the FGD with the expert panels of the industry and data support from the previous study, there are 21 critical jobs identified in this study, as mentioned in Table 4.25. There are two critical jobs for book publishing, and under software publishing, there are 19 critical jobs (Annex 4).

iii.   **Virtual Visit**

As mentioned by ITBM during the virtual visit, the employment of interpreters and translators is projected to grow 24 per cent from 2020 to 2030, much faster than the average for all occupations. Translator jobs are the new trend nowadays, and languages that are paid the highest according to ranks of the top and most popular languages are (i) German; (ii) Arabic; (iii) French; (iv) Dutch; (v) Spanish; (vi) Japanese; (v) Russian; (vi) Italian; and (vii) Mandarin.

The following example might be able to illustrate the lucrative and emerging development for interpreters and translators' employment.

German is ranked as the highest-paying translation language. This is because Germany is one of Britain's most lucrative trading partners. Consequently, there is a high demand for German speakers in the financial and business sector. The Arabic language ranks second among the highest-paid translation languages, with Arabic translators earning approximately £34,122 annually.

Being in close geographical proximity to Britain, France has a solid commercial relationship with it. A French translator can expect to earn £32,636 annually, leveraging on this commercial relationship. Dutch is a popular language of commerce and business. According to recent estimates, Spanish is spoken by 400 million native speakers and is the second language of approximately 9 million people worldwide. Due to the sheer population of Spanish, the Spanish translators are paid well. They can reasonably be expected to get reasonable remuneration for their work.

The Japanese language is a popular one, and a Japanese translator can secure an attractive salary worth £28,954 annually as a payment for his/her skills. The Russian language is an essential emerging language of the world, and a Russian translator can be expected to earn £28,658 annually, with translations mainly for economic and financial services.

The Italian language holds immense importance, and Italian is the fourth most widely taught language in the United States after Spanish, French, and German. This is why an excellent Italian translator can be expected to earn up to £28,523 annually. When it comes to the most widely spoken languages globally, Mandarin holds the highest importance with the boom in the Chinese market and the enormity of the Chinese export sector. Not surprisingly, an experienced Mandarin translator can expect to receive a handsome pay of approximately £28,168 annually.

For the job in demand in the creative industry, Sony PlayStation highlights the job area;

(i) <u>Animator; Cinematic and InGame</u>
     Animator, Senior Animator, Lead Animator

(ii)   <u>Technology</u>

Senior Technical Artist, Technical Artist

(iii)   <u>Art and Craft</u>

Senior Asset Artist, Asset Artist, Senior Environment Artist, Senior Texture Artist, Senior Concept Artist, Senior Lighting Artist, Senior Character Artist, Character Artist, Senior rigging Artist.

(iv)   <u>Production</u>

Project Manager

4.2.4 Research Questions 4: What are the relevant job titles in line with 4IR?

The identified job areas and job titles for the publishing activities industry were obtained during the development workshop through FGD with industry experts. Based on the discussion during the development workshops, the industry experts have identified that there are 27 IR 4.0-related job titles in the publishing activities.

4.2.5 Research Questions 5: How to develop the OD for each job title?

The OD for all job titles was obtained from FGD and related reports listed in Annex 6. Under OD, the Occupational Competencies (OC) describe the primary duties of each job title listed under the Occupational Structure (OS), which also corresponds with the job's respective area and level. The OR listed in this section may include (but is not limited to) the occupational within the publishing activities industry. The OC will serve as the future reference for developing the National Occupational Skills Standard (NOSS) for publishing under the MSIC 2008 Division J58.

4.3   Conclusion

This chapter has elaborated the findings obtained throughout the research based on the Research Question. The next chapter will conclude the overall findings of this research based on the research objectives.

CHAPTER V

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1   Introduction

In this chapter, the results are discussed according to the study's research questions linked to the study's findings, the literature review, and the research method employed. In summary, 24 job areas are identified based on the Divison J58 of MSIC 2008. There are 101 job titles, 21 critical jobs, and 27 jobs related to IR4.0.

5.2 Summary and Discussion of the Study

This section discusses the outcome of the data analyses established in the previous sections.

5.2.1 RO1: To develop Occupational Structure (OS) for the publishing activities based on Malaysia Standard Industrial Classification 2008 (MSIC 2008);

As a result of the Occupational Framework conducted with the panel experts from various organisations, in total, there are 24 job areas, 101 job titles, 21 critical job titles and 27 job titles related to IR4.0 have been identified in this study. This document will be used as a reference to fulfil the future plans of developing skilled personnel and certifying Malaysians in this sector towards improving the quality of the local sectors.

5.2.2 RO2: To investigate the competencies in demand in the publishing activities;

With the change in the work environment and tasks expected to be carried out by workers, the skills required will also change. Based on the FGD, document analysis and survey, the top 10 skills in demand for generic skills and emerging skills are as follows:

Generic Skills

1. ICT Skills
2. Communication Skills
3. Language Skills
4. Problem Solving Skills
5. Literacy Skills
6. Teamwork and Collaboration
7. Technical Skills
8. Creative Skills
9. Project Management Skills
10. Code and Ethics

Emerging Skills

1. Emotional Intelligence
2. Creativity, Originality and Initiative
3. Analytical Thinking and Innovation
4. Complex Problem-Solving
5. Active learning and Learning Strategies
6. Leadership and Social Influence
7. Critical Thinking and Analysis
8. Resilience, Stress Tolerance and Flexibility
9. Reasoning, Problem Solving and Ideation
10. Service Orientation

There are skills-related challenges faced by the companies. Findings show that there is a need for up-skilling, re-skilling, and cross-skilling. Up-skilling is the process of strengthening existing skills or learning complementary skills, often to close an organisational talent gap. Re-skilling is the process of learning new skills to do a completely different job, either within the same organisation or across companies. In comparison, cross-skilling (also known as cross-training) is developing new skills that apply across different functions. For example, a user experience designer might learn software development fundamentals to improve cross-functional collaboration and productivity.

Another related issue that was stressed through the survey is the rapid technological change. Respondents mentioned that the technology comes with higher costs and higher risk. A common belief is that with higher cost and higher risk, comes a higher return. However, such is not the case if a publisher did not get a reasonable return after spending a high amount of capital or taking a high risk. To remain competitive in the book publishing industry, the government need to make a clear policy for the book industry, that printed book is still relevant in the market. In other words, publishers need to grow and adapt to the changes, but some things do not need to change. For this matter, the printed book does not need to change into digital books. If not, the industry itself will suffer and die. Training and courses that are critically needed in this sector to remain competitive in this industry give us a bigger picture of what area we should as a publisher need to explore and publish books accordingly.

In terms of technological changes for book publishing, the digital book is generally a threat for the industry, especially for small publishers with limited resources on digital book production. It will also affect the bookstores across the country. For big publishers, it is an opportunity since they have enough resources to produce digital books. However, the market is not ready for digital books. Furthermore, the cost of producing a digital book is higher, and the return is not promising.

Other technological changes like IoT, big data and others will likely help the publishing activities industry. However, if it is a digital book, the product that needs to offer will likely threaten the industry, especially the small publisher. Nevertheless, if the product that needs to offer is still printed books, it is still relevant to survive.

5.2.3 RO3: To determine critical jobs for the industry of the Publishing activities;

Participants in FGD have reviewed the list and specified the critical job titles as in Annex 4. There are 21 critical job titles identified in publishing activities. In contrast, from Multimedia Journalism Occupation (2020), the projected number of job and labour market demand for journalism activities decreases around 5%-12% between the years 2019 and 2024. Due to the fact that journalist loses their careers in many countries (Ornebring & Cecilia, 2018), it was because of the long working hours, lack of professional development opportunities, lot of stress, and lack of support from colleagues and management. It is also a big challenge for female journalists to sustain themselves in this job.

5.2.4 RO4: To determine the relevant job titles that are in line with IR 4.0;

According to survey results and FGD findings, IR4.0 has impacted the sector by changing how work is done. There is 27 job for publishing activities that are in line with the IR4.0. In the context of Industry 4.0, the core qualification and skills imparted in the current technical and vocational education will remain important. They will have to be updated with the evolution of industry technology.

Based on the feedback from the respondents, it is sufficient to say that the technological changes are going to pose threats to the industry in the next 5-10 years. Among the matters discussed are as follows:

a. Content creation by Artificial Intelligences (AI). Centralisation or Monopolisation of infrastructure (both by government and giant industry players).
b. Most likely, robotics developments, machine learning, and artificial intelligence can replace humans and improve operations accuracy, productivity, and efficiency.
c. Self-editing/proofreading tools, self-publishing and self-marketing via digital platforms.
d. A constant stream of accessible and reliable information on the Internet.
e. How humans process information and how humans read.
f. Rapid policy changes do not account for supply chain complexities.
g. Unauthorized copying and distribution of works online.
h. Digital piracy is the biggest threat to publishing.
i. Poor reading culture and social media issues are threats to the robust publishing industry.

5.2.5 RO5: To develop the Occupational Description (OD) for each job title based on the industry Occupational Structure (OS).

The Occupational Descriptions for all job titles were obtained from the Focus Group Discussions and related documents analysis. This Occupational Description will serve as the primary reference for developing the National Occupational Skills Standard (NOSS), which will focus on the detail of required competencies for all job scopes. The Occupational Description can be referred to in Annex 6.

5.3 Recommendation

The Occupational Framework will be used as a reference to fulfil the plans of developing skilled personnel and certifying Malaysians in this sector towards improving the quality of the local publishing sector and thus spurring Malaysia's global competitiveness. There are several options when addressing or mitigating workforce demand and supply. It may include establishing and maintaining partnerships with other agencies, departments, or educational institutions to increase external talent pools and train existing staff in line with new skills requirements.

As a recommendation from the focus group discussion, the main problem identified in this industry is the changes in technology and market demand. New critical skills have been identified to meet industrial demand and improve the quality of the content produced by radio and TV stations. Besides that, a new revision on wages also needed to be addressed since the people in this industry need to perform multi-tasks and jobs without clear definitions in the job descriptions. The participants in this study also raised changes in top management by focusing on creative talent. The aim is to avoid the non-eligible person from managing the top management and affecting the decision-making process.

Companies in the industry also need to enhance local skilled workers by providing critical skills. Several policies can be taken, such as providing incentives to encourage companies to perform high-level skill training for their employees. It is hoped that the result of this OF can be a reference and guide to fulfil the plans of developing skilled personnel and certifying Malaysians in this industry.

All in all, this study would like to propose specific recommendations as listed below:

i. Developments in a publication should focus on the latest technology in the industry to ensure that the quality of the shows and content meets the needs of the audience and market.

ii. A variety of new skills requires focus in the aspects of self-development and high-level skills. The involvement of top management is an obligation to ensure that every level of skill meets highly skilled demands that satisfy the market needs.

iii. A form of academic collaboration between universities and industry needs to be developed and updated to conform to IR 4.0. This collaboration, called the Training Scheme, provides the concept of 2 years in university and one year in the industry to prepare the future talents for a real-world work setting. The implementation is conducted according to the market demand and changes in technologies.

iv. Implement Work-Based Learning (WBL) between universities and industries for students to gain hands-on practical skills and exposure to real-life publishing activities. It is the role of key stakeholders to offer real-life workplace and at the same time implement enriching academic processes.

v. An international benchmarking exercise must be undertaken considering the success of overseas publications in penetrating the international market in terms of marketing, branding, content development, and recognition. It will ensure that our local publishing contents are able to satisfy the demand and needs of the international market.

vi. Employers must invest in the employee training program to increase both sectors' performance, competencies, and skills. Training is the main issue that affects employee performance in the publication sector. If organisations invest in good employee training, it can enhance employee performance, competencies, and skills. In addition, training is a beneficial way to cope with change underpinned by technological innovation, market competition, and organisational structuring. Most importantly, it plays a key in improving employee performance.

vii. Continue and streamline efforts in NOSS development for areas under the industry in line with the findings of this analysis. This includes the development of the NOSS for the sectors and sub-sectors that are in demand and have not been developed.

viii. Invest in employee training programs to increase employee performance and competencies and skills for semi-skilled workers. Training is the main issue that affects employee performance.

ix. Upskilling and reskilling are helpful ways of coping with changes fostered by technological innovation, market competition, and organisational structuring. Most

importantly, it plays a crucial role in enhancing employee performance.

5.4 Limitations

In the development of this OF, several limitations were encountered. It is crucial to address these limitations for future improvement of the current OF. The limitation of physical movement during the infestation of COVID-19 somehow changed the development approach of this OF. All discussions and presentations were conducted online, which would be more effective sometimes but still need a face-to-face discussion with experts and plan the actual visit to the publishing companies and reputable key industry experts.

The COVID-19 Pandemic also limits the opportunity to get more respondents for the survey. The survey was disseminated using various online platforms such as e-mail, WhatsApp, and online forms, but it was still a challenge to get feedback from stakeholders and follow up on the responses. Hence, the responses are less than the targeted sampling size. Due to the time constraint, access to the experts was limited and the company has closed due to the COVID-19 Pandemic.

In collecting the information, most of the inputs were obtained from the industry experts who mainly represents the publication of Code J58 – short-term publication activities. Therefore, especially for other publication groups such as under the Code J581 and J582, there are possibilities that some of these job titles have not been well explored and identified.

5.5 Conclusion

In conclusion, the Occupational Framework (OF) is a document that contains (i) Occupational Structure that indicates the job areas, job titles at different levels, classified by the Malaysia Occupational Standard Qualification Framework (MOSQF) Level Descriptors, and (ii) Occupational Description (OD) that depicts the Job Responsibilities and the Competency set. This document also highlights the Job and Skills in demand, critical jobs, emerging skills, and jobs relevant to IR 4.0.

The challenges impacting the industry have also been discussed in this study. The findings were obtained through various research methods, including document analysis, Focus Group Discussions with the industry representatives, online surveys, and quality visits to the industry. The data were analysed through descriptive and content analysis. The document will be the main reference in developing the National Occupational Skills Standard (NOSS).

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ANNEX 1: MOSQF LEVEL DESCRIPTORS

**Malaysian Occupational Skills Qualification Framework (MOSQF) Level Descriptor
(Source: Department of Skills Development)**

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 definition. It includes taking responsibility for planning and developing courses of action that are able to underpin substantial change or development, as well as exercising broad autonomy and judgment. It also reflects an understanding of different perspectives, approaches of 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 an 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 an 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 the straightforward problem. It includes taking responsibility for completing tasks and procedures and exercising autonomy and judgment subject to overall direction or guidance.
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.

ANNEX 2: LIST OF CONTRIBUTORS

LIST OF OCCUPATIONAL FRAMEWORK DEVELOPMENT COMMITTEE FOR INFORMATION AND COMMUNICATION FRAMEWORK DEVELOPMENT (BOOK PUBLISHING)

NO.	NAME	POSITION	ORGANISATION
1.	Mohd Ikram Bin Mohammad Nor Wazir	General Manager	PTS Media Group Sdn Bhd
2.	Irnie Suhada Binti Musa@Mustafa	Manager	Rimbunan Ilmu Sdn Bhd
3.	Sakri Bin Abdullah	Director	Institut Terjemahan & Buku Malaysia
4.	Raja Shahfaizal bin Raja Khairudin	General Manager Marketing	Karangkraf Medicare Sdn Bhd
5.	Dr. Poh Swee Hiang	Publishing Director	Penerbitan Pelangi Sdn. Bhd.
6.	Prof. Madya Dr Amir Bin Khalid	Publishing Director / Prof Madya	Universiti Tun Hussein Onn Malaysia (UTHM)
7.	Sofiatul Nazira Binti Ahmad Shubki	Editor	Universiti Pendidikan Sultan Idris (UPSI)
8.	Mohammad Dzulhisham Bin Che Hassim	Editor	Universiti Teknikal Malaysia Melaka (UTeM)

LIST OF OCCUPATIONAL FRAMEWORK DEVELOPMENT COMMITTEE FOR INFORMATION AND COMMUNICATION FRAMEWORK DEVELOPMENT (SOFTWARE PUBLISHING)

NO.	NAME	POSITION	ORGANISATION
1.	Muhammad Lofty Bin Abd Karim	Manager	Technology Park Malaysia
2.	Pn. Azimah Kadir	Head of Market and Product Strategy	MIMOS Berhad
3.	PM. Dr. Tan Chin Ike	Head of School	UOW MALAYSIA KDU
4.	Salman Abdul Wahab	Manager	CyberSecurity Malaysia
5.	Laili Farhana Binti Md Ibharim	Senior Lecturer	UPSI
6.	Ts Nik Shahrimin Bin Wan Mohd Yusoff	Creative Director	Ceknek Production
7.	Haizal Izham bin Abd. Rahman	Manager	Colours Pro Resources

LIST OF OCCUPATIONAL FRAMEWORK TECHNICAL EVALUATION COMMITTEE

NO.	NAME	POSITION	ORGANISATION
1.	Dr. Dahlina Daut @Mohmud	Pengurus Pusat Bertauliah Akademi DBP	Dewan Bahasa dan Pustaka (DBP)
2.	Mohd Riduwan Bin Wahab	Ketua Bahagian Penyelidikan Bahasa	Dewan Bahasa dan Pustaka (DBP)
3.	Ts. Mohd Fadzley Bin abd Shukor	Pengarah Senireka	Istana Budaya

LIST OF DEPARTMENTS OF SKILLS DEVELOPMENT (DSD) OFFICERS INVOLVED IN OCCUPATIONAL FRAMEWORK DEVELOPMENT

NO.	NAME	POSITION	ORGANISATION
1.	En. Nazrul Hilmi	Committee	Unit NOSS, JPK
2.	Pn Khadijah binti Isaak	Committee	Principal Assistant Director
3.	Pn Noor Azura binti Adnan	Committee	Senior Assistant Director
4.	En Ahmad Azran bin Ranaai	Committee	Senior Assistant Director
5.	En Nazrul Hilmi bin Mohammad	Committee	Senior Assistant Director
6.	Pn Noorhadawati binti Daud	Committee	Skills Development Officer

LIST OF WORKFORCE TEAM IN OCCUPATIONAL FRAMEWORK DEVELOPMENT FOR PUBLISHING ACTIVITIES

NO.	NAME	POSITION	ORGANISATION
1.	Ts. Dr. Siti Nurul Mahfuzah Mohamad	Director/ Senior Lecturer	Penerbit UTeM Press
2.	Ts. Dr. Irdayanti Binti Mat Nashir	Senior Lecturer	UPSI
3.	Dr. Hasmaini Hashim	Senior Lecturer	Kolej Komuniti Masjid Tanah
4.	Alif Haikal	Part Time Teacher	Secondary Schools

ANNEX 3: QUESTIONNAIRE

OCCUPATIONAL FRAMEWORK SURVEY

J58: PUBLISHING ACTIVITIES

DEPARTMENT OF SKILLS DEVELOPMENT, MINISTRY OF HUMAN RESOURCES

Introduction

In collaboration with the Department of Skills Development (DSD), Ministry of Human Resources, the researcher is currently conducting an analysis on the occupational framework of the J58 (Publishing Activities). From the analysis, the sector framework occupational structure, occupational job title and job description will be summarised for the use of the government, private sectors, investors, employers, employees, educators, or any personnel involved either directly or indirectly in this sector.

We would like to extend our heartfelt gratitude for your cooperation in answering the survey. The survey will be used in field data to conduct a comprehensive analysis of the occupational framework in the sector.

Please fill in where necessary in the form provided. Any recommendation is deeply appreciated. Do advise us if you wish to remain anonymous in your survey response. There will be further communication with survey respondents to verify our findings.

Survey Respondent Details

Name* : _____
Position : _____
Organisation : _____
Date : _____

Questionnaire

The completed questionnaires can be returned by email to **Ts. Dr. Siti Nurul Mahfuzah Mohamad** (mahfuzah@utem.edu.my), or you can answer the survey online.

SECTION 1: COMPETENCY IN DEMAND

Listed below is a set of skills related to personnel involved in Publishing Activities.

4 (High in Demand)	
3 (Mid in Demand)	Jobs in demand for the future, with a better salary and required qualifications. The skill that will be in demand in 2021 and beyond.
2 (Low in Demand)	
1 (Not in Demand)	
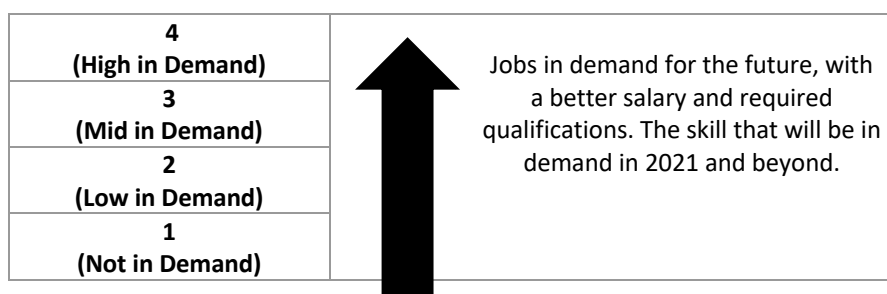
A. GENERIC SKILLS

No.	Generic Skills	Book Publishing	Software Publishing
1	ICT Skills (Software installation, file protection, online payment, searching documents etc)		
2	Computational Skills (selection and application of arithmetic operations to calculate solution to mathematical problems)		
3	Communication Skills (The ability to communicate in an effective manner with others)		
4	Language Skills (Listening, writing, reading, speaking)		
5	Problem Solving (creative, critical and analytical thinking, conflict handling, and decision-making)		
6	Numeracy Skills (Interpreting statistical information, using fractions, percentages, ratio and rates)		
7	Literacy Skills (File management, Internet usage, online communication etc)		
8	Teamwork and Collaboration (communicating with others in a polite and decent manner, seeking support and assistance from others when required)		
9	Technical Skills (Risk control, risk analysis, project management, vendor relations, quality control, etc)		
10	Negotiation Skills (persuading, influencing, convincing, co-operating, and compromising)		
11	Marketing Skills (Event management, Promotion, Social Media, Copywriting etc)		
11	Leadership (be able to direct, guide and lead others in the right direction)		
12	Administration Skills (the individuals to use the time productively and efficiently)		
13	Creative Skills (Thinking outside the box, imagination, inspiration, innovation)		
14	Entrepreneurship Skills (change-oriented, inner discipline, visionary, innovative, etc)		
15	Innovation and Creativity (Ideation, concepts, product, value, invention, etc.)		
16	Flexibility and Adaptability (Openness to new ideas and concepts, working independently, mobile, etc.)		

17	Professionalism and Work Ethics (managing the psychological problems of stress, coping effectively with conflicting situations, keeping knowledge and competencies current, generating awareness in terms of various areas)		
18	Project Management (implementing time management skills in an efficient manner, planning and organising the tasks and activities in a productive manner)		
19	Sales Skills (Product Knowledge, active listening, customer services, consultative selling, etc)		
20	Digitalisation Skills (text processor, spreadsheets, database, data analysts etc.)		
21	Code & Ethics (Attitude, Physical Appearance, Plagiarism etc.)		
22	Research and Development Skills (Market study, Need Analysis, etc.)		
23	Intellectual Property Management Skills (Licensing, Copyright, Trademark, etc.)		

B. EMERGING SKILLS

No.	Emerging Skills	Book Publishing	Software Publishing
1	Emotional Intelligence		
2	Creativity, Originality and Initiative		
3	Analytical Thinking and Innovation		
4	Technology Design and Programming		
5	Complex Problem-Solving		
6	Active learning and Learning Strategies		
7	Troubleshooting and User Experience		
8	Systems Analysis and Evaluation		
9	Leadership and Social Influence		
10	Critical Thinking and Analysis		
11	Technology Use, Monitoring and Control		
12	Resilience, Stress Tolerance and Flexibility		
13	Reasoning, Problem Solving and Ideation		
14	Service Orientation		
15	Instruction, Mentoring and Teaching		

References:
Critical Occupations List 2019/2020 Technical Report, Critical Skills Monitoring Committee, Kementerian Sumber Manusia
World Economic Forum (2020). The Future of Jobs Survey 2020.

SECTION 2: JOB TITLES

Rate the level of demand to the set of skills by using the scale below (MASCO, 2020):

Category of Skills	Description
Skilled Workers (S)	Managers, Executive, Specialist and Professional
Semi-Skilled Workers (SS)	Support, Technician, Admin and Machine Operator
Low Skilled Workers (LS)	Elementary Workers

Tick (/) where applicable.

J581: PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES

Job Area	Job Titles	Skilled Workers (S)	Semi-Skilled Workers (SS)	Low Skilled Workers (LS)
Authors / Editorial and Related Writers	Author			
	Biographer			
	Novelist			
	Playwright			
	Essayist			
	Humourist			
	Versifier			
	Critic			
	Writer, Comedy			
	Poet			
	Copywriter, Advertising			
	Lyricist			
	Fiction Writer			
	Song Writer			
	Publicity Writer			
	Script Writer			
	Technical Writer			
	Editor			
	Book Editor			
	Proofreader			
	Interactive Media Writer			
	Speech Writer			
	Executive Producer			
	Producer (News/Entertainment)			
	Assistant Producer			
	Head Writer			
	Copy Editor (New)			
	Writer			
	Researcher/Writer			
	Publications Officer			
	Publishing Management			
	Publishing Implementation			
	Publishing Support			
	Indexer			
	Narrator			
	Proof technical (book layout)			
	Online Marketer			
	Social Media Executive			
	Social Media Management			
	Non Fiction Writer			
Journalist	News Reporter			
	News Director			
	Executive Producer			
	Assistant Producer			
	Producer (News/Entertainment)			
	Columnist			
	Political Editor			
	Radio and Television Broadcasting Editor			

	Copy Editor (News)			
	Newspaper Editor			
	Newspaper Reporter			
	Researcher/Writer			
	Head Writer			
	Sports Writer			
	Sub Editor			
	Television/Radio New Reporter			
	Press Editor			
	Court Reporter			
	Journalist			
	Journalist Grade S29			
	Journalist Grade S41			
	Anchor/Presenter			
Translators, Interpreters and other Linguists	Simultaneous Interpreters Grade N41			
	Translators			
	Interpreters			
	Philologist			
	Lexicographer			
	Sign Language Interpreter			
	Subtitler			
	Language Planner Grade S41			
	Interpreter Grade LA29			
	Interpreter Grade LA19			
	Language Writer			
	Specific Text Translation and Management			
	Text Translation			

J582: SOFTWARE PUBLISHING

Job Area	Job Titles	Skilled Workers (S)	Semi-Skilled Workers (SS)	Low Skilled Workers (LS)
Graphic Design	Designer Grade B41			
	E-Commerce Web Designer			
	Designer Grade B43			
	Designer Grade B47			
	Designer Grade B51			
	Designer Grade B53			
	Graphic Designer (desktop publishing, Typographical Designer			
	CTP (Creative to print)			
	UI/ UX Designer			
	Creative Director			
Interactive Media Designer	Website Designer/Developer			
	Internet / Intranet Developer			
	Website Architect			
	Webmaster			
	Website Administrator			
	Interface (UI)/User Experience (UX) Front-end Developer			
	Full Stack Developer			
	E-Commerce Website Developer			
	Front-End Developer			

	Web and Mobility Developer			
	User Experience Engineer			
	Web Application Developer			
	Social Media Designer			
	Creative Content Development			
	Interactive Multimedia Design			
	Audio Production			
	Concept Design			
	Database Administrator			
	Voice Over (VO)			
Animation & Visual Effects Professional	Layout Artist			
	3D Animator			
	2D Animator			
	CG Modeller			
	3D Modeller			
	Match Move Artist/3D Tracker			
	Lighting Artist			
	Render Wrangler			
	Roto Artist			
	Compositor/Composite artist			
	Storyboard Artist			
	Scriptwriter / Screenwriter			
	Effects/FX Artist			
	Graphic Artist			
	Designer Artist			
	Digital Artist			
	Illustrator			
	Visualizer			
	Desktop Publishing Artist (Animation)			
	Multimedia Artist			
	Graphics Illustrator			
	Technical Illustrator			
	Cell Animator			
	Web Animator			
	Visualisation Specialist			
	Computer Specialist			
	Story Content Writer			
	3D Designer			
	Content Writer/Creator			
	3D Generalist			
	Content Developer			
	Content Analyst			
	Content Moderator			
	Digital Content Writer			
	Visual Art			
	Video Editor			
	Stop Motion Animator			
	Background Painter			
	Colour Key Artist			
	Compositing Artist			
	Concept Artist			
	Digital Painter			
	Effect Animator			
	Forensic Animator			

	Inbetweener			
	Storyboard Artist			
	Texture Artist			
	Visual Development Artist			
	Render Wranglers			
	Rigging Artist			
	Mocap Artist			
	Texture artist			
	Motion Graphic Designer			

Job Area	Job Titles	Skilled Workers (S)	Semi-Skilled Workers (SS)	Low Skilled Workers (LS)
Computer Games	Game Designer (Digital)			
	Level Designer (Digital			
	QA Tester/Game Tester (Digital)			
	Game Producer (Digital)			
	Game Director (Digital)			
	3D Artist			
	2D Artist			
	Animator			
	Concept Artist			
	Technical Artist			
	Art Director			
	Game Programmer (Digital)			
	Tools Programmer (Digital)			
	Engine Programmer (Digital)			
	Graphics Programmer			
	Computer Graphics and Sound Artist			
	Graphics Creator			
	Group Lead Artist Graphic			
	Video Game Artist			
	Computer Graphics (CG) Artist			
	Visual Effects Artist			
	Animation Supervisor			
	Creative Artist			
	Digital Game Artist			
	2D Game Visual Art			
	3D Game Art Development and Management			
	3D Game Art Production and Development			
	3D Game Asset Production			
	Game Design Management			
	Advanced Game Programming			
	Game Programming			
	Animation Director			
	Asset Artist			
	Character Artist			
	Environment Artist			

References:
MASCO 2020, MSIC 2008
National Occupational Skills Standard (NOSS) Registry 23 Jun 2021
Malaysian Qualification Framework (MQF), 2017

3: INDUSTRIAL REVOLUTION SKILLS

Emerging Skills are skills that are predicted to be imperative to the industry in the near future based on the recent development, trend or study.

3.1 Do you think Industry Revolution 4.0 (IR4.0) would have an impact on on the economic activities of Publishing Activities?

[   ] Yes   [   ] No   [   ] Not Sure

3.2 Listed below are the eleven (11) technology drives/pillars of IR 4.0. Which job area is likely to be affected by these 11 technology drives/pillars of IR 4.0?

Tick (√) where applicable; you may tick more than once.

No	Technology Drives/ Pillars	Job Areas						
		Book Publishing			Software Publishing			
		Authors/ Writers	Journalist	Translators	Graphic Design	Interactive Media	Animation	Comp Games
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)							

No	Technology Drives/ Pillars	Job Areas						
		Book Publishing			Software Publishing			
		Authors/ Writers	Journalist	Translators	Graphic Design	Interactive Media	Animation	Comp Games
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	**Cyber security** (with the increased connectivity and use of standard communications protocols, the need to protect critical industrial systems and manufacturing lines from cyber security 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)							

No	Technology Drives/ Pillars	Job Areas						
		Book Publishing			Software Publishing			
		Authors/ Writers	Journalist	Translators	Graphic Design	Interactive Media	Animation	CompGames
10	**Horizontal and Vertical Integration** Horizontal: Integrate through network & value chain from Suppliers, the company itself, and the customers. Vertical: Integrate through network & value chain across functional departments i.e., Sales, R&D, Procurement until customer services							
11	**New Business Models** Business model is a combination of two functions: the process of value creation and the process of value capture. The process of value creation refers to the process of creating value for the target consumer. The process of value capture refers to converting market opportunities into performance outcomes for the firm, which then justifies value creation							

References:
National Fourth Industrial Revolution (4IR) Policy (2020)

3.3 Table below shows the list of important prerequisites and skills required in order to equip the workforce for IR4.0. Select prerequisites and skills that are relevant to the job area.

Qualifications and Skills to Have for Industry 4.0 (Aulbur et.al, 2016)

No	Qualifications & Skills	Description
1	Knowledge about ICT	▪ Basic Information Technology knowledge ▪ Ability to use and interact with computers and smart machines like robots, tablets etc. ▪ Understanding machine to machine communication, IT security & data protection
2	Ability to work with data	▪ Ability to process and analyse data and information obtained from machines ▪ Understanding visual data output & making decisions ▪ Basic statistical knowledge
3	Technical Know-How	▪ Inter-disciplinary & generic knowledge about technology ▪ Specialized knowledge about manufacturing activities and processes in place ▪ Technical know-how of machines to carry out maintenance-related activities
4	Personal Skills	▪ Adaptability & ability to change ▪ Decision making ▪ Working in team ▪ Communication skills ▪ Mind-set change for lifelong learning
5	Cultural Skills	▪ Demonstrate procedure to handle apparatus/technology

Tick (√) where applicable, you may tick more than once.

No	Job Areas	Prerequisite and Skills for IR 4.0				
		Knowledge about ICT	Ability to work with data	Technical Know-How	Personal Skills	Cultural Skills
J581: Publishing Of Books, Periodicals and Other Publishing Activities						
1	Author/ Editorial and Related Writers					
2	Journalist					
3	Translators, Interpreters and other Linguists					
J582: Software Publishing						
1	Graphic Design					
2	Interactive Media Designer					
3	Animation & Visual Effects Professional					
4	Computer Games					

References: *Aulbur, W., Arvind, C, Rishi, B. ((2016). WHITEPAPER Skill Development for Industry 4.0. Roland Berger.*

SECTION 4: RELATED ISSUES

Tick (√) where applicable, you may tick more than one.

4.1 Skill Related Challenges Companies Will Face with Industry 4.0

No	Key Issues	Book Publishing	Software Publishing
1.	Up-skilling		
2.	Re-skilling		
3.	Cross-skilling		
4.	Continuous Learning		
5.	Mind-set change		
6.	Demand supply mismatch		
7.	Lack of access		
8.	Lack of industrial training		
9.	Lack of opportunities/ support		
10.	Lack of resources		
11.	Insufficient Manpower		
12.	Low skilled and low-performance workforce		
13.	High dependency on foreign labour		
14.	Labour cost (sub-contractors)		
15.	Rapid Technological Change		
16.	The gap between technology and skills		
17.	Extra Working Hours		
18.	Economic Conditions		
19.	Underpayment of wages lead to high turn over		
	Others, please specify:		

4.2 What is/are the solution/s for the skills gap that would you recommend?

No	Solutions	Book Publishing	Software Publishing
1.	Training / retraining		
2.	Upgrade trainer qualification		
3.	Review employment policy (e.g. enhance skilled workers' incentives)		
4.	Review skills training curriculum		
5.	Formal mentoring and/or coaching		
6.	Upskilling / reskilling		
7.	Acknowledgement and recognition		
8.	Career path development programme		
9.	Continuous learning and training		
10.	Increase salary and emoluments (bonus, increment, allowance or promotion)		
	Others, please specify:		

4.3 Please give your expert opinion on the future scenario in this sector.

a. What sort of training or courses are critically needed in this sector to remain competitive in the industry?

b. What sort of technological changes is going to pose threats to the industry in the next 5-10 years?

c. Other related issues that you want to highlight.

*** *End of Survey* ***
Thank you.

ANNEX 4: LIST OF CRITICAL JOB TITLES

LIST OF CRITICAL JOB TITLE

No	Critical Job Title	Area/ Sub-Area	Level	LS	SS	S
1	Editor	Authors/ Writers	6	X	X	√
2	Text Translator	Text Translator	6	X	X	√
3	Lead Web Designer	Web Designer	6	X	X	√
4	Lead Web Developer	Web Developer	6	X	X	√
5	Lead App Designer	App Designer	6	X	X	√
6	Lead App Developer	App Developer	6	X	X	√
7	Lead 2D/3D Animator	2D/3D Animator	6	X	X	√
8	Lead CG Modeller	CG Modeller	6	X	X	√
9	Lead Game Programmer	Video Game Programming	5	X	√	X
10	Engine Programmer	Video Game Programming	5	X	√	X
11	Game Production Manager	Video Game Production	5	X	√	X
12	Gameplay Designer	Video Game Design	4	X	√	X
13	Game Programmer	Video Game Programming	4	X	√	X
14	Assistant Game Programmer	Video Game Programming	3	√	X	X
15	Lead 3D Game Artist	3D Game Art	5	X	√	X
16	Senior Concept Artist	2D Game Art	4	X	√	X
17	Senior 2D Game Artist	2D Game Art	4	X	√	X
18	Senior 3D Game Artist	3D Game Art	4	X	√	X
19	Assistant Concept Artist	2D Game Art	3	√	X	X
20	Assistant 2D Game Artist	2D Game Art	3	√	X	X
21	Assistant 3D Game Artist	3D Game Art	3	√	X	X

ANNEX 5: JOB TITLES RELEVANT TO INDUSTRIAL REVOLUTION

JOB RELATED TO IR4.0

No	Job Related to IR4.0	Area/ Sub-Area	Level
1	Editor	Editorial	6
2	Fiction Author/Writer	Authors/Writer	6
3	Non-Fiction Author/Writer		6
4	Text Translator	Text Translation	6
5	Journalist	Journalist	6
6	Senior News Editor	News Editor	6
7	Lead Web Designer	Web Designer	6
8	Lead Web Developer	Web Developer	6
9	Lead App Designer	App Designer	6
10	Lead App Developer	App Developer	6
11	Lead 2D/3D Animator	2D/3D Animator	6
12	Lead Game Programmer	Video Game Programming	5
13	Engine Programmer		5
14	Game Programmer		4
15	Assistant Game Programmer		3
16	Gameplay Designer	Video Game Design	4
17	Game Level Designer		4
18	Senior Concept Artist	2D Game Art	4
19	Senior 2D Game Artist		4
20	Assistant Concept Artist		3
21	Assistant 2D Game Artist		3
22	Lead 3D Game Artist	3D Game Art	5
23	Senior 3D Game Artist		4
24	Assistant 3D Game Artist		3
25	Lead UI/UX Artist	User Interface/User Experience (UI/UX)	5
26	Senior UI/UX Artist		4
27	Assistant UI/UX Artist		3

ANNEX 6: OCCUPATIONAL DESCRIPTION (OD)

SECTION **:** **(J) INFORMATION AND COMMUNICATION**

DIVISION **:** **(58) PUBLISHING ACTIVITIES**

GROUP **: (581) PUBLISHING OF BOOKS, PERIODICALS AND OTHER PUBLISHING ACTIVITIES**

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**581**
AREA	:	**EDITORIAL**
JOB TITLE	:	**EDITOR**
LEVEL	:	**6**

Responsibilities:
1. Modify written material for publication, draft and implement editorial policy.
2. Point out that the content of publications or news items
3. Manage the production of publications and the staff involved.

Knowledge:
1. Candidates with other backgrounds who can show strong writing skills also may find jobs as editors.
2. Editors who deal with the specific subject matter may need related work experience.
3. For example, fashion editors may need expertise in fashion that they gain through formal training or work experience
4. Those who are particularly skilled at identifying good stories, recognising writing talent, and interacting with writers may be interested in editing jobs.

Skills:
1. Creativity.
2. Detail oriented.
3. A good grasp of narrative.
4. Good judgment.
5. Interpersonal skills.
6. Language skills.
7. Writing skills.

Attributes (Attitude/Safety/Environmental):
1. Good appreciation of what working within the advertising industry involves.
2. Good understanding of what working within the advertising industry involves.
3. Excellent self-motivation.
4. Commercial awareness.
5. Ability to work well under pressure and meet deadlines

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**581**
AREA	:	**TEXT TRANSLATION**
JOB TITLE	:	**TEXT TRANSLATOR**
LEVEL	:	**6**

Responsibilities:
1. Provide accurate translations of texts.
2. Attend meetings to translate discussions.
3. Continually take language fluency assessments to certify fluency.
4. Liaise with colleagues to ensure that translations are true to the original meaning.

Knowledge:
1. Must be fluent in at least two languages.
2. Proof of language fluency.
3. Must have prior experience doing translations.
4. A high school qualification or equivalent.

Skills:
1. Using dictionaries and thesauruses to find the exact words
2. Using Translation Memory software
3. Management of time to complete documents
4. Working with people from different cultural backgrounds and industries

Attributes (Attitude/Safety/Environmental):
1. Good appreciation of what working within the advertising industry involves.
2. Good appreciation of what working within the advertising industry involves.
3. Excellent self-motivation.
4. Commercial awareness.
5. Ability to work well under pressure and meet deadlines

SECTION   :   (J) INFORMATION AND COMMUNICATION

DIVISION   :   (58) PUBLISHING ACTIVITIES

GROUP   :   (582) SOFTWARE PUBLISHING

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**INTERACTIVE MULTIMEDIA (WEB DESIGNER)**
JOB TITLE	:	**LEAD WEB DESIGNER**
LEVEL	:	**6**

Responsibilities:
1. Lead the design efforts of client external websites
2. Work with internal online team, marketing team and external creative agencies to drive the look and feel of client sites

Knowledge:
1. Master the craft of enhancing user experience (UX) and user interface (UI).
2. Master colour psychology, grid systems, and web fonts to design websites that are visually appealing and which are responsive to all kinds of devices.
3. Experience in using Adobe Software

Skills:
1. Digital communication skills
2. Imagination
3. Creativity
4. Patience
5. Attention to detail
6. Analytical skills
7. Communication skills
8. Technical ability
9. Excellent IT skills
10. SEO knowledge

Attributes (Attitude/Safety/Environmental):
1. Designing engaging and responsive landing pages.
2. Integrating client CMS programs and data feeds into websites.
3. Employing industry and design best practices through the website build process.
4. Conducting website testing.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**INTERACTIVE MULTIMEDIA (WEB DEVELOPER)**
JOB TITLE	:	**LEAD WEB DEVELOPER**
LEVEL	:	**6**

Responsibilities:
1. Oversees the daily operation of the company's website.
2. Identifies and evaluates potential risks and mitigates.
3. Manage website content, features and functionality for each department.

Knowledge:
1. Master in HTML5, CSS3 and JavaScript
2. Working in a fast-paced and collaborative environment, and will be driven to help push web development initiatives.
3. Work experience as a Senior Web Developer.

Skills:
1. Expertise in at least one programming language, preferably Javascript, Ruby or PHP.
2. Solid knowledge of HTML/CSS.
3. Experience with mockup and UI prototyping tools.
4. Understanding of security practices.
5. Familiarity with network diagnostics tools.
6. Team management skills.

Attributes (Attitude/Safety/Environmental):
1. Artist Vision
2. Critical Thinking
3. Flexibility and Adaptability
4. Active Questioner
5. Attention to Detail

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**INTERACTIVE MULTIMEDIA (MOBILE APPLICATION)**
JOB TITLE	:	**LEAD APP DESIGNER**
LEVEL	:	**6**

Responsibilities:
1. Creating information for web pages and online marketing.
2. Talking through requirements with clients
3. Testing software and fixing problems
4. Maintaining systems
5. Technical designing

Knowledge:
1. Master in UI/UX.

Skills:
1. Digital communication skills
2. Written and verbal skills
3. Product Management.
4. Agile Methodologies and Scrum Management.
5. User Interface and User Experience.
6. Design.
7. Business Analysis.
8. Communication.
9. QA and Performance Testing

Attributes (Attitude/Safety/Environmental):
1. Identifies a target demographic
2. Encourages user engagement
3. Beautiful UI Design
4. Use of Familiar Screens

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**INTERACTIVE MULTIMEDIA (MOBILE APPLICATION)**
JOB TITLE	:	**LEAD APP DEVELOPER**
LEVEL	:	**6**

Responsibilities:

1. Designing, building and configuring applications to meet business process and application requirements.
2. Directing the development team in the design, development, coding, testing and debugging of applications.
3. Writing testable, scalable and efficient code and leading code.

Knowledge:

1. Master in HTML 5, Java, Application Programming Interface (API) and CSS.

Skills:

1. Digital communication skills
2. Written and verbal skills
3. Strategic thinking skills
4. Proficiency with content management software
5. Basic knowledge of HTML
6. Good Communication skills

Attributes (Attitude/Safety/Environmental):

1. Have a great idea. Behind every great app is a great idea.
2. Identifies a Target Demographic.
3. Encourages User Engagement.
4. Beautiful UI Design.
5. Frictionless Navigation Feature.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**INTERACTIVE MULTIMEDIA (ANIMATION)**
JOB TITLE	:	**LEAD 2D/3D ANIMATOR**
LEVEL	:	**6**

Responsibilities:

1. Development skills to create, test, and develop applications on mobile devices.

2. Support role across other platforms

3. Creating graphics, using photos, and working on web page layout.

Knowledge:

1. Master in 2D animation and computer graphics

2. Ability to visualise abstract concepts, storyboarding, drawing ability, artistic mindset, visual storytelling, draw in a variety of styles and genres.

Skills:

1. Digital communication skills
2. App design.
3. Software design.
4. Coding.
5. Native app writing ability.
6. Backend web services knowledge.
7. Knowledge of UX and UI.
8. Unit tests, automation, and code reviews.
9. Creativity and brainstorming.

Attributes (Attitude/Safety/Environmental):

1. Creative mind and a strong visual imagination.

2. An eye for detail and good colour vision.

3. The ability to draw, make models and/or use computer graphics software.

4. Patience and stamina - the work is painstakingly detailed, and you may need to work long hours to meet deadlines.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**INTERACTIVE MULTIMEDIA (ANIMATION)**
JOB TITLE	:	**LEAD CG MODELLER**
LEVEL	:	**6**

Responsibilities:

1. Help create and design accurate and efficient models.

2. Oversee a team of CG artists producing assets for shots in a commercial pipeline.

3. Complete visually stunning and photo-real visual effects for high-end advertising

Knowledge:

1. Master in Modelling Software, 2D Software, 3D Modelling, Compositing Visuals, Texturing, Sculpting and Image Editing.

2. Topology knowledge

3. Model Optimisation

4. Image Editing, UV mapping

Skills:

1. Agile Problem-Solving
2. Business acumen
3. Creative
4. Critical thinking
5. Strong Communication
6. Team building
7. Anatomy & Articulation Knowledge
8. Resourcefulness
9. Storytelling Skills
10. Teamwork/Working with others

Attributes (Attitude/Safety/Environmental):

1. Ability to create moderate to complex and organic models, characters, props and environments.

2. Good understanding of modelling with either Polygons or NURBS

3. Artistic talent and technical skills

4. A good eye for detail

5. Networking skills and commitment to projects through previous work experience

6. Multitasking - the flexibility to switch between several projects at once.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM (VIDEO GAME PROGRAMMING)**
JOB TITLE	:	**LEAD GAME PROGRAMMER**
LEVEL	:	**5**

Responsibilities:

1. Manage programmers on the team and help them meet their development goals
2. Create technical design and maintain design documents
3. Build and self-manage the programming task schedules and define the development milestones
4. Collaborate with other leads within the team on game features
5. Implement game features and systems

Knowledge:

1. Fairly good knowledge of game design, computer science, digital media or business.

Skills:

1. Very strong skills in C, C++ and Object-Oriented Programming.
2. Strong analytical skills.
3. Should be familiar with performance bottlenecks and ways to resolve them, multi-threading, OS concepts, System programming,
4. Very strong debugging skills.
5. Excellent communication skills.
6. Strong reporting and documentation skills.

Attributes (Attitude/Safety/Environmental):

1. Strong Leadership Skills.
2. Excellent Communication Skills.
3. A Strong Knowledge of Manufacturing Standards.
4. Health & Safety Procedures.
5. Exceptional Organisation Skills

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME PROGRAMMING)
JOB TITLE	:	**ENGINE PROGRAMMER**
LEVEL	:	**5**

Responsibilities:

1. Create new functionality in the engine and rewrite the existing systems to make them as efficient as possible.

2. Figure out how to create the best engine for that particular game when a new game is being devised.

Knowledge:

1. Programming languages
2. Industry-standard software
3. Calculus, algebra and statistical theory
4. Knowledge of games engines and platforms: understand graphic integration, collision, detection, data transformation, database management
5. Expert knowledge of technical and software advancements in the gaming industry
6. Knowledge of gaming genres and trends
7. Knowledge of high-end coding languages

Skills:

1. Creative Problem-solving skills
2. Familiar with the game production pipeline process
3. Interpersonal skills to deal with creative and production teams
4. Team player, ability to work independently
5. Good communication skills

Attributes (Attitude/Safety/Environmental):

1. Analytical mindset
2. Passion for video games and experience with gaming
3. Able to keep on schedule and meet deadlines
4. Spot problems with the game engine and find solutions
5. Listen to the people working on the game, understands their problems, share the solutions and write technology documentation

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM (VIDEO GAME PRODUCTION)**
JOB TITLE	:	**GAME PRODUCTION MANAGER**
LEVEL	:	**5**

Responsibilities:

1. Manage the business and marketing side of game development, including budget management and contract negotiation.
2. Manage the development team.

Knowledge:

1. A fairly good knowledge of game design, computer science, digital media or business would be a benefit in this profession.

Skills:

1. Digital communication skills
2. Stress and change management skills.
3. Time and priority management skills.
4. Problem-solving skills.
5. Ability to adapt to different personalities.
6. Excellent Communication Skills.
7. Good listening skills
8. Professionalism.
9. Project management skills.
10. Strong Leadership skills.
11. Organisation Skills

Attributes (Attitude/Safety/Environmental):

1. Health & Safety Procedures.
2. Clarity, Courage.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM (VIDEO GAME DESIGN)**
JOB TITLE	:	**GAMEPLAY DESIGNER**
LEVEL	:	**4**

Responsibilities:

3. Design and develop the original concept, construct level structure
4. Write storyline, character bios, dialogue, plot points, game objective
5. Storyboard the action of the game
6. Conceive every element of the game including rules, setting, objects, vehicles, weapons, flora, fauna, etc,
7. Direct action sequences, define the user interface, menus and controls
8. Generate the Game Design Document (GDD)
9. Knowledge of 2D and 3D animation software.

Knowledge:

1. In-depth knowledge of full lifecycle game programming and related technologies.
2. Highly proficient in programming languages, such as C++ and Java.
3. Superb analytical and problem-solving skills.
4. Excellent communication and collaboration abilities.
5. Great organisational and time management skills.
6. Ability to contribute to innovation in game design.
7. Technical knowledge
8. Solid knowledge of the gaming industry, how games work and the latest trends

Skills:

1. Creativity - designing the world of the game, characters, storyline, visual style
2. Strong analytical mind
3. Programming skills
4. Good communication skills
5. Leadership skills

Attributes (Attitude/Safety/Environmental):

1. Focus - the ability to think about the big picture while dealing with the daily production issues that arise.
2. Passion for video games and experience with gaming.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM (VIDEO GAME PROGRAMMING)**
JOB TITLE	:	**GAME PROGRAMMER**
LEVEL	:	**4**

Responsibilities:
1. Developing and implementing game software
2. Ensuring that the game design is fully implemented and performs as expected
3. Creating unit tests and validation procedures, and documenting technical specifications
4. Working closely with a lead game developer to create task/project deliverables
5. Interface with Quality Assurance, Game Producers, Game Designers, Artists, Mathematicians, and Sound Designers

Knowledge:
1. In-depth knowledge of full lifecycle game programming and related technologies.
2. Highly proficient in programming languages, such as C++ and Java.
3. Superb analytical and problem-solving skills.
4. Excellent communication and collaboration abilities.
5. Great organisational and time management skills.
6. Ability to contribute to innovation in game design.
7. Knowledge of 2D and 3D animation software.

Skills:
1. Creative, imaginative and original.
2. Be fluent in a number of software packages.
3. Understanding the market and target audience for video games.
4. problem-solving skills.
5. Storytelling ability.
6. Excellent communication and presentation skills.

Attributes (Attitude/Safety/Environmental):
1. Familiar with the game production pipeline process.
2. Passion for video games and experience with gaming.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM (VIDEO GAME PROGRAMMING)**
JOB TITLE	:	**ASSISTANT GAME PROGRAMMER**
LEVEL	:	**3**

Responsibilities:
1. Help game programmers develop the software to create video games.
2. Help game programmers to write code for custom software to support the unique requirements of games.
3. Help game programmers to design games.

Knowledge:
1. Fairly good knowledge of character design, scenery design, and user interface design would benefit in this profession.
2. Knowledge of 2D and 3D animation software.

Skills:
1. Creative, imaginative and original.
2. Be fluent in a number of software packages.
3. Understanding the market and target audience for video games.
4. problem-solving skills.
5. Storytelling ability.
6. Excellent communication and presentation skills.

Attributes (Attitude/ Safety/Environmental):
1. Familiar with the game production pipeline process.
2. Passion for video games and experience with gaming.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME VISUAL ART- 3D GAME ART)
JOB TITLE	:	**LEAD 3D GAME ARTIST**
LEVEL	:	**5**

Responsibilities:

1. Managing, rallying and developing a 3D/2D artists team

2. Overseeing and organising the art production to meet the requirements in terms of quality of the project while respecting technical, time and budget constraints,

3. Building up the art direction for the project by working closely with the Art Director and the Technical Artist

4. Participating with the Lead Developers and the Technical Artist to develop the pipeline and the tools needed to complete successfully the art production

5. Creating 3D and 2D assets

Knowledge:

1. In-depth knowledge of full lifecycle game programming and related technologies.
2. Highly proficient in programming languages, such as C++ and Java.
3. Ability to contribute to innovation in game design.
4. Good knowledge of 3Ds Max, Zbrush, Photoshop
5. Working knowledge of normal mapping and the different methods of creating them is preferred.
6. Knowledge of the technical constraints relating to real-time, the 3D engines, and level editors.

Skills:

12. Superb analytical and problem-solving skills.
13. Excellent communication and collaboration abilities.
14. Great organisational and time management skills.
15. Strong modelling, UVing and texturing skills are required.

Attributes (Attitude/Safety/Environmental):

1. Ability to work in a team, with good leadership skills and to delegate work accordingly.

2. Excellent interpersonal and communication skills with team members of different departments.

3. Must be creative, detail-oriented and able to handle multiple projects under pressure

4. Passion for videogames and extensive knowledge of different game genres across all platforms

5. Self-motivated and proactive

6. Positive attitude and a genuine team player

7. Ability to take direction well

8. Ability to work on different artistic styles.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME VISUAL ART- 2D GAME ART)
JOB TITLE	:	**SENIOR CONCEPT ARTIST**
LEVEL	:	**4**

Responsibilities:

1. The style and look of a game.

2. Draw the environments, enemies and player characters.

3. Working with a brief from the producer

Knowledge:

1. Fairly good knowledge of technical ability to effectively use computer software packages and tools such as ZBrush, Maya, 3DS Max, Substance Painter, Mudbox, and Photoshop would be a benefit in this profession.

Skills:

1. Good communication skills
2. Teamwork skills
3. Strategic thinking skills
4. Ability to calmly problem-solve issues
5. Analytical skills
6. Skill set up to date and learn about new software.
7. Creative thinking and bringing a new perspective to the workplace.
8. Communicate effectively with teams.

Attributes (Attitude/Safety/Environmental):

1. Work collaboratively with other game artists.
2. Ensure artwork follows the agreed project style.
3. Ability to work both independently and with a team.
4. Attention to detail.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	**:**	**582**
AREA	**:**	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME VISUAL ART- 2D GAME ART)
JOB TITLE	**:**	**SENIOR 2D GAME ARTIST**
LEVEL	**:**	**4**

Responsibilities:

1. Drawing sprites and textures for the characters, environments and effects.
2. Develops gaming systems, interfaces, controls, and other interactive elements of a game

Knowledge:

1. Fairly good knowledge of 2D software, 3D animation, Compositing visuals and concept creation.
2. Knowledge of lighting, perspective, material finishes and special effects.
3. Solid knowledge of game genres and the latest trends in gaming.

Skills:

1. Digital communication skills
2. Agile Problem-Solving
3. Creative
4. Critical & Analytical Skills
5. Strong Communication
6. Team building
7. Time Management
8. Strong drawing skills, ability to visualise and design from abstract ideas.

Attributes (Attitude/Safety/Environmental):

1. Training in-game art and animation.
2. Cinematic eye for lighting and shading.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME VISUAL ART- 3D GAME ART)
JOB TITLE	:	**SENIOR 3D GAME ARTIST**
LEVEL	:	**4**

Responsibilities:

1. Create realistic 3D models and textures including architecture, organic objects and props in accordance with the artistic direction, production deadlines and technical specifications.
2. Sculpt/model UV & texture and integrate both high & low polygon meshes in a PBR pipeline.
3. Verify the quality of objects in the game, and make improvements where necessary to fit technical constraints and artistic direction
4. Responsibility in mentoring and training other 3D artists.

Knowledge:

1. In-depth knowledge of full lifecycle game programming and related technologies.
2. Highly proficient in programming languages, such as C++ and Java.
3. Familiarity with the game development cycle.
4. Good understanding of architecture.
5. Knowledge of Python, MEL, MAX Script an asset
6. Knowledge of a programming language
7. Expert knowledge of 3DSMax.
8. Expert knowledge of Photoshop.
9. Expert knowledge of ZBrush and Substance Painter.
10. Excellent knowledge of real-time modelling techniques (shaders, PBR, normal, displacement etc.)

Skills:

1. Great organisational and time management skills.
2. Excellent communication and collaboration abilities.
3. Superb analytical and problem-solving skills.
4. Strong portfolio showing 3D art skills and demonstrating a high level of artistic creativity.
5. Strong high & low resolution modelling and texturing skills.
6. Good organisation skills.
7. Strong time management skills.

Attributes (Attitude/Safety/Environmental):

1. Ability to contribute to innovation in game design.
2. Ability to work in a team with good leadership skills and to delegate work accordingly.
3. Excellent interpersonal and communication skills with team members of different departments.
4. Creative, detail-oriented and able to handle multiple projects under pressure
5. Passion for videogames and extensive knowledge of different games

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME VISUAL ART- 2D GAME ART)
JOB TITLE	:	**ASSISTANT CONCEPT ARTIST**
LEVEL	:	**3**

Responsibilities:
1. Propose the style and look of a game.
2. Generate a multitude of ideas and sketch environments, props, characters and creatures convincingly.
3. Create expressive concept art on par with the quality of the concept art.
4. Research and collect visual material to define and improve the visual style and contents of the game.
5. Consider the gameplay implications of the design and the overall player experience.

Knowledge:
1. Fairly good knowledge of technical ability to effectively use computer software packages and tools such as ZBrush, Maya, 3DS Max, Substance Painter, Mudbox and Photoshop
2. Very good illustration and storytelling skills with an eye for perspective, colour, lighting, mood and composition;

Skills:
1. Strong use of research and reference material in idea generation and problem-solving;
2. Good communication skills
3. Strategic thinking skills
4. Ability to calmly problem-solve issues
5. Teamwork
6. Analytical skills
7. Skill set up to date and learn about new software.
8. Work collaboratively with other game artists.
9. Ensure artwork follows the agreed project style.

Attributes (Attitude/Safety/Environmental):
1. Ability to drive any environment sketch to photorealistic illustration;
2. Good sense of form, shape, silhouette, scale and surface materials;
3. Creative thinking and bringing new perspectives to the workplace.
4. Communicate effectively with teams.
5. Ability to work both independently and with a team.
6. Attention to detail.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME VISUAL ART- 2D GAME ART)
JOB TITLE	:	**ASSISTANT 2D GAME ARTIST**
LEVEL	:	**3**

Responsibilities:
1. Create art in a wide range of styles, from realistic to cartoon, from start concept to implementation in the game.
2. Conceptualize, design, and create stunning (2D) in-game visual effects (l, texturing, animating, lighting, shaders, etc.) by using available tools in a real-time engine.
3. Create high-quality texture content for the game world (textures and other related maps or images for mapping on 3D objects).
4. Create character concepts, environments and backgrounds.
5. Create game interface and menus

Knowledge:
1. Fairly good knowledge of 2D software, 3D animation, Compositing visuals and concept creation.
2. Experience with 3D tools, texturing in both Low and High poly
3. Knowledge of lighting, perspective, material finishes and special effects.
4. Solid knowledge of game genres and the latest trends in gaming.

Skills:
1. Animation skills (2D mostly, 3D a real plus).
2. Working Unity experience.
3. Texture painting skills.
4. Strong drawing skills, ability to visualise and design from abstract ideas.

Attributes (Attitude/Safety/Environmental):
1. Cinematic eye for lighting and shading.

OCCUPATIONAL DESCRIPTION

MSIC GROUP	:	**582**
AREA	:	**COMPUTER GAMES FOR ALL PLATFORM**
		(VIDEO GAME VISUAL ART- 3D GAME ART)
JOB TITLE	:	**ASSISTANT 3D GAME ARTIST**
LEVEL	:	**3**

Responsibilities:
1. Defining the game art style while respecting the initial creative direction.
2. Conveying expectations in terms of quality and content (settings, environments, characters) to the graphics team (concept artists, environment artists, character model artists) using relevant visual references
3. Set high-quality standards.
4. Monitoring and approving work done by the graphics team so that the elements produced respect the vision of the game and meet quality standards.

Knowledge:
1. In-depth knowledge of full lifecycle game programming and related technologies.
2. Highly proficient in programming languages, such as C++ and Java.
3. Expert knowledge of 3DSMax.
4. Expert knowledge of Photoshop.
5. Expert knowledge of ZBrush and Substance Painter.
6. Excellent knowledge of real-time modelling techniques (shaders, PBR, normal, displacement etc.)
7. Knowledge of Python, MEL, MAX Script an asset
8. Knowledge of a programming language
9. Familiarity with the game development cycle.
10. Good understanding of architecture.

Skills:
1. Superb analytical and problem-solving skills.
2. Excellent communication and collaboration abilities.
3. Great organisational and time management skills.
4. Strong portfolio showing 3D art skills and demonstrating a high level of artistic creativity.
5. Strong high & low resolution modelling and texturing skills.
6. Excellent interpersonal and communication skills with team members of different departments.

Attributes (Attitude/Safety/Environmental):
1. Ability to contribute to innovation in game design.
2. Ability to work in a team with good leadership skills and to delegate work accordingly.
3. Creative, detail-oriented and able to handle multiple projects